The Value of Using Rapid Rural Appraisal Techniques to Generate and Record Indigenous Knowledge: The case of indigenous vegetables in Uganda.

By

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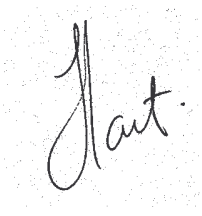
DECLARATION

I the undersigned hereby declare that the work contained in this thesis is my own original work and has not previously in its entirety or in part been submitted at any university for a degree.



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ABSTRACT

In recent decades increasing attention has been paid to the idea of sustainable development and in particular to sustainable agricultural practices. Studies in the seventies, eighties and nineties indicated that many resource-poor farmers were practising low external input sustainable practices by virtue of their resource-poor status. Despite this status these farmers were developing sustainable practises that enabled them to survive even the harshest conditions. It was believed that an understanding of their local practices and associated knowledge, called indigenous technical knowledge by conventional scientists, could provide agricultural development workers with a greater understanding of how to achieve sustainable agricultural development. This awareness would ensure the optimal and sustainable use of local livelihood sources. Following this interest a number of complementary research methods were developed to generate and record indigenous knowledge. Many of these methods fall within the participatory research paradigm of the Social Sciences. Using one of the earlier complementary methods, Rapid Rural Appraisal (RRA), this study considers its value as a method to collect indigenous knowledge about the local cultivation and use of indigenous vegetables in a parish in Uganda. The basic RRA tools are described and the position of RRA within the participatory research paradigm is discussed, indicating that the method probably has a lower-middle of the road position when placed on a continuum of participation. In this study the use of the method enabled the generation of information relating to the context in which agriculture was practised in the parish; specifically the production and use of plants known as indigenous vegetables. At the same time the tools enabled a broad understanding of indigenous knowledge regarding the production, associated practises and beliefs, as well as the use of indigenous vegetables in the parish. This information included technical and socio-cultural information indicating that indigenous knowledge is not only about technical knowledge. In recent years debate has emerged with regard to the value, use and misuse of indigenous knowledge. The debate has questioned the ability of various participatory complementary methods to accurately generate and record this knowledge. One of the main concerns is that most of these methods, like those associated with the quantitative and qualitative paradigms, tend to have inherent biases which detract from their value. Reflection

on the use of RRA in the Ugandan study indicated that it was subject to a number of contextual constraints, namely: the assumption and treatment of indigenous knowledge as a stock of knowledge which can neatly conform to scientific categorisation; the unawareness of the powerladen interactions in which knowledge is generated; the consequences of local power struggles on the generation of knowledge; the significance that the presence of researchers during the knowledge generating process has on the resultant knowledge; the relevance of the time, timing and location where knowledge is generated; and the effect that local social differences, such as gender, age, wealth, class, etc. have on who has access to what sort of knowledge. More recently developed and refined methods such as Participatory Rural Appraisal (PRA) and Participatory Technology Development (PTD) include some tools and strategies that overcome some of these constraints. However, these methods are often subject to similar constraints, given the context in which they are used. In the final analysis, the use of the RRA method in Uganda is considered to be a useful tool for collecting contextual data and indigenous knowledge given the circumstances in which it was used. These circumstances included financial constraints, a lack of skills in the complementary methods within the research team, insufficient time and other resources. These hindrances are common in many agricultural development contexts. Based on the results of the study it is recommended that where circumstances permit it, participatory methods such as PRA and PTD should be used. However, users must remain aware that these methods can suffer from some contextual constraints if they are not used with care and if this use is not regularly reflected upon. Despite a number of shortcomings, the use of the RRA method indicated that it is a suitable method in certain contexts. It also indicated that indigenous knowledge is extremely important for agricultural development, but that care must be taken as to how it is generated, understood, recorded and subsequently used. The data generated by means of the RRA method enabled some preliminary reflections on the current understanding of indigenous knowledge. These were reflections on the following: it is a system of knowledge; it originates in and is exclusive to a particular location; it has the ability to include knowledge developed in other locations; and it is deeply entwined within the context in which it is developed. In conclusion a number of possible areas for future research on indigenous knowledge and participatory methods are identified which will allow us to develop a deeper understanding of the value of participatory methods and the significance of indigenous knowledge.

OPSOMMING

Gedurende die afgelope dekades is verhoogde aandag geskenk aan die idee van volhoubare ontwikkeling en spesifiek aan volhoubare landbouprаktyke. Studies gedurende die sewentigs, tagtigs en negentigs wys daarop dat verskeie hulpbronbeperkte boere lae eksterne inset, volhoubare praktyke be-oefen het na aanleiding van hulle hulpbronbeperkte status. Nieteenstaande hierdie boere se stand van sake het hulle nietemin standhoudende praktyke ontwikkel wat hulle in staat gestel het om selfs die moeilikste omstandighede te oorleef. Daar was geglo dat deur van hulle plaaslike praktyke en die daarmee saamgaande kennis, bekend as Inheemse Tegniese Kennis onder konvensionele wetenskaplikes, te begryp, dit landbou-ontwikkelingswerkers kan voorsien van ‘n beter begrip rakende, hoe om standhoudende landbou-ontwikkeling te bereik. Hierdie bewustheid sal die optimale en volhoubare gebruik van plaaslike lewens- en huishoudingsbronne verseker. As gevolg van hierdie belangstelling is ‘n hele aantal komplimenterende navorsingsmetodes ontwikkel om inheemse kennis in te win en op te teken. Verskeie van hierdie metodes val binne die deelnemende navorsings-paradigma van die Geesteswetenskappe. Deur gebruik te maak van een van die vroeëre aanvullende metodes, Rapid Rural Appraisal (RRA), lê die waarde van RRA daarin dat dit ‘n metode is om inheemse kennis in te samel rakende die plaaslike verbouïng en gebruik van inheemse groentes in ‘n wyk in Uganda. Die basiese RRA tegnieke word omskryf asook die posisie van RRA binne die deelnemende navorsings paradigma en dan word daar aangedui dat die metode heel moontlik ‘n lae-middelposisie het wanneer dit geplaas word in terme van ‘n kontinuüm van deelname. In hierdie studie het die metode dit moontlik gemaak om inligting in te win wat verband hou met die konteks waarbinne landbou be-oefen is in die wyk; spesifiek wat produksie en die gebruik van plante, bekend as inheemse groentes, aanbetref. Terselfdertyd het die tegnieke ‘n breër begrip daargestel van inheemse kennis rakende die produksie, daarmee saamgaande praktyke en plaaslike menings, sowel as die gebruik van inheemse groentes in die wyk. Hierdie inligting het ingesluit die tegniese en sosio-kulturele inligting en aangedui dat inheemse kennis nie net oor tegniese kennis handel nie. In die pas afgelope jare het die debat ontstaan rakende die waarde, gebruik en misbruik van inheemse kennis. Die debat het die vermoë van die verskeie deelnemende komplimentêre metodes om akkuraat hierdie kennis in te win en op te skryf, bevraagteken. Een van die hoof

bekommernisse is dat die meeste van hierdie metodes, soos die verbonde aan kwalitatiewe en kwantitatiewe paradigmas, daarna neig om inherent bevooroordeeld te wees wat hulle van hul waarde laat verminder. 'n Refleksie op die gebruik van RRA in die Uganda-studie wys daarop dat dit onderhewig was aan 'n aantal kontekstuele beperkings naamlik: die aanname en hantering van inheemse kennis as 'n inventaris van kennis wat netjies omgeskakel kan word in wetenskaplike katagorisering; onbewustheid van die mags-onewewigtigheid interaksies waarbinne kennis ingewin word; die gevolge van plaaslike magstryde op die insameling van kennis; die effek wat die teenwoordigheid van navorsers tydens die proses van kennis insameling het op die resultaatgewende kennis, die relevansie van tyd, tydsberekening en plek waar kennis ingewin word; en die effek wat plaaslike sosiale verskille, soos geslag, ouderdom, rykdom, klas, ens. het op wie toegang het tot watter soort van kennis. Meer onlangs ontwikkelde en verfynde metodes soos Participatory Rural Appraisal (PRA) en Participtory Technology Development (PTD) sluit van die tegnieke en strategieë in wat sommige van hierdie beperkings oorkom. Maar sommige van hierdie metodes is gereëld onderworpe aan soortgelyke beperkings, gegewe die konteks waarbinne dit gebruik word. In die finale analise is die gebruik van die RRA metode in Uganda beskou as 'n bruikbare tegniek vir die insameling van kontekstuele data en inheemse kennis, gegewe die omstandighede waarbinne dit gebruik is. Hierdie omstandighede sluit in, finansiele beperkings, 'n gebrek aan vaardigheid met die komplimentêre metodes binne die navorsingspan, onvoldoende tyd en ander bronne. Hierdie hindernisse is algemeen in verskeie landbouontwikkelingskontekste. Gebasseer op die resultate van die studie word aanbeveel dat waar omstandighede hul daartoe leen, deelnemende metodes soos PRA en PTD, gebruik moet word. Maar gebruikers moet daarvan bewus bly dat hierdie metodes kan ly aan kontekstuele tekortkomings indien hulle nie met sorg gebruik word en daar nie gereeld oor die gebruik daarvan gereflekteer word nie. Ten spyte van 'n aantal tekortkomminge het die gebruik van die RRA metode aangewys dat dit 'n toespaslike metode binne 'n sekere konteks is. Dit het ook aangewys dat inheemse kennis uiters belangrik is vir landbouontwikkeling, maar dat sorg gedra moet word rakende hoe dit ingewin, verstaan, opgeskryf en daarna gebruik word. Die data wat ingewin is deur middel van die RRA metode het voorlopige refleksies moontlik gemaak rakende die huidige begrip van inheemse kennis. Hierdie was refleksies op die volgende: dit is 'n stelsel van kennis, dit ontstaan in en is eksklusief aan 'n spesifieke gebied, dit het die vermoë om kennis in te sluit wat in ander gebiede ontwikkel is, en dit is diep ingeweef in die konteks waarbinne dit ontwikkel is. Ten slotte 'n hele aantal moontlike areas vir toekomstige navorsing rakende inheemse kennis en

deelnemende metodes is geidentifiseer wat ons in staat sal stel om ‘n beter begrip te ontwikkel van die waarde van deelnemende metodes en die belangrikheid van inheemse kennis.

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PREFACE

Perusal of an official list of the parishes in Uganda will elicit that Gameru Parish does not in fact exist on any list. I have changed the original name of the parish to Gameru in an attempt to ensure the confidentiality of its residents and disguise its location. Similarly, I do not mention the names of any of the informants who provided me with information during my visits to the parish. The decision to use my field-notes, based on my work in this parish, to substantiate the argument presented in this thesis was a very late decision and occurred long after I had left Uganda in June 2002. I was unable to return to Uganda during the past eighteen months. Subsequent efforts to notify parish residents of my intention to include some of their information in my thesis and to obtain their permission, proved to be an obstacle that I was unable to overcome. During the fieldwork the research team informed the parish residents and local farmers that the research team intended writing a number of reports about our interactions with them, so I assumed that there would not be strong opposition to my using field-notes and the report for the study that is presented in this thesis. However, in case some residents are dissatisfied with my use of their information without their personal sanction I apologise and assume that withholding their identity and that of the parish is satisfactory.

A number of researchers and colleagues in Uganda were members of the research team that carried out the study in Gameru parish. They generated some of the information reported here. However, they were not part of this post-facto analysis of the interaction that we undertook with the residents of Gameru. I alone am responsible for generating this latter information. Consequently, the analyses and suggestions reported in this thesis are my own and I assume sole responsibility for them.

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CHAPTER ONE

THE RELEVANCE OF INDIGENOUS KNOWLEDGE IN AGRICULTURAL RESEARCH AND DEVELOPMENT

Background

Based on the experiences and lessons of various local and international agricultural and development support agencies operating in the developing world during the sixties and seventies, enormous shifts in thinking about agriculture and its priorities have transpired in developing countries since the 1980s. According to Chambers *et al.* (1989) questions regarding who produces food, where this occurs and who controls it often gain precedence over issues of yield and the quantities produced. Previously, maximising yield was at the top of the agricultural agenda while nowadays the sustainability of output (and sustainable agriculture) has a high position on the international agenda. This seems to be based on the realisation that the productivity of an ecosystem has an upper-limit, which if exceeded can result in its degradation and collapse, reducing the availability of resources required for human survival (Reintjies *et al.,* 1993).

Consequently, the idea of sustainable agriculture is in vogue, yet it seems to be a concept that is difficult to define in absolute terms. Whiteside (1998:4) has defined it as "…agriculture which meets today's livelihood needs, without preventing the needs of neighbours or future generations from being met." In a similar vein the World Commission on Environment and Development also avoids defining sustainable development in absolute terms: "[sustainable development is] development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987:43).

Reintjies *et al*. (1993:217) provide a more holistic definition in which they emphasise the management of agricultural resources in such a fashion that they satisfy changing human needs, while consistently improving or at least maintaining the quality of the environment and quantity of natural resources. However, none of these definitions provide any specific criteria

regarding the associated practices that result in sustainability. This avoidance of an absolute definition and prescription has resulted in much debate about what sustainable agriculture is and is not. Pretty (1996:3) stresses that sustainable agriculture should not prescribe a concretely defined set of technologies, policies and practices, arguing that the evidence suggests four important principles (1996:11) that are contrary to a concrete prescription:

- Externally imposed technologies do not persist;
- Externally imposed institutions do not persist;
- Expensive technologies, those requiring expensive inputs, do not persist; and
- Sustainability does not equal fossilisation or continuation of a thing or practice forever; rather it is dynamic and a state of flux exists.

A rigid prescription would inevitably restrict the future options and innovations of farmers which must necessarily change as knowledge and conditions change. Pretty closes her discussion on the topic by explaining what sustainable agriculture attempts rather than what it is:

> "Sustainable agriculture seeks the integrated use of a wide range of pest, nutrient, soil and water management technologies. It aims for an increased diversity of enterprises within farms combined with increased linkages and flows between them. By-products or wastes from one component or enterprise become inputs to another. As natural processes increasingly substitute for external inputs, so the impact on the environment is reduced" (Pretty, 1996:4).

In essence it seems that sustainable agriculture (and also sustainable development) is not only concerned with obtaining a livelihood by preserving the present to ensure availability for others, now and in the future, but also in effectively using all locally available resources to this end. The implication is that the development and transfer of technology must be compatible with the farmers' environment – natural, economic, socio-cultural, infrastructure and institutional (Torkelsson and Anandajayasekeram, 2000; WCED, 1987).

The significance of sustainable agriculture on the international agricultural agenda is a consequence of a number of factors:

- Environmental degradation, including desertification in Africa and deforestation in Asia and South America.
- The rapid population increase of the sixties and seventies also prompted this change in thought and priority setting on the international agricultural agenda (Chambers *et al.*, 1989). There is a need to ensure food security for future generations without depleting the natural resources that make this possible.
- Writing on sub-Saharan Africa at the beginning of the 21st Century, Torkelsson and Anandajayasekeram (2000) explain that due to macro-level politico-economic factors (including structural adjustment programmes, transformed and reduced extension and research services) it is increasingly difficult for farmers to resolve their constraints (in terms of access and affordability) relating to high-input requirements of conventional agriculture and access to credit facilities. Mensah (1994) draws our attention to the fact that Africa is familiar with high import prices for inputs and low export prices for her exported commodities. Therefore, African farmers need to look at low external input options, while maximising the efficiency of their use of local resources.
- The advent of new democracies has increased awareness of the resource-poor farming sector and opened up agricultural opportunities to previously disadvantaged populations, as in South Africa since the early 1990s. Given their limited resources and their ability to rely on external inputs, coupled with the threat that an agricultural explosion might place on an already fragile environment has raised concern about the predicament of the resource-poor farming sector.

Given this situation, Torkelsson and Anandajayasekeram (2000) argue that there is a need for a low external input sustainable agriculture (LEISA) to meet the needs of farming households. Indigenous farming systems and the associated knowledge of these systems possessed by local farmers are important to developing suitable LEISA strategies because of their functional integration of different resources (predominantly locally available) and farming skills (Reintjes *et al.*, 1993). Before looking at how farmers and conventional researchers can work together to bring about low external input sustainable agriculture we need to look at some of the issues that affect such collaboration.

Three types of agriculture

The 1987 Brundtland Commission identified three types of agriculture: industrial agriculture, green revolution agriculture and resource-poor or third agriculture (WCED, 1987). Industrial agriculture is predominantly found in Europe and North America, but there are enclaves in some developing countries. Large-scale agriculture practised in South Africa prior to the nineties and in some countries in South America are examples from the developing countries. This type of agriculture is characterised by highly capitalised infrastructure and machinery, large-scale farming units, reliance on high volumes of external inputs such as synthetic fertilisers and pesticides, and in certain parts of the world is heavily dependent on government subsidies.

Green revolution agriculture is found in optimal environmental regions in developing countries. These areas are either well irrigated or receive reliable and sufficient rainfall. Farms are both large and small in scale and rely on high-yielding crop varieties with corresponding high volumes of external inputs. Examples include parts of Latin America and North Africa, and the vast irrigated plains and deltas of South, South-east and East Asia (Chambers *et al.,* 1989). Both industrial and green revolution agriculture employ fairly simple farming systems, often involving the planting of single crops (monocropping) on large fields. Uniform environments are sought out and these agricultural types are relatively low-risk in comparison to resource-poor agriculture. However, it is not unusual for farmers in green revolution areas to diversify their agricultural activities, although they tend to place major emphasis on monocrops.

Resource-poor agriculture is identified with marginal or unfavourable areas that are almost exclusively rain-fed, often characterised by an undulating terrain with fragile or poor soils. The farming lands are very diverse and include drylands, wetlands, highlands, hinterlands or remote areas, forests, mountains and hill slopes, grasslands, swamps and semi-desert areas. Examples include most of sub-Saharan Africa, upland areas in South East Asia and Latin America and the Deccan Plateau in India (Chambers *et al.,* 1989). This form of agriculture, characterised by *complex* farming systems, *diverse* environments and being exceptionally *risk*-prone is often given the acronym CDR agriculture.

Future options for agricultural development

Wolf (1986) estimates that at least 1.4 billion people (more than 25% of the world's population) are dependant on resource-poor agriculture for their livelihoods, i.e. their means of survival. At least 300 million of these people live in sub-Saharan Africa. Another source (Pretty, 1996) stresses that despite the fact that enough food is produced in aggregate globally to feed the entire population of the world, and that food prices have been dropping, approximately 800 million people do not have local access to sufficient food. The recent famine warnings in Southern African states such as Zimbabwe, Lesotho and Mozambique are evidence of this. There is a need to develop agricultural practices that will not only increase local food production and access but also ensure sustainability for both the present and the future. The arguments as to what should be done are countless and diverse. Pretty (1996:2 - 3) highlights five main schools of thought which are now briefly described.

Optimists believe that supply will always meet increasing demand and expect an increase in food production based on the assumptions that (i) biotechnology research will boost plant and animal productivity, and that (ii) the area under agricultural cultivation will increase.

The *environmental pessimists* suggest that the ecological limits to growth are near, have been attained or have in fact been surpassed. Population control is seen as the solution and is the priority.

I would call the third group the *industrialists* as they believe that the industrialised world will have to rescue the Third World countries because the latter will never feed themselves because of various reasons which are infrastructural, ecological and institutional in nature. This group also argues that any adverse consequences of modern industrialised agricultural systems are minor in comparison with the expansion of agriculture into new environments.

Others, the *new modernists*, stress that it is possible to increase biological yields on existing lands solely by virtue of adopting high-external input farming practices. Existing green revolution lands and other lands with high agricultural potential are targeted. This model is known as science based agriculture and argues that high-input farming is more

environmentally sustainable than low-input agriculture as the latter can only ever result in low-output.

The *proponents of sustainable agriculture* propose that substantial growth is possible in both currently unimproved and degraded areas while simultaneously protecting or even regenerating the natural resources in these areas (see Scoones and Thompson, 1994a and Pretty, 1996 for references listing various sources of evidence). Evidence indicates that regenerative and low-input agriculture is highly productive if the farmers participate completely in all stages of technology development and extension. Further evidence suggests that productivity of land is not only based on physical and biological processes but is also a function of human capacity and creativity, stressing that these latter resources need to be utilised to their fullest, instead of being ignored as was previously the case. Agriculture is no longer considered to be only a complex, diverse and risky technical undertaking but is also a complex social process, implying new theoretical and methodological challenges for the agricultural development professional (Scoones and Thompson, 1994b: 5).

The problem with conventional agricultural research

Smallholder farmers relying on agriculture for a major component of their livelihood continue to farm on fragile soils in risk prone areas. However, there is an increasing awareness that these resource-poor farmers have been inadequately served by the agricultural research and extension professions in comparison to the resource-rich farmers (Chambers *et al.*, 1989; Mettrick, 1993; FAO, 1996b). Despite this inadequacy, many of the smallholder resource-poor farmers continue to eke out an existence in the marginal areas they inhabit and in some cases they prosper (Scoones and Thompson, 1994a; Van Veldhuizen *et al.*, 1997). Consequently, for reasons of equity, the desire to ensure economic development by commercialising smallholder agriculture and the need for improved production to ensure food security, increased attention is being paid to the circumstances of these farmers. Chambers *et al.* (1989) give the example that interest in rain-fed agriculture (the predominant source of water for most resource-poor farmers in sub-Saharan Africa) has intensified in comparison to that of irrigated agriculture (see also FAO, 1996a). Furthermore, attention is paid to the fact that despite inadequate support from conventional agricultural research and extension services resource-poor farmers still manage to sustain a livelihood. There is a strong belief

that lessons can be learned from these farmers to ensure sustainable agriculture now and in the future (Chambers *et al*., 1989; Mettrick, 1993; Reintjies *et al.,* 1993; Scoones & Thompson, 1994a; Pretty 1996; Van Veldhuizen *et al.,* 1997).

These changes in thinking about and the attention given to agriculture imply a need for changes in the thinking, practice, behaviour, values and methods used by agricultural researchers and extensionists when working with resource-poor or smallholder farmers in marginal areas. So necessary and profound are these changes that Chambers *et al.* (1989:xvii) talk about the profession of agricultural research itself being a problem to the development of resource-poor agriculture along with the more obvious problems of the pricing of agricultural products, security of tenure, infrastructure, inputs, resources, and access to credit and markets. To understand why the profession of agricultural research is considered a significant problem it is necessary to understand how it has typically functioned in agriculture, and in particular within the three types of agriculture identified by the Brundtland Commission.

Conventional agricultural research seems to have had most of its success when applied to industrial and green revolution agriculture, but very little success when used in resource-poor or CDR agricultural environments. According to various sources (Chambers *et al.,* 1989; Maurya, 1989; Richards, 1989) the success of traditional agricultural research with the industrial and green revolution agriculture can be attributed to the following factors:

1. Conditions on research stations (easy access to inputs, availability of labour, and controlled environments ensuring optimal conditions) almost match those on resource-rich farms and what does well on the station can do well with the farmer, *ceteris paribus*.
2. The standardised methods of agronomic research have produced simple high-input packages that are suitable to extensive adoption in identical and relatively low risk settings.
3. The farmers and farm households that have benefited from conventional agricultural research practices are those that are resource-rich, have optimal farming environments and good access to markets, capital and the required inputs. Their resource-richness has ensured that they are well represented in the main industrial and green revolution agricultural areas allowing them to get the technology they require from the research institutions (FAO, 1996b). In the green

revolution areas even some of the smaller and poorer farmers have reaped some benefits from the new technologies by virtue of their being situated in optimal areas.

The farmers involved in resource-poor agriculture do not seem to have benefited, or at least not as much, from conventional agricultural research. According to Chambers *et al.* (1989) a number of reasons for this exist:

1. The conditions (physical, socio-economic and other) differ markedly between the environments in which resource-poor agriculture is practised and the research stations on which the technology is developed (Richards, 1989).
2. The simple and high input packages developed by conventional research activities do not fit well with the small-scale complex and diverse farming systems that are characterised by poor access to required resources (inputs) and risk-prone environments. Each season demands that the smallholder farmer makes suitable adaptations to his/her practices to ensure continued performance or sustainability. Adaptations are based on the unpredictable weather and the interplay of household resources and agricultural activities (Richards, 1989). The available, conventionally derived, technology packages do not consider seasonal adaptations of the weather and household resources, for their use is intended to be more long-term, until a newer technology is developed. Similarly, farming households face unreliable access to the necessary inputs and must use them sparingly (often this is not optimal from an agronomic perspective), if at all. Trade-offs are made between availability, affordability, risk and household survival. The later always takes precedence. It is therefore not surprising that conventional research activities and technology transfer seldom meet resource-poor farmers' needs. Pretty (1996) and Richards (1989) point out that farmers are unable to adopt complete technology packages without making considerable adjustments to their own practices and livelihood systems. While this might be okay for some farmers, for the majority who lack many of the required resources, it is not an option. In a project in Nigeria subsidised fertiliser resulted in farmers abandoning their traditional manuring practices although no improved yield was obtained (FAO, 1996b). When subsidies were stopped farmers were unable to immediately return to their traditional practices. This resulted in reduced yields. Partial adoption

and adaptation is sometimes a more realistic option when this complies with the farmers' needs, even if no external resources are required. Pretty (1996:12) suggests that the problem is that these imposed packages initially look good and then fade away as a result of incompatibility with local circumstances. In his discussion on alley cropping Carter (1995) points out that many productive and sustainable systems, requiring few or no external inputs, have been developed. These systems have the benefit of stopping erosion, producing food and wood, and can be cropped over long periods without damage to soil and environment. Yet despite this and the cost of millions of dollars in research and technology transfer he found that none of the farmers had adopted the alley cropping systems as originally designed. Kerkhof (1990) noted a similar trend in Kenya and Rwanda which clearly indicated that farmers were adapting the technology to suit their needs for border crops, separators and shade.

3. I would also add that many researchers lack the skills (Anandajayasekeram and Stillwell, 1998) and the commitment to work with resource-poor farmers who are often situated far from the main roadways, are different in ethnic origin, class or caste, and typically have lower levels of formal education. Similarly, some researchers avoid trying to help because they perceive it is just too difficult to bridge the gap between their experience and that of the farmers or they are afraid of being unable to help, given the constraints under which these farmers practise agriculture.
4. A lack of dialogue with rural communities and farmers, for whatever reason, has resulted in their rejection of new technology and marketing plans (Mensah, 1994)

A consequence of this lack of fit between resource-poor farmers' needs and circumstances, and conventional agricultural research has been the slowness, inability or unwillingness of resource-poor farmers to adopt recommendations and technologies derived from such agricultural research. The failure of conventional research activities to solve the problems of resource-poor farmers was conveniently interpreted as a problem of non-adoption. In fact my current employment is a result of such an interpretation in the South African resource-poor farmer sector, whereby many colleagues expected me to increase the adoption rates of their technology by farmers, despite the fact that farmers have no say in the development of this technology. During the 1960s and 1970s, non-adoption was blamed on the ignorance of the farmers. Consequently extension in the form of education and training was prescribed. In the

early 1980s non-adoption of agricultural technology now became attributed to farm-level constraints: identified in terms of gaps in the yield obtained on-farm versus those obtained on-station. The prescription was to make the farm more like the research station, an almost impossible task given the inherent differences between the two.

A new paradigm emerges

In the later half of the 1980s a new interpretation of the problem emerged which has gained increased support in ensuing years (Chambers *et al.*, 1989; Mettrick, 1993; Reintjies, 1993; Van Veldhuizen *et al.*, 1997; Scoones and Thompson, 1994a; Bruin and Meerman; 2001). The problem was no longer considered to be the farmer or the farm but rather the developed technology itself, the root causes of which lie in the priorities and processes that generate it. Conventional research is often based on priorities perceived by researchers, having little or no contact with the resource-poor farmers for whom they are doing the research. The developed technology is later transferred to the farmers by the extension services and researchers who both tend to be largely ignorant of the local circumstances. To compound matters the technologies are developed in laboratories and on station in environments that are completely alien to those where resource-poor agriculture is practised (personal experience in Uganda during 2002 indicated that research stations sometimes tried to replicate some of the general physical and technical conditions found on resource-poor farms but could not do this for the social and cultural conditions). In some instances conventional research is shifting towards on-farm research (OFR). However, many researchers are experiencing problems in accepting the manner in which fields (experimental and other) are managed due to the nature of farmers' management practices (Mutsaers *et al.*, 1997). These practices are generally more socially, rather than technically, governed. Some researchers still want to demonstrate how good the technology is under ideal conditions rather than determine how it fares in the farmers' environments.

Resource-rich farmers, by virtue of their positions of influence and affluence, have been able to monopolise the research agendas for decades ensuring that they receive the technology that they desired. This meant that, where they have been acknowledged, the needs of the resource-poor farmers have taken second place to those of resource-rich farmers. Such practices still continue today. The fact that conventional agricultural research has failed to

adequately support the resource-poor farmers and address the problems they encounter can be understood as being a result of the practices and politics within conventional agricultural research and the forces that influence it.

The shift in thinking regarding agricultural research and the problem of non-adoption of technology, which now considers conventional agricultural research to be a part of the problem of the ineffective agricultural development of resource-poor farms, has its origin in the following activities, which are occurring more often (Scoones and Thompson, 1994b):

1. Researchers and social scientists increasingly take time to talk, listen, discuss and work with resource-poor farmers, to understand reasons for non-adoption and to identify and develop solutions to their specific problems (Chambers *et al.*, 1989; Scoones and Thompson, 1994a).
2. Indigenous knowledge, including that relating to technical agricultural knowledge is increasingly recognised as being valid and useful in identifying and explaining the practices followed by farmers and the reasons for these (Krotschi *et al.*, 1990; Mettrick, 1993; IIRR, 1996; Greiner, 1998; Langill, 1999; Langill and Ndathi, 1998; Torkelsson and Anandajayasekeram, 2000).
3. Transformation within the Farming Systems Research and Extension (FSR-E) approach revealed the complex nature of resource-poor farming systems and the decisions (trade-offs) made by resource-poor farmers to ensure a livelihood from agriculture in marginal environments (Matata *et al.*, 2001).
4. The exposure of researchers and extensionists to farmers resulted in their increased awareness of the farmers as experimenters and innovators at various levels (Reintjies *et al.*, 1993; Van Veldhuizen *et al.*, 1997, ref).
5. The most crucial realisation by conventional researchers is that time and again resource-poor farmers are acknowledged as being correct and rational in practices that were initially considered to be ‘primitive’, incorrect and irrational (Chambers *et al.*, 1989: xix).

This list of activities suggests that the new understanding regarding the problem of non-adoption and the movement towards resolving the problem is heavily reliant on farmers’ own knowledge, innovation and experimentation, and the acknowledgement of the value of this by outsiders (researchers, extensionists and development workers). It also suggests that in a

paradigm attempting to reverse the problems inherent in the practice of conventional research, participation and collaboration by farmers, researchers and extension is essential for understanding the complexities involved and identifying solutions to farmers' problems.

Multiple approaches

The realisation that practices and attitudes within conventional agricultural research are the problem has given rise to a number of approaches, and although similar, different labels have been applied such as 'farmer first and last', 'farmer participatory research', 'farmer back to farmer', 'rapid (or relaxed) rural appraisal', 'participatory rural appraisal' and 'participatory technology development', to name a few of the more common approaches or methods. However, it seems that the precursor was the alternative movement that developed within the farming systems research approach (FSR or FSA) and more recently known as farming systems research and extension or FSR-E (Chambers *et al*., 1989; Matata *et al*., 2001). What these multiple approaches have in common is that they all start with the knowledge, problems, analysis and priorities of farmers and farm households. This a reversal of the approach usually adopted by conventional research. Other reversals inherent in these new approaches include the farm (rather than the research station and laboratory) becoming the main locus of action, with the farmer and farm household members becoming the central experimenters (Chambers *et al*., 1989: xix). Furthermore, all these approaches stress participation and rapport between researchers / extension agents and the farmers / farming households. This demands that the typical power-laden relationships between agricultural researchers, extension officials and resource-poor farmers must be transformed into relationships of equity in which the value of both parties is acknowledged. This reversal to the way in which conventional research is practised resulted in these methods being termed alternative methods. However, given that these methods seldom occur without the integration of more conventional practices it is more apt to call them complementary methods.

Pretty and Chambers (1994:184) note that six common principles underlie most of these methods, irrespective of which name they go by:

- *A defined methodology and systemic learning process* – the focus is on cumulative learning by all the participants (including the outsiders) and, given the nature of these approaches as systems of enquiry, their use has to be participative.
- *Multiple perspectives* – a central objective is to seek diversity, rather than characterise complexity in terms of average values. Different individuals and groups make different evaluations of situations, which lead to different actions. All views of activity or purpose are heavy with interpretation and prejudice, and this implies that there are multiple possibilities of descriptions of any real-world activity.
- *Group enquiry process* – all these approaches involve the recognition that the complexity of the world will only be revealed through group inquiry. This implies three possible mixes of investigators, namely those from different disciplines, from different sectors and from different backgrounds (e.g. outsider professionals and insider local people).
- *Context specific* – the approaches are flexible enough to be adapted to suit each new set of conditions and actors, giving rise to multiple variants.
- *Facilitating experts and stakeholders* – the approaches are concerned with the transformation of existing activities to try to bring about changes which people in the situation regard as improvements. The role of the 'expert' is best thought of as helping people in their situation carry out their own study and so achieve a desired outcome.
- *Leading to sustained action* – the inquiry process leads to debate about change, and debate changes the perceptions of actors and their readiness to contemplate action. Action is agreed, and implementable changes will therefore represent an accommodation between different conflicting views. Analysis both defines changes which would bring about improvement and seeks to motivate people to take action to implement the defined changes. This action includes local institution building or strengthening, thereby increasing the capacity of people to initiate action on their own.

Cornwall *et al.* (1994) note that earlier extractive investigations are replaced by investigations and analyses that are increasingly done by the farmers themselves. These newly emerging approaches are not intended to supersede the conventional research and technology transfer approach, but are complementary to it because commodity research, on station and in-laboratory research, etc., will always be required in agriculture given the different types of

agriculture practised, the various components within each and the context in which research is conducted. In fact the research project from which this thesis developed is to include both phases in which the exclusive use of conventional research is intended, other phases in which complementary approaches are used almost exclusively and phases where practices from both are combined. It is necessary that researchers are aware of and able to select the appropriate methodologies for the context and topic, irrespective of whether these methodologies are conventional or complementary. What is required is a paradigm shift within conventional agricultural research to realise the benefits that these approaches bring to the situation of the resource-poor farmers and to the work of researchers attempting to help them. As Hart (1992) suggests this is not a de-professionalisation of agricultural research but rather re-professionalisation in which the researcher is a democratic participant with new roles (cited in Pretty, 1996: 21). Such a shift in thought, coupled with the willingness to use the complementary approaches will, if the increasing evidence from around the world is accepted, ensure the agricultural development of resource-poor farmers and move us on the path to sustainable agriculture and innovation. That this shift is necessary is echoed by Chambers (1994c) who notes that the arguments of this new paradigm increasingly apply to industrial and green revolution agriculture in light of the trend of structural adjustment policies (e.g. the abolishment or reduction of subsidies), and the increased complexity, intensity and diversity of these once simple farming systems. Failing to adopt the approaches of the new paradigm might in the future find agricultural research with very few clients.

Indigenous knowledge

This thesis is concerned with suitable methods for the generation and collection of indigenous knowledge and the role it has for agricultural research and development with resource-poor farmers. In the previous section we noted that the new approaches to agricultural research advocate that we start with the knowledge and experiences of the farmers and the broader farming community. We now need to look at how these relate to what we are going to define as indigenous knowledge.

Indigenous knowledge (IK) is variously described as the knowledge which local people in a given area or community have developed over time and which they continue to develop (this is largely the theme of the contributions to Scoones and Thompson, 1994a). Therefore, such

knowledge is not static and is not confined to the “original” inhabitants of an area (IIRR, 1996; Grenier, 1998; Langill, 1999). It is usually:

- based on experience and can include external influences;
- tried and tested over generations and even centuries of use (although this is not necessarily always so as in the case of recent farmer innovations which might have been practised over a shorter period but could include some older indigenous practices);
- adapted to local environmental conditions and is part of local culture;
- dynamic and changes continuously.

The content of indigenous knowledge is not confined to only one subject but covers a wide range of topics in a particular area and can include knowledge on such diverse topics that include:

- Agriculture
- The rearing of animals
- Food preparation
- Local beliefs and rituals
- Education
- Institutional development and management
- Natural resource management
- Religion and spirituality
- Healthcare, etc.

It can also include aspects or sub-topics of these topics. By virtue of the numerous topics that are included under the concept of indigenous knowledge it is deemed a vital resource for development initiatives and in many instances can be equal or superior to Western scientific knowledge (IIRR, 1996; Langill, 1999).

Indigenous knowledge is by no means a recent concept, as it was reportedly used in the late seventies. I believe that social anthropologists and ethnographers would argue that their cultural studies have involved little else but the generation and recording of indigenous knowledge, including the reasons for local practices and beliefs since the discipline was first started in the late nineteenth century. Since the 1990s other scientists from diverse

disciplines started to pay increasing attention to what is termed indigenous knowledge or at least indigenous technical knowledge (Grenier, 1998). It is seen as being the cornerstone in agricultural development and of low external input sustainable agriculture (LEISA) in particular (IIRR, 1996; Langill, 1999; Langill and Ndathi, 1998; Mettrick, 1993; Reintjes *et al.*, 1993; Scoones and Thompson, 1994a; Torkelsson and Anandajayasekeram, 2000).

Many proponents of complementary approaches to agricultural research and extension talk of indigenous technical knowledge (Chambers *et al.,* 1989; Mettrick, 1993; Torkelsson and Anandajayasekeram, 2000). Some have tended to describe this resource in broad terms (Torkelsson and Anadajayasekeram, 2000) while others have interpreted this rather narrowly to refer solely to the role of people's technical knowledge and abilities in agricultural production. Mettrick (1993: XXIII) describes indigenous technical knowledge as:

> "the knowledge of local people about their environment and the technical aspects of their farming situation, including a capacity to expand that knowledge through observation and experimentation".

During the later half of the 1990s the trend has been to accept indigenous technical knowledge as being more a part of indigenous knowledge rather than the same thing (IIRR 1996; Langill, 1999; Langill &Ndathi, 1998). As Scoones and Thompson (1994c: 18) explain:

> "In recent years, this perspective [indigenous technical knowledge] has been expanded to consider indigenous knowledge as *cultural* knowledge, producing and reproducing mutual understanding and identity among the members of a farming community, where local technical knowledge, skills and capacities are inextricably linked to non-technical ones (i.e. cultural, ecological and sociological factors…). ….it appears that this broader conception of indigenous knowledge is gaining wider currency (italics in original)".

This thesis looks at technical knowledge as well as other aspects of indigenous knowledge, including rituals and beliefs which are linked to the cultivation and use of indigenous vegetables in a parish in Uganda. Therefore, the term indigenous knowledge will be used to include indigenous technical knowledge and all other forms of indigenous knowledge identified during the study in Uganda. I see indigenous technical knowledge as being a part of

a broader indigenous knowledge base and which is intrinsically intertwined with all the other aspects to the extent that the precise separation becomes problematic and as we shall see probably undesirable.

Given the breadth of local information that is incorporated into indigenous knowledge we have noted in our discussion that an increasing number of agricultural and other development professionals have come to realise the importance of this local resource, especially in agricultural initiatives in marginalised areas. There are a number of reasons for the interest and value attributed to agricultural indigenous knowledge:

- Farmers in marginalised areas have adapted both to their circumstances and to nature. These are continually changing and farmers and farming households are continuously adapting to survive. Resource-rich farmers in better and more central areas have used conventional science to change the environment to suit their needs. Given the constraints of resource-poor farmers and their ability to eke out a livelihood in what are often the direst of circumstances, if they are to sustain or improve production then an understanding of their indigenous knowledge is required.
- Most resource-poor farmers in marginalised areas have been practising low external input agriculture (LEIA) for generations due to their typical location in marginal and remote areas, and did this in spite of non-existent or minimal support from research and extension services. The implication is that they have developed a vast knowledge of such practices. In many cases this knowledge has proved to be an effective and efficient coping strategy for their survival. A further implication is that a strong foundation upon which sustainable agricultural practices such as LEISA can be built exists within these areas.
- Indigenous knowledge provides the currently constrained research and extension services with low-cost solutions. These form a base upon which further research (conventional and complementary) can be developed to optimise local practices (Torkelsson and Anandajayasekeram, 2001). Grenier (1998) cites Richard Wilk's (1995) example of how, over a period of several years, the numerous studies and projects that attempted to commercialise the production of edible palm oil from a native tree in the Belizean rainforest failed, despite access to high-yield trees and

a range of tried and tested modern technology. Throughout this period local household production, based on a variety of simple technologies, never stopped.

- Local farmers have developed ways to improve soil structure, water-holding capacity, nutrient availability, water availability, and pest control without using artificial inputs such as chemical fertilisers, pesticides and herbicides (see Reintjes *et al*., 1993). These strategies often use carefully planned crop-rotation, intercropping or companion planting methods that farmers have developed.
- Many local farming systems mimic nature ensuring that optimal use is made of sunlight, nutrients and rainfall. As nature changes so farmers have continued to mimic nature ensuring the sustainability of local agriculture (Reintjes *et al*., 1993).
- Often the farming systems employed are complex designs of ecological agriculture that farmers have fine-tuned to their local environment (Krotschi *et al*., 1990; Reintjes *et al*., 1993). It is argued that the sharing of such knowledge can ensure the improvement of local systems and practices along the lines of sustainable agriculture (Chambers *et al*., 1989; Mettrick, 1993; Reintjies *et al.,* 1993; Scoones & Thompson, 1994; Pretty, 1996; Van Veldhuizen *et al.,* 1997; Torkelsson and Anandajayasekeram, 2000).
- By virtue of the fact that indigenous knowledge is disseminated across generations, giving it a long-term perspective, and is shared in varying degrees within communities, securing the notion of equity inherent in sustainable agriculture, it is believed to be a source of sustainability for the resource-poor farmer (Torkelsson and Anandajayasekeram, 2000).

With over a quarter of the world's population dependent on resource-poor agriculture, and given the problems faced by industrial and green revolution agriculture (Wolf, 1986, Chambers, 1994c, Grenier, 1998) and the significance of indigenous knowledge in resolving these issues, it is vital that satisfactory methods are developed and tested to generate, record and analyse indigenous knowledge.

The problem addressed by the current study

Scoones and Thompson (1994b: 2) emphasise that the gaps or distances between the researcher / extentionist and the farmer must be bridged. Consequently, dialogue must take place and new ways need to be found to understand local knowledge, strengthen local capacities and address local needs. Following from the increased awareness of indigenous knowledge and its apparent value in agricultural research and development, it was decided that such knowledge on the cultivation practices and the use of Ugandan indigenous vegetables needed to be collected as a first step in a larger research project, in order to define the appropriate areas for further research. However, given the current evidence and realisation that conventional agricultural and social science research practices are largely inappropriate to such an undertaking, an appropriate method in line with the complementary approaches suggested above was required. Initially it was decided to use the participatory rural appraisal (PRA) method but due to a number of unavoidable circumstances, discussed in Chapter 3, it was later decided to adopt the quicker and more extractive rapid rural appraisal (RRA) method using a combination of the basic RRA and PRA tools. To compensate for the initial heavier reliance on a rapid method it was recommended in the subsequent field-work report that the future design and implementation of the project incorporate a stronger element of participation. It is believed that recommending a greater encouragement of the active participation of the farmers, farm-households and researchers in the future project phases will alleviate some of the shortcomings that were experienced as a consequence of carrying out a rapid appraisal at the beginning of the project. Greinier (1998) makes a similar suggestion in that she advocates that initially it is easier to obtain intimate knowledge of an area by using less participatory research methods such as RRA but emphasises that these should be followed up with methods which place a greater emphasis on participation.

The current study, as it is reported in this thesis, assesses the value of using a particular research method, Rapid Rural Appraisal, and methodology, participatory research, in the collection of indigenous knowledge relevant to agricultural development projects. As a means of assessing an alternative to more traditional social science research practices in agricultural development, this considers whether the RRA method is an effective and efficient means of obtaining an understanding of indigenous knowledge and what conditions need to be met to ensure that this is adequately achieved. The hypothesis is that RRA should be an adequate

method because it has been suggested that one of the reasons for the development of RRA was to generate and record indigenous knowledge, so that it could be more clearly understood and thereby aid agricultural research and development (Torkelsson and Anandajayasekeram, 2000). A better understanding of indigenous knowledge would enable it to positively inform future agricultural development activities, if they make effective use of this knowledge (Grenier, 1998).

Using the example of collecting indigenous knowledge on the cultivation and use of indigenous vegetables in a parish in Uganda the thesis intends to add to our understanding of the application of suitable methods for research in the agricultural development arena and of indigenous knowledge. This is done by discussing the reasons why indigenous knowledge is important, looking at suitable methods, applying a particular method and listing the results. The application of the method is then discussed in terms of current debates on complementary methods to examine its strengths and weaknesses. The results obtained by means of applying this method are discussed to see what preliminary contribution they can make to our understanding of indigenous knowledge.

The outline of the thesis

Chapter One has introduced the topic of indigenous knowledge and explained why it is considered important to current agricultural development activities and especially sustainable agricultural practices.

Chapter Two discusses the history and origin of the RRA method and distinguishes it from other forms of participatory research. Some of the common tools used in this method are discussed. Contrasts with the more traditional qualitative and quantitative methodologies of the social sciences are also highlighted.

Chapter Three briefly describes the project relating to the collection of indigenous knowledge about indigenous vegetables in Uganda. The chapter ends with a discussion of the research design and why the RRA approach was adopted over other qualitative, quantitative and participatory methods.

Indigenous knowledge needs to be understood in the context within which it develops. Chapter Four provides the information that was obtained, using RRA tools, regarding the local circumstances in the parish, and how these evolved to their present form. This chapter also provides information relating to the gender analysis that was carried out in the parish using the RRA tools. Differences such as gender (or sex grouping) are integral to the generation and recording of indigenous knowledge. An indication of some local problems and needs are briefly stated.

The details of the indigenous knowledge that was collected about the cultivation and use of indigenous vegetables in the parish are presented in Chapter Five along with some of the RRA tools used to record it. The results presented in this chapter and also in Chapter Four are done in great detail because they provide much of the data for the reflections that are carried out in subsequent chapters.

Chapter Six considers the effects of the context in which participatory methods are used as a means to record indigenous knowledge. It includes a discussion of the various extraneous variables that influenced the research process in Uganda, such as power-roles, relationships, differences, communication, timing and locality of research, and the need to incorporate it within science.

In Chapter Seven the use of RRA as a method to record indigenous knowledge in terms of the objectives of the first phase of the project on the genetic diversity of indigenous vegetables in Uganda is assessed. This is followed by some preliminary reflections on the indigenous knowledge debate based on the information obtained during the current study.

Using data obtained in the study, the final chapter reflects on why it is important to study indigenous knowledge. This is followed by a short synopsis on the value of the RRA method and the provisional reflections that are made about indigenous knowledge. The chapter concludes with some possible areas for future research on indigenous knowledge.

CHAPTER TWO

THE SIGNIFICANCE OF RAPID RURAL APPRAISAL AND PARTICIPATORY RESEARCH

Introduction

According to Torkelsson and Anandajayasekeram (2000) indigenous knowledge was one of the pillars upon which the *rapid rural appraisal* (RRA) approach was developed during the seventies. As I have suggested in Chapter One it would be fair to assume that it is a good method to use when analysing indigenous knowledge and the purpose of this thesis is to determine this. Following the presentations of the results of the study in Chapters Four and Five the appropriateness of this method is discussed in Chapter 6 in terms of current debates and also in light of the process undertaken in Uganda. This allows the assessment of its value in terms of the objectives of the Ugandan study and also generally as a complementary method in agricultural development initiatives. We noted that Grenier (1998) supports the use of RRA as an initial and quick means of generating indigenous knowledge to provide an insider's perspective. Others have argued that if used correctly the *participatory rural appraisal* (PRA) is a more superior, equitable, valid and reliable method to use (Scoones and Thompson, 1994a). We need to come to grips with why these two methods that appear similar are not necessarily so and why one might be more beneficial when collecting indigenous knowledge. This chapter looks at the origins of RRA and describes the most commonly used tools. It touches on the origins and purposes of participatory research and the debate regarding its use in agricultural development projects. The chapter concludes by contrasting the RRA approach with that of PRA.

The origins and theory underlying rapid rural appraisal (RRA)

Rapid rural appraisal (RRA) is a research process or method that developed in the late 1970s in Asia and Kenya out of the work of Robert Chambers and Gordon Conway. It emerged in response to the realisation that the social context in which agricultural development takes place was largely being ignored and that holistic analyses were avoided. Simultaneously, it was a response to the growing dissatisfaction that arose from the biased and very often erroneous perceptions made about the social dimension in agricultural development which resulted from the brief rural visits made by urban professionals (Burkey, 1998). These visits were often referred to as 'rural development tourism' due to their short duration and desire to always go to the same localities that were within easy travelling distance (Chambers, 1994a).

The primary constraint with these research activities was that the preferred questionnaire surveys presupposed that all the dimensions of a system / culture could be identified in advance; consequently they mainly reflected the culture / experience of the researchers and not those of the objects of research. These problems were compounded with the high costs and numerous defects associated with quantitative questionnaire surveys. Very often survey research results were never analysed or took too long to analyse and the different disciplines were seldom integrated in the analyses (Chambers, 1994a and 1994b; Gibbs, 1995; Van Zyl, 1999). Many of the classic approaches to development research undermined rural people's knowledge, were incomprehensible to locals and were extractive. The purpose of more classical approaches to research is to extract or obtain information from respondents or informants so that the researchers can analyse this information for the purposes of the research, whether this be for a Ph.D. thesis, book, policy formulation or development project plan. The locals or respondents generally react to questions put to them by the researchers. The idea that research is primarily extractive has been applied equally to quantitative surveys and to more qualitative approaches such as ethnography (see Chambers (1994a) and Guijt and van Veldhuizen (1998) who argue that this essentially extractive nature is really only overcome since the progression from RRA to PRA). PRA, and to a lesser extent RRA, encourages the locals to be proactive rather than reactive.

RRA was developed as a somewhat different approach to the classic research methods. Instead of developing a statistical description of the basic units forming the local system, as in surveys, the goal of RRA was to get an 'insider's perspective' on the system and to

understand it holistically, which is more in line with the ethnographic method but is done quicker. Chambers and Conway refined a set of tools based on elements of other research traditions and approaches that were showing positive results during the 1970s and 1980s. According to Chambers (1994a) these traditions included:

1. Agro-ecosystem Analysis;
2. Applied Social Anthropology;
3. Farming Systems Research.

The ensuing tools were packaged into what became known as the *rapid rural appraisal* method. The tools worked together to ensure that not only were data captured but also that this was done in terms of the local context. Researchers could now understand the 'what' in terms of the 'why'. A key purpose of this approach, especially manifested in the simplicity of the tools, was to provide a common platform on which researchers and rural inhabitants could interact, allowing researchers to obtain an understanding of the local circumstances from the perceptions of the local people who were able to develop their own questions and responses. In essence there was a shift from reactive to proactive behaviour. The developed tools are relatively simple and consist largely of visual representations, such as simple graphs, maps and sketches, thereby making the information generated by the process accessible / understandable to both insiders and outsiders (particularly those from diverse disciplines). These tools have demystified some natural and social science techniques making them available to non-scientists. Visualisation has made the techniques available to both literate and illiterate people. Some tools involve a bit more writing (historical timelines) but because the issues are openly discussed before they are recorded people are able to follow the process. Typical qualitative research techniques such as participant observation, focus group interviewing, semi-structured and informal interviewing are also used.

As with qualitative and quantitative research methods reviews of prior research, reports and literature is done when these are available. The tools that are used to generate information with the participants tend to generally allow for the use of open-ended questions, allowing for more qualitative collection of data than is the case when questionnaires, designed by outsiders with their concerns and categories in mind, consisting of closed questions are used. Tools such as semi-structured interviews (including workshop discussions), mapping and diagramming are open-ended and encourage proactive involvement rather than reactive

responses. Popular (local) categories are used as a means to understand local knowledge. In this particular study the English names for various categories and the Georgian Calendar were generally used as these had replaced many of the local names. Residents in the parish tended to be more familiar with the English names. The use of the RRA method brings about a shift from the etic to the emic, resulting in a greater focus on the local situation rather than the broader or universal situation.

By using the tools and techniques in the manner discussed above indigenous knowledge relating to local practices and circumstances is recorded, and problems and opportunities are identified and ranked. However, as its name implies the RRA method is conducted in a rapid fashion and development workers tended to use the tools in a predominantly extractive manner and while many tools allow for co-analysis of the information with the farmers during application this was seldom done. The tools were often administered in the same fashion as questionnaires and consequently used solely to generate and record information in a quicker, more holistically and representative manner than questionnaires had achieved. The process was also quicker than ethnography but consequently lacked the typical detail of the ethnographic experience. Unfortunately, the recorded information was seldom discussed in any detail with the respondents. This oversight has meant that while the farmers can verify the information generated and recorded in the tools they are not able to verify the results and the researchers' subsequent analyses. Consequently, RRA did not enable farmers to directly control how the information was used and to what ends.

Chambers (1994a), Matata *et al.,* (2001) and Dunn (1994) all stress that the value of the development and use of RRA in the seventies and eighties was that the data obtained was more contextually relevant and holistic in comparison to that previously obtained by using questionnaire surveys. Similarly, it was beneficial because it was rapid (took no longer than a week or two) in comparison to the six months to one-year participatory observation fieldwork periods of traditional ethnography. Admittedly it did not record as much detailed information as typically obtained in ethnographic studies. Furthermore, the RRA method and tools made the extraction of data easier than traditional methods and instruments:

- The tools bring together a range of disciplines, knowledge and informants providing a simple framework for interaction (Grenier, 1998).

- Valid and reliable questionnaire design and coding is a long process and requires significant skill and experience. A new questionnaire is usually drawn up for each research topic. The basic RRA and PRA tools are simple and can be used in a variety of studies and contexts from agriculture to education, and in corporate boardrooms and rural villages without any great change (see PLA Notes No 38, 2000).
- The basic tools described and used in the current research do not have to be pilot-tested beforehand like questionnaires do. However, Narayan (1996: 78) suggests that some aids to discussions should be prepared and tested before used in the workshop. Grenier (1998) describes this lack of a need to know all the questions at the outset as 'progressive learning'.
- The information obtained from the use of the tools tends to be freer of researcher bias because the tools do not generally emphasise outsider preferences and categories.
- The tools are used during group situations rather than with individuals and the information obtained is a result of consensus seeking that is verified by the presence of others. Unlike questionnaires and field notes the tools are visually displayed for all to see and can in this manner be adjusted when some respondents disagree. However, we need to remember that group situations bring complex social processes to play and are not without their own constraints (Burkey, 1998; Grenier, 1998). Disagreements might be a result of power relationships and not necessarily because of the presentation of incorrect knowledge.
- Different tools can be simultaneously displayed to triangulate and crosscheck information, or to explain how information from one tool relates to that of another. For example, a timeline can explain when and why certain practices have changed when it is contrasted with the trend line in a trend diagram.
- The visual nature of the tools, the use of diagrams and proportions, makes them easily understood by all, even by illiterate respondents. Grenier (1998) reports that the visual nature facilitates mutual learning as well as aiding with the crosschecking of the information.
- The fact that the tools immediately elicit patterns and trends means that patterns and trends are immediately identified without having to carry out prolonged

analysis. Consequently questions of clarity can immediately be asked, avoiding the necessity of having to return to the village at a later stage.

- Tools often define the sequence of their use. For example, resource mapping might lead to transect walks and subsequent auditing of local trees, soil or water samples and the condition of these. This in turn can lead to the identification of cropping patterns and the most suitable varieties.

Typically, in the application of RRA a multidisciplinary team enters a community or village and stays in the area for about a week. The team members apply the various tools during their stay and the generated information is recorded. However, the information is not really shared with the locals and is not analysed in any great depth with them. The manner in which the information is generated does not encourage them to be proactive and to use it for their benefit even if copies of the tools are made and the originals are left behind. The researchers return to their universities and research institutes, analyse the information they have recorded and put it to their own uses, including project proposals, reports, journal articles, theses, etc. In some instances researchers might only include selected bits of information that fit the purposes of their proposed project, in other instances they might use the information to make changes to their projects or they might design projects based predominantly on the analysis of this information. The last use is the most preferable for it is the one that is most likely to be in line with the priorities of the rural inhabitants. However, in view of what we have discussed on alternative or complementary agricultural research approaches it would be better if the rural inhabitants took part in this analysis.

The basic rapid rural appraisal tools

The basic RRA tools include the following nine which are also shared with the participatory rural appraisal method (PRA): participatory mapping and modelling; time lines; transect walks; Venn and analytical diagrams; wealth-ranking; seasonal calendars; matrices used for ranking and scoring; trend analysis; and semi-structured interviewing (Davis-Case *et al.*, 1990; Bulwer participants, 1993; Chambers, 1994a and 1994b; Mascarenhas, 1990a–g; Grenier, 1998; Hinton and Young, 1999; Isaacs, 1999; Langill, 1999; Van Zyl, 1999; IIED, 2000). However, many authors and RRA / PRA practitioners agree that tools are continuously evolving to meet given situations (Narayan, 1996; Grenier, 1998) and some list

between twenty-three (Davis-Case, 1990) and forty (Grenier, 1998) different PRA tools. Familiarity with the basic tools makes it clear that the many of the new tools are adaptations and variations of these which are appropriate to given situations. More recent additions to PRA activities include games and tools that allow for further visualisation exercises and expression, in the form of role-plays, mini-dramas and even puppet shows (Davis Case, 1990). These are semi-projective techniques that allow for clearer understanding and also provide entry points for detailed discussion. In contrast to the original RRA 'toolbox' the increased number of tools in the PRA 'toolbox' are essentially for the purpose of empowerment and self-mobilisation of the local participants (Grenier, 1998). It is not expected that all the numerous tools be used during an appraisal process; rather it is important that the appropriate tools are used in situations where they are best suited.

The tools are simple and were specifically designed so that their format and interpretation is easily understood and can be used by all the stakeholders (the community members, farmers, researchers of different disciplines, extension officers, officials, etc.) even if they have differing levels of education and experience. Due to their simplicity, the fact that they demystify traditional research methods, their multidisciplinary origin and emphasis, the tools give us a better understanding and appreciation of the situation (Grenier, 1998). This enables joint analysis and decision making with the local people on how best to improve / change local circumstances. The users become more informed about locally available resources. The tools can be used to generate information regarding a specific sectoral activity (such as housing, transport, health, agriculture, forestry, etc.) or they can be used to generate information for integrated activities, providing a holistic picture of the development priorities, resources and constraints in an area, either across all or only some sectors.

Like the tools used in the more traditional social science methods, the tools used in RRA and PRA are designed for specific purposes in order to examine specific areas of interest to the outsiders and the local people. Table 1 shows the purposes of the various tools.

Table 1

The more commonly used RRA / PRA Tools and their analytical purposes

Analysis	Tools
Resource Analysis	Social Maps Natural Resource Maps Farm Maps Census Maps Livelihood Maps Transect Walks
Seasonality Analysis (Some of these tools are extremely useful in Gender Analysis to note different roles, responsibilities and resources)	Seasonal Calendars Time Lines Daily Routines Time Clocks Flow Diagrams Trend Analysis
Institutional and Group Analysis	Participatory Diagramming - Venn and Analytical Diagrams
Preference Analysis	Matrix Ranking Matrix Scoring
Well Being Analysis (Often used for Gender Analysis to note sexual interpretation and distribution of wealth / ownership of resources)	Wealth Ranking
Problem Analysis	Pair-wise Ranking Problem ranking SWOT Analyses
Crosschecking and clarity	Semi-structured Interviews Questions of Clarity
Selection of Participants	Checklists Sampling Convenience sampling and self selection

Source: Adapted Guijt & van Veldhuizen (1998) and Lundall-Magnuson (2000)

Many of the tools listed above are important for gender analysis when used with single-gender groups for the purpose of analysing gender roles in various activities and

responsibilities, access to resources, wealth and well being trends, etc (Sims Feldstein and Jiggins, 1994).

The nine most common tools are discussed below. Of these only eight were used during this study. These were: semi-structured interviewing techniques; trend analysis using line graphs; pair-wise ranking; social and resource mapping; seasonal calendars; looping transect walks of farms; timelines; and the proportional analytical diagram. A ninth tool was used, the livelihood map (Ugandan colleagues reported its use in Kenya during a PRA training workshop at Eggerton University in 2001). It is a more recent inclusion to the PRA tools and is probably a result of the growing interest in the concept of rural livelihoods. It is also discussed below. The facilitation process is extremely important to generating and recording knowledge so the role of the facilitator is also discussed

Mapping and Modelling

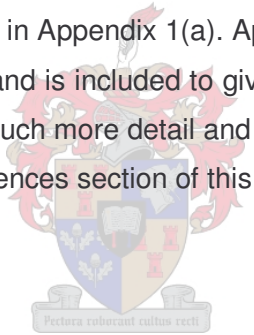
Mapping and modelling serve the same purposes and are discussed here together as mapping. The former is a two-dimensional map and is drawn on a surface (paper, cement floor, earth, wood etc.) while the latter is a three-dimensional model constructed from locally available materials (clay, sticks, stones, sand, leaves, grass, etc.) and is sometimes considered to be an improvement over mapping due to its ability to show more detail and to do this on a three dimensional plane.

Generally there are two types of mapping and while they are discussed separately here they are often included on the same map (Mascarenhas, 1990e & 1992, Narayan, 1996; Grenier, 1998).

1. *Social Mapping* is concerned with the social and physical infrastructure in the community such as housing, churches, shops, businesses, services, etc. Once the base map is drawn it is possible to add on other information such as residence patterns, health status, population and animal census data, economic status, etc. Social Mapping can be used to examine household size and make-up, economic status, animal and land ownership, health status, educational status, economic activities, residence period and patterns, etc. Information of this type is vital for planning (Mascarenhas, 1990e; Bulwer Participants, 1993, Chambers, 1994a).

2. *Natural Resource Mapping* is used to locate the natural resources such as water, forests, land, etc. The location, size, current use and condition of these resources can be analysed. Natural Resource Mapping is used to indicate the existence of water and the different sources, the different land types and usage, and for preparing soil treatment plans, nature conservation and other treatment plans (Mascarenhas, 1990e and 1992; Bulwer Participants, 1993).

Both types of maps are extremely useful introductory tools to the RRA process and foster interest and participation among the participants (Mascarenhas, 1990d). They both set the theme for the process in that the participants are encouraged to take charge of what takes place and what information is required (Chambers, 1994a). Mapping is important, as it would be irresponsible to construct a road that covers a large portion of the most arable land on which the local people depend on for their agricultural livelihoods. The map drawn by the residents of Gameru parish included both natural and social resources but was not done in any great detail. A copy is included in Appendix 1(a). Appendix 1(b) is a copy of a map drawn by the Bulwer Participants (1993) and is included to give an alternative example. Many maps of a single village tend to include much more detail and the interested reader is referred to the various manuals listed in the References section of this thesis.



Time Lines

This tool illustrates a chronology of events that have occurred in a particular area, community or organisation to generate a history or describe the evolution that has transpired over a specific period. Events may relate to the general history of a community or area, or to specific subjects, or to various sectors such as education, management, agriculture, etc. A time line of local agricultural practices can indicate changes in land use, growth periods, changes in crops and livestock, etc. It provides areas for further exploration and also provides the reasons for changes or events, lending a qualitative element to the information (Mascarenhas, 1990g; Bulwer Participants, 1993). Awareness and the understanding of cycles of change can assist the locals and the outsiders to focus on future actions (Grenier, 1998). Where a time line does not provide all the information desired then one of the other tools can be used to explore specific data in more detail. Another tool can also be used to verify the data recorded on the timeline. For example, the transect walk, discussed below, might indicate why a specific area was selected for cropping instead of an alternative use or

alternative area, or even why a practice is no longer carried out in a specific area. The time line generated during the current study (Time Line 1) can be found in Chapter Four. Two other time lines were also generated during the gender analysis carried out as part of this study and can also be found in Chapter Four. For comparison purposes Appendix 2 is a copy of the time line used by the Bulwer Participants (1993).

Transect Walks

Transect walks are planned walks across fields, the countryside/landscape and village in any given area or community from a predetermined point A to point B. They allow participants to see and discuss first hand a number of important issues including the physical environment, micro environment, local conditions, the use of local technology, management systems, problems and opportunities, agricultural practises, vegetation, non-farming livelihood activities, etc (Mascarenhas, 1990f; Bulwer Participants, 1993). Primarily, there are three types of transect walks: *Village Transect, Resource Transect and Historical Transect* (Mascarenhas, 1990f and 1992). The information produced is usually recorded on paper.

1. A *village transect* is a walk through the residential area of a village noting and recording the layout and places strong emphasis on the social aspects of village life. Social interactions between groups can also be observed at first hand at stages along the walk (Mascarenhas, 1990f).
2. *Resource transects* can be divided into five different types but all look at the different resources available: Straight (Classical) Transect; Zigzag Transect; Looping Transect (includes single and multiple loops); Water course or Nullah Transect and the Sweeping Transect. The differences stem from the direction in which the walk is taken and the number of groups available to do the walk (Mascarenhas, 1990f & 1992; Bulwer Participants, 1993).
3. The *historical transect* differs from the first two for a number of reasons. Unlike the first two the historical transect is not a walk. It is based on historical data that are generated by recall and are used to indicate trends that have taken place over a period of time (Mascarenhas, 1992). Changes can be in terms of resource use, population spread and growth, economic activity, or crop yields.

The use of transects are important for the assessment, planning, monitoring and evaluation of resource management and development projects. This exercise has the ability to establish a good rapport between outsiders and local people due to the varied and in-depth information that is generated and shared (Mascarenhas, 1990d). It is also valuable in identifying problem areas and possible solutions (Grenier, 1998). The outcomes of these can be recorded in a matrix and scored to determine their feasibility.

While 'Village and Resource Transect Walks' provide a wealth of information regarding current observations made during the walk the 'Historical Transect' is used to understand changes that have occurred over time to various social, natural and physical practises and resources. Transects are diagrammatic and very visual. As a result the 'Historical Transect' with its use of pictures to describe events can be used to replace the more written and less visual 'Trend Analysis' for groups that have a low level of literacy. The 'Historical Transect' was not used in this research. During the current research the 'Village and Resource Transect Walks' were combined and not done separately due to the fact that the agricultural land was situated in the village, rather than outside the village. Appendices 3 (a, b, c) are the transect walks that were carried out during this study and Appendices 3 (d, e) are examples of transect walks obtained from the study by the Bulwer Participants (1993).

Participatory Diagrams - Venn and Analytical Diagrams

Venn diagrams show the relationships between various groupings, institutions, organisations, programmes or individuals, both in and outside the community, and the local people / participants, as currently perceived by the local participants (Grenier, 1998). Usually different sizes of circles (representing institutions, etc) are drawn on paper / sand or placed on a wall and their distances from the participants / community (also indicated by a circle or other shape) are used to indicate the nature and importance of the relationship between the participants/community and the various institutions, organisations, programmes or individuals. The size of the circle indicates the extent of involvement in the area / village or the physical size of group, etc. Positioning of the circle will indicate the relationships between the groups and the participants or even amongst the groups themselves. For example the closeness or even overlapping of one circle with another or with that symbolising the participants might illustrate a good relationship while a distance might suggest a strained or weak relationship. These criteria must all be defined and recorded at the beginning of the exercise (Bulwer

Participants, 1993). Subsequent discussion about the positioning and size of circles provides information as to why the positioning takes its current form and what the problems are within any problematic relationships. The same can be said of strengths within a relationship. Data of a quantitative and a qualitative nature is obtained. A Venn diagram was not used in the current research but an example is provided in Appendix 4 and is taken from the Bulwer Participants (1993).

Other types of participatory diagrams were used in this study. In particular the *proportionality diagram* was used in order to obtain proportions of selected criteria rather than accurate figures. Local residents do not always have access to such figures but are more aware of proportions from their daily observations in the area. Typical diagrams are histograms, pie-charts and bar charts with variations of these becoming more common (Davis Case *et al.,* 1990; Grenier, 1998). In this study use was made of a proportionality diagram of a box in which the participants were asked to allocate representative portions to certain subjects or criteria such as sex, age groups or employment levels. The proportionality diagrams used in the study can be found in Chapter Four as Proportionality Diagrams 1 and 2.

Wealth or Well-being Ranking

This tool is used to generate information relating to the local criteria used to determine wealth or well-being in a given setting and also how local residents/participants fit into these criteria (Bulwer Participants, 1993; Chambers, 1994a; Narayan, 1996, Grenier, 1998). All the families/households/farms etc. within a community, village or selected area are listed on separate pieces of paper. A knowledgeable respondent is asked to rank the families. Firstly he/she must establish criteria for wealth such as Rich, Middle Class/Wealth/Income, and Poor. These criteria are listed and defined. Then the pieces of paper representing the households/farms are placed into the most applicable group. The tool can be very valuable when information is incorporated with that generated in Venn diagrams and other tools. When used in conjunction with Venn diagrams the information can clarify the relationships between different groups. When it is used with maps it can explain residential or ownership patterns. This tool was not used in the manner described above during the current study because of time constraints. However, the community identified and defined the local criteria for the local categories of wealth and well-being and these are described in Chapter Four.

Seasonal Calendar

This tool takes the form of a matrix that incorporates the locally defined months of the year (located on the horizontal axis) and is used to determine the seasonal patterns relating to items such as holidays/festivals, production and harvesting practices, employment, rainfall, etc. (located on the vertical axis) as these are locally understood (Mascarenhas, 1990g & 1992; Bulwer Participants, 1993). It can be used to indicate various seasonal trends such as agricultural practises, employment activities, availability of credit, crop yields, population movement patterns, health and disease, climatic patterns, etc. The seasonal calendars generated during the course of this study can be found in Chapter Five and are listed as Seasonal Diagrams 1 and 2. Appendices 5(a, b) are examples of seasonal diagrams obtained from Bulwer Participants (1993) and Appendix 5(c) is an example from Langill and Ndathi (1998).

Matrices and Scoring/Ranking

This tool is a matrix in the true sense of the word and is used to score or prioritise and rank certain criteria and issues. Before recording criteria/issues it is important that these are defined and that the definitions are recorded and understood by all participants (Bulwer Participants, 1993). The tool can be used in two ways:

1. *Pair-wise Ranking*: Issues decided upon by participants can be listed on the horizontal (top) axis and then the same issues are listed in the same sequence on the vertical (left-hand side or right-hand side depending on written cultural practices) axis. Participants proceed either horizontally or vertically deciding which one of each pair of issues is the most important / more serious, etc. The choice is then noted and the process is actually duplicated to ensure that answers are consistent. In other words, the process has an inherent crosschecking facility allowing for clarification and correction. After all the issues have been paired and ranked within the pairs the results are counted either horizontally or vertically. Issues occurring most often are ranked as being the most important. When issues have the same score participants are again asked to decide which one of the two or more issues is the most significant. This use of the tool is important in

determining the priority of the issues as understood and expressed by the participants (Bulwer Participants, 1993). It can be used to determine the priority of groups' needs, problems, etc. and the relevance of these to the group at a particular time. The pair-wise ranking matrix generated during this study to prioritise indigenous vegetables in the parish can be found in Chapter Five as Figure 15.

2. *Scoring:* Issues are listed on the vertical (left-hand side) axis and criteria deemed important to these issues are listed on the horizontal (top) axis. A scale is decided on and recorded. The group use the scale to determine the importance or the availability of the criteria to the issues. After the issues and criteria have been paired and scored within pairs the results are counted. Issues having criteria with high or low score (depending on the scale used) are then selected (Bulwer Participants, 1993). The use of the tool in this manner allows for the determination of the feasibility of selected projects by scoring the availability of resources for different projects or objectives. It is also useful to uncover the value that the group attaches to certain criteria such as different cures for certain illnesses and disease or the support of certain service providers for certain issues. This particular matrix was not used in the current study due to time constraints but it could have provided useful information on the value attached to certain uses of indigenous vegetables. Some of this information was partially captured in other ways. Examples of scoring matrices are provided in Appendix 6(a) taken from the Bulwer Participants (1993) and Appendix 6(b) which comes from the FAO (1996a).

Both these tools can be put to a number of uses and the second one can also be used to elicit more detail pertaining to what has been generated by the first tool. In some instances it can provide the 'why' to the 'what' and is commonly used to determine the feasibility of a project or activities when the availability of resources are ranked. Grenier (1998) suggests that besides these two uses of matrices they can also be used to record information and to focus the analysis of the discussions. In this instance the columns and rows have different labels and the intersection of a row with a column is used to comment on their intersection. During this study matrices were often used in this fashion as it proved to be time-saving, while also ensuring that those present could contribute and observe the recording process, allowing them to make corrections if the researchers misunderstood the discussion and recorded the data incorrectly. Examples of the matrices generated by the parish residents and farmers

during this study can be found as Tables 1 – 17 in Chapters Four and Five. They appear in their original format in this report unless otherwise indicated. An example of a matrix using diagrams is given in Appendix 7; source is FAO (1996a).

Trend Analysis

This tool takes on a matrix like form and is useful for looking at the trends that emerge in various practices over a specified period. The time frames are written or diagrammatised (in the case of illiterate people) in equal increments on the vertical axis and the items under discussion can be diagrammatised on the horizontal axis (Mascarenhas, 1990g; Bulwer Participants, 1993; Buenavista & Butler-Flora, 1994). A common variation of this tool is to represent trends in the form of either a bar chart or line graph (Bulwer Participants, 1993). Trends at certain times can be identified. In this instance the vertical axis might indicate criteria such as very good or very bad. The horizontal axis can indicate months or decades or some other time period. The perceived trends over the time periods are plotted on the graph. The tool can be used for examining how land use practices, employment opportunities, management practices, transport uses, etc. have changed over a specified period. Further discussion can indicate why changes have or have not occurred. If done regularly it is a useful monitoring and evaluation tool. The results from the trend analysis can often be crosschecked with the time lines. Examples of the trend diagrams generated in this study are listed as figures and can be found in Chapters Four and Five. Appendix 8 provides 2 examples of trend diagrams, obtained from FAO (1996a).

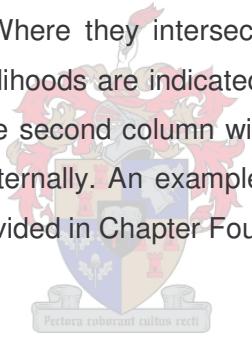
Semi-structured Interviewing

Research involving the use of RRA or PRA is sometimes seen as a process of interviewing local people using the various tools as means to capture and interpret the data that is generated (Mascarenhas, 1990c). However, the tools not only perform this function but also raise further questions, either regarding content and / or clarity that can be answered by means of semi-structured interviews with members of the same group or with key people. These people are asked specific open-ended questions or are given open-ended prompts in order to obtain further information. The process is informal and conversational, allowing new topics to be explored as the process develops (Grenier, 1998). This tool is often also used when first meeting with gatekeepers and local representatives to get a preliminary overview of

the situation. Semi-structured interviews can be done with either small groups (often focus groups) or individuals. A scribe can capture the data or video cameras and cassette recorders can be used to record these interviews. However, the latter equipment can be intimidating to some groups and individuals so their use is cautioned. During the current study a number of the members of the research team acted as scribes, either simultaneously or at differing times, to record the data.

Livelihood Map

The livelihood map is used to look at what the main sources of local livelihoods are and whether they are found in the study area or outside of the study area (Patrick Rubaihayo, personal communication June 2002). Three columns or two overlapping circles can be drawn in soil or on newsprint. The first and third columns are labelled *local* and *external* respectively, while the second column is labelled *both*. If two overlapping circles are used one must be labelled *local* and one *external*. Where they intersect must be labelled *both*. Locally and externally available sources of livelihoods are indicated under the respective headings while the intersection of the circle, or the second column will contain those sources of livelihoods that are found both locally and externally. An example of the Livelihood Map generated by parish residents in this study is provided in Chapter Four as Livelihood Map 1.



The Facilitator

The facilitator is not a tool but has a key role in the process of generating information. There is usually at least one main facilitator per group of participants. Co-facilitators can accompany this person. The more skilled the facilitator the greater the likelihood of obtaining information of a high quality, similarly the more focused the discussions will be and the clearer the knowledge generated. The facilitator acts a guide and a catalyst, ensuring that information is generated and that everybody who wants to contribute is encouraged to do so (Narayan, 1996). According to Guijt and van Veldhuizen (1998) this person is trained to develop an ordered process that considers the emerging issues from a systems perspective rather than concentrating on a narrow slice of reality. In our discussion on the distinction between RRA and PRA we will see that a main distinction between the two approaches is the level of participation by the rural inhabitants that occurs during the process.

Depending on their skills the facilitators can encourage or discourage participation (Narayan, 1996). If the facilitator uses the tools purely in an extractive fashion in much the same way as a conventional questionnaire is used then he or she will not encourage local empowerment or social transformation. The facilitator needs to be creative and observant. Mascarenhas *et al.,* (1991) have proposed that the behaviour and attitude of outsiders needs to change so that local people can confidently and capably express their knowledge, analyse their situations and assert their priorities rather than have these imposed upon them from the outside. This stresses the importance of the facilitator's role. By means of group discussions and analysis local people share knowledge among themselves. They also share this knowledge with the facilitators and other outsiders on the condition that they do not impose their own reality and ideas unless asked to do so. However, should the outsider be aware that some of the inferences and decisions made during the process might have detrimental effects to the local community members then I believe he or she has the obligation to point this out. Where possible this should be done using the information at hand. The facilitators share what they learn with the local people and also with other outsiders.

Integration of the tools

Many of these tools can be integrated with one another to crosscheck and verify data. They can simultaneously be used to collect further information that can be used for obtaining clarity as well as verification of information. A brief example will explain this. Social and resource mapping can be done of the present and past conditions in the village. This will prompt people to look at how the current conditions came about and this information can be recorded in a time line or captured by a scribe. The social and resource map can be used to get an idea of the business areas or the agricultural and fallow areas, etc. This can be further explored by means of a transect walk which can also be used to verify the information in the social and resource map. The transect walk will provide locals with cues and will prompt researchers to ask more questions. A trend diagram of land use patterns can be compiled and would be another source of verification and knowledge generation. This process can be taken further and a social and resource map can be drawn of the expected or desired future situation. Discussion can then look at why a negative future scenario is indicated and how this can be avoided. Such a process combines local perceptions of temporal and spatial dimensions of local changes in land use, prompting further discussion. This could result in a participatory planning process to determine how the best future option could be realised. The

use of the RRA / PRA tools in such a process would generate information that would take a conventional questionnaire survey a couple of weeks to uncover.

Rapid rural appraisal and social science research methodology

In the preceding discussion we have seen that RRA has originated from a number of research methodologies, including those of the social sciences and involves a mixture of natural and social science techniques. Given the influence of the social sciences within the development of RRA we now examine how the approach fits within the three main methodological paradigms of the social sciences: quantitative, qualitative and participatory.

RRA tends to be predominantly qualitative in method, relying heavily on qualitative techniques and data analysis. Subsequently it tends to generate trends, patterns and insights rather than statistics. However, the tools also allow for the collection of some quantitative data. This is largely in the form of descriptive statistics. These are usually collected by means of matrices and on maps and diagrams. The type of information can include population characteristics and sizes, number and type of water sources, etc. Tools such as graphs indicate patterns, trends and proportions rather than absolute numbers. Some practitioners have argued that there is no reason why mini-questionnaire surveys cannot be done and use made of inferential statistics after the relevant questions have been identified by means of RRA or PRA (Thomas-Slayter, 1995; Matata *et al*., 2001). This would necessitate the use of representative sampling procedures to allow for the making of inferences. However, there is no reason why, where necessary, more quantitative data cannot be collected as part of a RRA / PRA process.

Chambers (1994a) draws our attention to the fact that RRA tools are able to produce worthwhile quantified data and can be used as complements to questionnaire surveys. In the early 1990s the National Council for Applied Economic Research in India (NCAER) undertook a research project to contrast RRA / PRA tools with those of the survey questionnaire (Chambers, 1994b). The NCAER found that these tools were able to provide valid and reliable qualitative and quantitative data at village level. At state level the tools were found to provide good ratio estimates for many of the variables. The questionnaire survey sampled 120 villages while the RRA tools were only used in ten. In the report of this study NCAER

officials argued that it was conceivable that if the number of villages was increased then the RRA approach would very likely provide equivalent data while using a smaller sample of respondents in each village than required when doing a questionnaire survey (Chambers, 1994b: 1443). Other surveys using questionnaires that were carried out in Africa and Asia also verified that very little conflicting or new data was collected in comparison to the use of participatory methods using the RRA / PRA tools (see Guijt and van Veldhuizen, 1998).

The fact that RRA is a combination of qualitative and quantitative methodologies allows it to collect a wide variety of data, such as spatial, temporal, social and institutional, discrete, and cultural data without having to change methods and methodologies (IFAD, ANGOC and IIRR, 2001). This is a time saving factor for it allows the reliable collection of a wide range of data by means of simple and easy to use tools. According to Guijt and van Veldhuizen (1998) it also makes "… trade-offs between the quantity, accuracy, relevance and timeliness of [the] information collected and analysed". The wide range of quantitative and qualitative data that is generated makes the tools appealing and acceptable to natural scientists, statisticians, social anthropologists, bureaucrats and extension officials alike (Chambers, 1994b). This undoubtedly makes RRA / PRA tools extremely valuable for use in multidisciplinary teams that are required in agricultural research and especially when they work in an interdisciplinary fashion.

According to Beebe (1995) RRA has three basic principles that strengthen its ability to collect valid and reliable data:

- It follows a *systems approach* in that the subject under study is assumed to be part of an integrated system. In order to understand the role, function and place within the system it is necessary to get an 'insider perspective' before formulating hypotheses (see Grenier (1998) for a similar view when RRA is used to collect information on indigenous knowledge systems).
- *Triangulation or crosschecking* is done on two fronts. Firstly, when information obtained from the tools is triangulated with information from other tools and sources, allowing for verification. Secondly, by retaining clarity about each person or group's tendencies towards bias (locals and researchers), the sources of information, and the system itself. We shall see in Chapter Six that the awareness of inherent biases in these three areas has often not been maintained. While locals

might or might not provide all the necessary information in an unbiased manner it is just as likely that the extension officer or researcher, who are both intrinsically embedded in a political system, can also provide biased information. In recent years greater emphasis has been placed on this second front, especially with regard to how it can affect knowledge generation (see Scoones and Thompson, 1994a).

- *Iterative data collection and analysis* throughout the process. As the information is generated and recorded it is used to modify the research process by means of feedback and reflection with team members and others involved. This looping process does not detract from the rigorous and systematic way in which the data is recorded but allows it the necessary flexibility to ensure that the process is in fact effective in understanding the local context and perspective on various issues. If done correctly this can reduce the influence of the biases noted above.

In the discussion on the origin of RRA we noted that besides being a cost-effective approach, it was also developed to get an "insiders' perspective" on the local circumstances and to bring about a more bottom-up approach to rural development, thereby reversing the conventional practice of research in development (Chambers, 1992; 1994a). In the previous discussion we saw that this necessitated researchers, often with their own agendas, interacting with locals in the form of dialogue to determine what the local issues were and how best to go about identifying and implementing improvements. It has been argued that out of necessity this implies some participation of the locals in the research process, especially in terms of generating knowledge and discussing the local circumstances (Dunn, 1994; Matata *et al*., 2001). While RRA is typically viewed as an extractive approach as explained previously (Chambers, 1992; 1994a; 1994b), it also seemingly involves a necessary element of participation by local residents and farmers. This element of participation and the fact that PRA subsequently developed out of RRA makes it necessary to discuss RRA in terms of the participatory research paradigm of the social sciences.

The participatory research paradigm in the social sciences

Within the social sciences the participatory research paradigm is relatively new, owing its development to action research (AR) work done in the 1940s which was later refined to the

development of participatory action research (PAR) in the developing countries during the 1970s. Mouton (2001) stresses that there are a number of debates which surround participatory research and PAR in particular. The understanding of what does or does not constitute participatory research is complex. Sometimes radically different research approaches are termed participatory. In other cases very similar approaches are given different labels by different practitioners and to achieve clarity we need to attach distinctly different labels to distinctly different phenomena (Mouton, 2001:94).

The approaches of PRA, RRA and PTD (Participatory Technology Development), as used in agriculture, provide us with good examples of this complexity. Within agriculture participatory research is often used to refer to the practice of researchers and farmers jointly developing technology. However, this can probably be more correctly understood as the participatory development of technology and go by the name of Participatory Technology Development. PTD is an activity in which participatory methods are used to develop appropriate technology. Participatory research is more along the lines of PRA and sometimes RRA, although even here there is some disagreement (Guijt and van Veldhuizen, 1998 and Matata *et al.,* 2001). Participatory research does not necessarily involve the development of technology. It is something that is done throughout the process of interaction between the researchers and the local residents. It involves the generation, recording and analysis of social (village and resident profiles, gender analysis, etc.) and technical data (rainfall patterns, land size and use, herd size, existing practices and technology, etc.), which might be used to bring about social change, policy formulation or some other end.

In an attempt to reach clarity on what is and what is possibly not participatory research, and to place RRA within the participatory paradigm debate we can begin by contrasting action research (AR) with PAR. According to practitioners AR actually implies participation and would in fact be impossible without participation, because the research process is carried out in collaboration with those who experience a problem or with their representatives (Mouton, 2001). In the previous section a similar issue was raised with regard to RRA. We may well ask, what is the requirement that makes the addition of “participatory” justified to distinguish between AR and PAR?

According to proponents, PAR not only implies greater participation but more importantly it redefines the concept of participation by giving researcher status to all the participants in the

process (Mouton, 2001). Here participation is understood as the co-management of the research process and the co-generation of solutions to problems and new knowledge. The emphasis is on the co-researcher status of locals whose knowledge is equally required for "valid scientific sense making, as is outsiders' technical expertise and abstract general knowledge" (Mouton, 2001: 95).

Fals-Borda (1988) has argued that action research, as opposed to participatory action research, does not attempt to bring about social transformation but rather maintains the political status quo in terms of the power relationships between the poor and the wealthy. While both AR and PAR aim at gaining knowledge and taking action, added to PAR is the purpose of redressing inequity and redistributing power. Simply put AR aims at social reform while PAR aims at social transformation (Mouton, 2001).

If we consider this argument within the current international debate on farmer participation (Chambers *et al.,* 1989) and farmers' knowledge (Scoones and Thompson, 1994a) and if we accept Fals-Borda's (1988) argument then RRA is closely related to AR and more likely to look at social reform while PRA is more closely related to PAR, involving a political element and more concerned with actual social transformation (Guijt and van Veldhuizen, 1998).

Despite the implication of participation in AR there are numerous examples of non-participatory action research in which the subjects of the research do not participate in the research process. According to Mouton (2001) this is applied research which does not require participation. It is action research in the sense that the research informs the need for and type of action required. The argument is that only action research processes having the following characteristics can be given the title of PAR (Mouton, 2001):

- Local people are involved in setting the research agendas;
- Local people must participate in data generation, recording and analysis;
- Local people control the use of outcomes while there is shared ownership of the research process and the products of this process;
- The separation of the researcher and the research subject is removed – all involved are now researchers;
- It is political in that it aims at social transformation and considers the question of whose interests are best being served by the research process and its outcomes.

We shall see later in our discussion that it is precisely these characteristics, inherent in PRA, which distinguish it from RRA.

Fals-Borda (1988) stresses that a major distinguishing characteristic between PAR and AR is their respective origins in the Southern and the Northern Hemispheres, coupled with the fact that they are each predominantly practised in their respective hemispheres of origin. He argues that where it is practised determines whether it is PAR or AR and therefore participatory or not participatory. This debate is problematic in terms of RRA and PRA as these have been continually practised and refined in both hemispheres. Given that their origin is probably more Northern because Chambers and Conway are European this might lend credence to Fals-Borda's argument. However, the approaches and tools were developed and evolved out of the work that they and others did in India and Kenya (Chambers, 1994b). By the mid-1990s the use of participatory appraisals and PRA tools spread to approximately forty countries in the South, of which most could be described as developing countries, and were refined by southern practitioners and farmers (Chambers, 1994b). At the same time the use of PRA was spreading to the countries of the North, including the United States, Canada, Germany, the United Kingdom, Switzerland, and Norway (Chambers, 1994b; IIED, 2000). Participatory appraisals and the use of the RRA or PRA tools are therefore not only applicable for situations found in the South and Fals Borda's distinction probably does not apply. Both RRA and PRA have been put to some of the following uses in countries in the North and South (Chambers, 1994b, IIED, 2000):

- Policy research and analysis in Canada and Tanzania;
- Village or community level assessments, planning, monitoring and evaluating in Indian rural villages and inner cities in the United Kingdom;
- Natural resource management in Scotland and India;
- Social intervention programmes for disadvantaged groups in deprived areas of the North and South;
- Japanese urban planning;
- Organisational development in large multinational corporations.

Some scholars consider PAR as the convergence of action research and participatory research implying that it is participatory research which leads to action (see Rahman, 1993

and Brown, 1993 in Mouton, 2001). Others such as Cornwall and Jakes propose that PAR is a type of participatory research (Mouton, 2001). To clarify the issue better we need to consider the origins of participatory research, as it is understood in the social sciences. It emerged as a result of the increased emphasis on participation in development activities in the Third World during the latter part of the 1970s. Participation promised a new version of development that was populist, bottom-up (in contrast to top-down) and free from the usual colonial and techno-economistic constraints of the conventional approaches (Burkey; 1998). It was also believed that the participation by local residents in research and development activities would not only ensure appropriate interventions, but also local commitment and thus sustainable development. In the words of the former Vice-President of the International Fund for Agriculture (IFAD):

> "A meaningful rural development programme is one which not only obtains the political commitment of the government, but also implies the full commitment of the rural communities concerned. Hence the importance of a participatory approach to the design and implementation of such programmes" (Mensa, 1994:2).

Brown and Tandon (1983) have characterised participatory research in the following way (Mouton, 2001:97):

- The problem is identified in the community;
- It ultimately aims at the cardinal structural transformation and improvement of the lives of the participants;
- The community participants are involved in the management and control of the whole process;
- It strengthens peoples' awareness of their own abilities and resources while supporting their mobilisation and organisation;
- The term researcher is applied equally to all participants, both those with and without formal training as well as to insider and outsider;
- The external researchers are committed participants and learners in a process that results in assertiveness rather than detachment.

We can recall that this set of characteristics includes some of those highlighted for PAR and we shall see later that it is precisely these characteristics that are used to distinguish PRA

from RRA as most of these characteristics are found in PRA but not in RRA (see also the debates in Chambers *et al.,* 1989 and Scoones and Thompson, 1994a).

In agriculture and rural development many variants of participatory research have been developed, such as PRA, Community Based Natural Resource Management (CBRNM), Research for Agricultural Development (RAD) and PAR (Rahman 1993) to name a few. So PAR could also be considered to be one of the many variants of participatory research and Reason has argued that it is the most widely practised of these approaches (see Mouton, 2001: 98). Given this, PAR and participatory research are likely to share many common features and as was previously pointed out the comparison of their characteristics confirms this. Mouton (2001) points out that in the development context these two terms are in fact used interchangeably. However, there is justification for the use of separate terms because participatory research can occur in which people participate in the process without any action being planned or implemented. Mouton (2001) suggests that in such a case the research is participatory but that the term PAR can only be applied when such a project evolves through action developed, planned and implemented by the researchers and the participants. Here the crux is that the project must evolve into action with the continual involvement of the participants in the project activities.

Apart from the distinction of the need for action PAR can also be understood as a type of participatory research in which the type or level of participation is distinguished. This is to say that research processes or activities that are currently termed participatory research actually involve different levels of participation. Mouton (2001: 99) identifies four modes or types of participation.

1. *Contractual* – Local people are contracted into projects and take part in the investigations and experiments that have been designed by researchers.
2. *Consultative* – The researchers ask people for their opinions and consult them prior to designing and implementing interventions.
3. *Collaborative* – The researchers and the locals work together on projects designed, initiated and managed by researchers.
4. *Collegiate* – Local people and researchers work together as colleagues, offering diverse skills, in a process of mutual learning in which the locals have control over the process.

When considering these four types of participation PAR might be defined as a variation of participatory research that aims towards a more collegiate and collaborative research process coupled with the need for action. Other scholars, particularly those involved in agricultural development, argue that the issue of participation is not clear and that one needs to distinguish between the concepts of participation and participatory (Mikkelsen, 1995).

The issue of different types of participation

During recent years both the concepts of participation and participatory have become buzz-words in agricultural and rural development circles to the extent that they are often misused and abused as token lip-service, in the attempt to obtain credibility and funding for projects. Given the frequency of these misstatements there is a need to analyse current understandings of participation. According to Mikkelsen (1995) participation is defined as the voluntary involvement of people in interventions, but without their taking part in the decision-making. While some might rightfully object to this being termed participation because the local people are merely present it is considered important to this discussion. All too often I have heard development workers, researchers and agricultural officials talk about the participation of local farmers in their projects or research activities when in fact all that is taking place is that locals are present, are observing the outsiders and provide information when asked. The term participation is tagged to an activity in an attempt to give it credibility, although participation is not really taking place. In light of similar practices, four types of participation are usually identified in agricultural development (Matata *et al*., 2001:79):

1. *Passive participation* – most decisions are made by the project staff who in turn tell the local people what to do. This is mostly one-way communication between the project staff and the locals. It is possible that this is a version of contractual participation identified by Mouton (2001);
2. *Active participation* – the local people interact with the project staff and two-way communication occurs. This is possibly a mixture of consultative and collaborative participation;
3. *Participation by subscription* – local people are allowed to subscribe to the project. In return they will receive some benefits from the project. In a sense this is

contractual participation in that in return for community action the project will reciprocate;

4. *Participation based on locally expressed needs* – planned activities respond to locally expressed needs but the locals do not necessarily take part in designing and implementing the project although it is definitely demand driven. This is probably similar to consultative participation.

None of these four types consider the idea of researchers and locals working together as colleagues who are involved in a mutual learning process in which the locals have control. Consequently, within the discussion of action research and RRA these four types of participation can essentially be considered to bring about social reform but not social transformation, as suggested by PAR and PRA.

Mikkelsen (1995) distinguishes the concept of participatory from levels of participation in that for him the former concept implies that local people make decisions over their own lives. According to him they participate in all stages of the project from conceptualisation, design, implementation and evaluation and make most of the decisions regarding the process. Autonomy lies with them and this type of process often results in empowerment and self-mobilisation – everybody having the right and capacity to make decisions concerning their own lives. In a sense their participation is so complete that it transforms them and subsequently the status quo. In the grammatical sense participatory is an adjective while participation is a noun. In our discussion so far participation has always be preceded by an adjective. However, Mikkelsen is using the concept of participatory to refer to the highest level of participation in a research process, to distinguish it from other levels of participation. He therefore seems to apply the label of participatory research only to a process that includes the characteristics identified by Brown and Tandon (1983) and Mouton (2001). Following from this, I would suggest that there is in fact a fifth type of participation that can be added to the list of Matata *et al.* (2001); full or complete participation which embraces the characteristics that Mikkelsen considers to be embodied in the concept of participatory – it is participation that is empowering, leading to self-mobilisation and transformation. It also needs to be added after the term collegiate to the list by Mouton (2001:99) as collegiate does not suggest the idea of empowerment and transformation, only that of collaboration and co-ownership.

Pretty (1996: 7,8) identifies seven types of participation (see Table 2) that range from manipulative and passive participation to self-mobilisation where people are predominantly independent of external institutions and make most of the key decisions. While she does not distinguish between participation and participatory her argument is that participation can be understood along a continuum from no participation to self-autonomy.

Matata *et al.* (2001) and Mouton (2001) presented a similar understanding of participation although not as extensive. However, Mikkelsen (1995), who seems to be a purist, only labels those practices that ensure self-mobilisation and transformation as participatory, thereby discounting other types or levels of participation as not actually being elements of participatory research. However, while informative to our discussion Mikkelsen's use of the term participatory is grammatically confusing and I will opt to go with the idea of different levels or types of participation within participatory research rather than using an adjective to conceptualise what is generally considered to be the highest and most desirable level of participation. Rahnema (1992) suggests that participation in the form of Pretty's types one to four is unlikely to have any long lasting positive effect on local people's circumstances, while Hart (1992) argues that these first four types should in fact be considered types of non-participation because manipulation is often used. At his point the debate could probably continue but given that there is general agreement of the existence of various levels of participation I would argue that we should accept Pretty's notion of a continuum of participatory research as it is the most encompassing. If we do this then we are justified in putting RRA and PRA on a continuum of research approaches to ensuring participation and empowerment, with the understanding that while RRA does not ensure empowerment and self-mobilisation PRA developed out of it to ensure this (Chambers *et al.,* 1989; Mascarenhas, 1990a, Matata *et al.,* 2001, IIED, 2002). RRA is then understood as a type of participatory research just as AR, PAR and PRA can be so understood. When talking about participation and participatory research in this study I will follow Pretty's understanding and her types.

During the current study, given the constraints that are discussed in Chapter 3, the RRA / PRA tools were used in a more extractive manner rather than one in which empowerment, self-mobilisation and social transformation is emphasised. Consequently, I place the emphasis on RRA, as the method of participatory research used, rather than PRA. However, a number of attempts were made to implement the research process in such a way that active

participation was encouraged. In terms of Pretty's typology the research was probably carried out in line with a mixture of types three and five. Based on these attempts to extend an element of participation to the process we now need to look at the evolution from RRA method to PRA because the use of PRA was the research team's first choice although it was not applied in the study.

Table 2

A Typology of Participation: how local people participate in development projects

Type	Characteristics of Each Type
1. Manipulative Participation	Participation is simply a pretence, with 'people's' representatives on official boards but who are unelected and have no power.
2. Passive Participation	People participate by being told what has been decided or has already happened. It involves unilateral announcements by an administration or project management without listening to people's responses. The information being shared belongs only to external professionals.
3. Participation by Consultation	People participate by being consulted or by answering questions. External agents define problems and information gathering processes, and so control analysis. Such a consultative process does not concede any share in decision making, and professionals are under no obligation to take on board people's views.
4. Participation for material incentives	People participate by contributing resources, for example labour, in return for food, cash or other material incentives. Farmers may provide the fields and the labour, but are involved in neither experimentation nor the process of learning. It is very common to see this called participation, yet people have no stake in prolonging technologies or practices when the incentives end.
5. Functional Participation	Participation seen by external agencies as a means to achieve project goals, especially reduced costs. People may participate by forming groups to meet predetermined objectives related to the project. Such involvement may be interactive and involve shared decision making, but tends to arise only after major decisions have already been made by external agents. At worst, local people may still only be co-opted to serve external goals.
6. Interactive Participation	People participate in joint analysis, development of action plans and formation of strengthening of local institutions. Participation is seen as right, not just the means to achieve project goals. The process involves interdisciplinary methodologies that seek multiple perspectives and make use of the systemic and structured learning process. As groups take control over local decisions and determine how available resources are used, so they have a stake in maintaining structures or practices.
7. Self-mobilisation	People participate by taking initiatives independently of external institutions to change systems. They develop contacts with external institutions for resources and technical advice they need, but retain control over how resources are used. Self-mobilisation can spread if governments and NGOs provide an enabling framework of support. Such self-initiated mobilisation may or may not challenge existing distributions of wealth and power.

Source: Pretty, 1996:7; 8

The desire for increased participation and the emergence of participatory rural appraisal (PRA)

At the same time that RRA was developing on the Asian continent in the 1970s participatory research and participatory action research were developing in Latin America. While some have argued that RRA is participatory and falls within the participatory research paradigm and is the same as PRA (Dunn, 1994; Matata *et al*., 2001), others might argue that this is not the case as it is rather PRA that is more likely to fall within the participatory action research paradigm (Mikkelsen, 1995) while RRA is not. Our preceding discussion identified a number of characteristics of participatory research, many of which are not evident in RRA but we shall now see that most are evident in PRA. This will strengthen the contention that RRA and PRA should be seen as different points along a participatory research continuum.

The development and use of RRA was able to elicit a range of quality information and insights that had previously been unobtainable with traditional research methods. However, its essentially extractive nature and the limited participation it encouraged with the local residents led to dissatisfaction with the rapid rural appraisal approach during the later part of the 1980s, resulting in the development of the participatory rural appraisal, which increased the number of techniques used and encouraged increased participation (Chambers *et al*., 1989;Chambers, 1992; Chambers, 1994a). This approach not only entails shared knowledge but also shared analysis, creativity and commitment to the process. It is the evolution and application of simple, structured interactive techniques based on game theory and social science research methods, which are able to produce reliable information through means of dialogue and group work (Shepherd, 1998:200). Since the late 1980s until the present an increasing emphasis has been placed on the participation of the beneficiaries of agricultural development interventions, their empowerment and subsequent self-mobilisation. It is argued that not only must conventional research and extension be aware of local circumstances and work with local knowledge to improve these, but it must do so in such a way that local people participate in the entire process and develop extra skills that empower them to act on their environment. As Grenier (1998) explains, the rural inhabitants must become the main investigators, analysts and applicators. It is believed that this type of integration will lead to sustainable development (Chambers, 1994a; Pretty, 1996; Sheperd, 1998). PRA emerged

from RRA as a result of wanting to ensure sustainable development by means of increased awareness and self-mobilisation that would result in social transformation.

One could argue that RRA and PRA are essentially similar methods (Dunn, 1994; Matata *et al*., 2001), sharing much in common because the latter grew out of the former and that they generally have access to and make use of the same tools (Davis Case, 1990). However, there are some very important differences between the two approaches i.e. the way in which the tools are used and the emphasis that is placed on certain tools:

1. PRA is based on the same research traditions as RRA but includes an emphasis on participatory action research (PAR) following the work of Paulo Freire and Fals Borda in which empowerment and social transformation are emphasised. Shepherd (1998) distinguishes between a set of techniques (RRA) and a set of techniques wrapped up in a participatory approach (PRA);
2. The process of information gathering in RRA is such that the information is extracted, analysed and owned by outsiders while in PRA the emphasis is placed on the insiders and outsiders jointly producing, analysing, sharing and owning the produced knowledge as part of a process of their mutual empowerment. All relevant information and reports possessed by the outsiders are shared with the locals (Chambers, 1992);
3. With PRA insiders ultimately own and control the knowledge that they generate. Chambers (1994a, 1994b) cites examples and gives references to examples in which insiders have owned the information and used it to their own purposes and benefit (see Ashby *et al*, 1997 for an example of this occurring in participatory technology development). In other methods, including many uses of RRA, the generated knowledge is recorded and removed for further analysis but in PRA the recorded information is supposed to be analysed with the locals. The records of original information and analysis tend to be left behind or copies are given to the locals. Locals can now act on this information as and when they please (Narayan, 1996; Grenier, 1998; IFAD, ANGOC & IIRR, 2001). A review of the PRA literature suggests that if this is not done then the process is not participatory and is not PRA but rather RRA, despite it often being given the name PRA;
4. In PRA the outsiders act largely as facilitators and only contribute their specialist knowledge once the issues have been identified and discussed by the local

people. Outsiders are another source of information and not necessarily the controllers of information;

5. In RRA the approach aims for consensus or general agreement with issues while in PRA negotiation, trade-off and difference are highlighted;
6. PRA includes in its repertoire a number of tools that encourage local people to express themselves in various ways, including role-playing and mini-dramas (Narayan, 1996). These are not found in earlier RRA activities.
7. RRA was initially a once-off investigation at the beginning of a project or to identify a possible project. The use of PRA has been similar but the tools and processes are usually used throughout the project lifespan making it a continuous process of participatory knowledge generation, reflection and action (Guijt and van Veldhuizen, 1998). If this is not done then PRA essentially loses its participatory characteristics, to follow Mikkelsen (1995) and reverts back to RRA (Chambers *et al.,* 1989).

The fundamental differences seem to be in the way in which the tools are used, i.e. in the approach. PRA stresses complete or meaningful participation that is associated with interdependency leading to empowerment and self-mobilisation while RRA does not stress these criteria. Cornwall *et al.* (1994:109) acknowledge that both approaches are valuable for they "offer a creative approach to information sharing and a challenge to prevailing biases and preconceptions about rural peoples' knowledge." However, they caution against the often, common trap of applying the tools mechanistically and warn that the application of PRA is often not participatory in the true sense but rather a term applied to short-cut research (*ibid.*) such as RRA to give it credibility. This is a concern emphasised by Chambers (1994a) and Grenier (1998). It is therefore likely that PRA can become more like RRA if it is not applied as intended – to bring about empowerment, self-mobilisation and social transformation.

Matata *et al.* (2001) point out that the main difference between PRA and RRA is theoretical and argue that in practical application the theoretical extremes are unfounded because in application both approaches exhibit elements of extraction, outside facilitation and are able to contribute to capacity building and empowerment of all involved. They suggest that in practice both approaches reach a middle ground in which outsiders can initiate or facilitate the process, but subsequently, the local people take greater control as the process develops and

knowledge is shared. The implication is that neither process can claim to be exclusively participatory as stressed by Mikkelsen (1995). Rather it is up to the people who partake in the process and the manner in which the process unfolds, or is allowed to unfold, that determines the level of participation and the strength of the participatory outcomes of the process, i.e. empowerment, self mobilisation and social transformation. We should remember that participatory research is equally exposed to gatekeepers, opposition and bias as qualitative and quantitative research. The intention, on the part of the researcher, who opts to use a participatory methodology, should therefore be to strive to ensure that such a process is allowed to be participatory to the extent that it encourages participation, is empowering and leads to self-mobilisation, while simultaneously gathering and analysing data. It should also control for biases and undue influences of extraneous variables where possible. Chambers (1994a) draws the distinction between RRA and PRA in that the former is about getting more relevant and reliable research data, while the latter includes rethinking the communication between the development agents and the local people during the data collection process. PRA collects data by means of visual diagrams that encourage groups of locals residents to reflect on their knowledge of local circumstances in ways that lead to locally driven action and change.

One of the important effects of their participation in the PRA process and the use of the tools by local residents is that they make use of a scientific research method that includes both qualitative and quantitative data collection and analysis. By virtue of their participation in the process local capacity is increased, allowing them to understand the tools and their use, and their self-esteem is raised. They are able to use a scientific research method that was previously alien to them, for their own purposes. Narayan (1996) points out that PRA is about capacity building and that this requires much more than the exposure of participants to a set of participatory research techniques and their inclusion in the research process, which is what normally transpires in the typical RRA process:

> "[Capacity building] is the result of a sustained process involving new experiences, reflection, analysis, exploration, decision making, acting and evaluation. At some point in this process, the researcher's role must give way to the facilitator's role and the human development objective must override the more extractive data-gathering objective (1996:142)".

If local people use the PRA approach regularly they can become skilled proponents in this approach, to the extent that they educate scientists and other professionals in its theory and use (Chambers, 1994a and 1994b, Mascarenhas, 1990a–g). Such a result would be unlikely in a RRA process because the locals would not be encouraged to use the tools and the manner in which the process is carried out would prevent them in getting any real experience in the tools.

Conclusion

This overview of the development of participatory research in both academic and applied fields stresses that the core principle is the participation of the respondent in the process. The discussion indicated that participation means many different things to different people. RRA and PRA are only two of a number of methods in the participatory research paradigm. This paradigm has developed a set of research methods that can be located on a continuum from no participation to complete participation. Those closer to the latter end of the continuum not only foster the participation of the beneficiaries of the research but simultaneously promote their empowerment. The participatory research process is not only a research process but also a social, political and cultural process. The political process is indicated by the power sharing between researcher and subject, the reversal of historical roles and the ultimate process of social transformation. While borrowing from the two traditional methodological paradigms (the quantitative and qualitative paradigms) it is the political element of wanting to invoke change that distinguishes participatory research from these two methodologies.

To simplify the distinction between PRA and RRA we can consider them to exist not only on a participatory research continuum but also on an empowerment continuum. I would suggest that RRA would lie closer to the centre while PRA would lie very close to that end emphasising empowerment and transformation of the status quo. In terms of Pretty's (1996) typology RRA would probably be situated between types 3: Participation by Consultation and 5: Functional Participation, while PRA would be type 7: Self-mobilisation.

The techniques and principles of rapid and participatory appraisals have allowed numerous people to empower themselves by understanding and applying the approaches to improve their own circumstances. The success of this is evidenced by the many instances where they

are used and the fact that PRA practitioners in the South have improved and adapted the techniques, and have trained many scientists in the North (see Chambers, 1994a and 1994b, and Narayan, 1996 for examples). The growing acceptance and application of RRA, and more importantly PRA in recent years is an indicator of its worth, its recognition and increased acceptability within the international scientific community, and the numerous situations in which it can and is used. With regard to the preference of using RRA or PRA, we have seen that Grenier (1998) suggests that RRA techniques, such as the nine described at the beginning of this chapter, can be used to obtain an intimate knowledge of the local area in a short period of time. She posits that the newer PRA tools can then be used to move towards empowerment and self-mobilisation of the local residents. She notes that the use of participatory methods does not guarantee participation and empowerment as we have discussed these here; the approach used and the facilitation and communication skills of the users are important (see Chambers *et al*., 1989 and Scoones and Thompson, 1994a for similar arguments). RRA, PRA and other participatory approaches make no claim to being perfect nor do they profess to be free of extraneous variables but then which methods within the social and natural sciences can make such a claim?

Given the issues discussed in this chapter, PRA would have been the better approach to use in the study of indigenous knowledge in Uganda, but given the various constraints that were encountered a trade-off had to be made for practical purposes. These trade-offs are now discussed in Chapter Three in terms of the objectives of the study and the methodology used to obtain indigenous knowledge relating to indigenous vegetables during the study.

CHAPTER THREE

OVERVIEW OF THE PROJECT OBJECTIVES AND THE METHODOLOGY USED

An overview of the project

Background

The European based Development Assistance Committee (DAC) of the Organisation for Economic Co-operation and Development lists Uganda as a Least Developed Country (LDC), having a high poverty index; subsequently a large portion of its population are expected to suffer from inadequate dietary nutrition (OECD, 2002). Such a situation directly and indirectly affects important areas of developmental growth such as human, economic, and social development, to name a few. According to research colleagues based at one of the national agricultural research institutes in Uganda the diet of average rural inhabitants in Uganda is known to be deficient in proteins, iron, calcium, vitamins B and C, riboflavin and often iodine. Other researchers support this and include vitamin A along with sufficient supplies of minerals, carbohydrates, fibre and protein (Mnzava, 1997 cited in Chweya and Eyzaguirre, 1999). Some researchers believe that many of these nutrients can be obtained from locally available indigenous vegetables.

Indigenous vegetables (also known as traditional vegetables – see Chweya and Eyzaguirre, 1999) are believed to be either local in origin or have historically been grown in a specific area for a number of generations, sometimes centuries. Exotic vegetables, on the other hand, are those that are known to be foreign in origin and include crops such as lettuce, cabbage, carrots, etc. which have been introduced recently into the area during the lifetime of the current rural inhabitants. In Uganda it seems that these exotic vegetables are fairly recent introductions, primarily cultivated for commercial purposes while indigenous vegetables often grow by themselves with no human encouragement, have a history in the area and are primarily consumed by rural dwellers. Another distinction is that some indigenous vegetables are associated with cultural rituals and taboos, while exotic vegetables do not typically have such associations. Recent trends in urbanisation (rural-urban migration) have created a

demand for the production of indigenous vegetables for commercial purposes in towns and large urban areas (Chweya and Eyzaguirre, 1999; TUAN, 1999). This has prompted increased production of these plants and with this increased interest in their potential as a nutritional foodstuff.

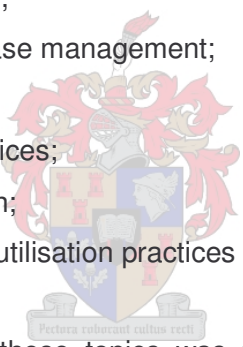
During 2001 I was requested to collaborate, with agricultural researchers in Uganda, on a project looking at the genetic diversity of crops which were believed to be indigenous vegetables. The purpose of the proposed project was to *"ensure enhanced and sustainable conservation, production and consumption of indigenous vegetables in Uganda"*. Local research team members were of the opinion that the production of indigenous vegetables had been neglected in favour of the increased activity in recent years of producing exotic vegetables as cash crops. However, the indigenous vegetables were believed to have a higher nutritional value than the exotic vegetables and could therefore improve the nutritional composition of the diet of rural inhabitants. They were also available in town markets and were cheaper than exotic vegetables. This relative low cost implied that they could be beneficial to poorer households in both the rural and urban areas. As such crops were considered to be indigenous there was also the assumption that they were probably easier to cultivate than exotic vegetables. The project intended to focus on characterising the indigenous vegetables by determining their genetic diversity and nutritional value. The related conservation, cultivation and consumption patterns and practices would be examined and assessed to determine if they required improvement. This project was broken down into thirteen phases of which some were expected to overlap at times.

In Chapter One we discussed the significance and benefits of indigenous knowledge in the domain of agricultural research and development. As a result of this increased awareness the project donor and the research team decided that indigenous knowledge on the cultivation practices and use of indigenous vegetables in various contexts within Uganda needed to be collected as the first phase of the bigger research project on the genetic diversity of indigenous vegetables. Such an investigation was expected to help more clearly define the appropriate areas, objectives and activities for the future research in the project. My role in the project was to advise and assist the Ugandan researchers in using suitable methods to generate and record indigenous knowledge. The study that is described in this thesis entails only the generating and recording of indigenous knowledge in one parish in Uganda. It is an applied research study as opposed to a pure research study.

Objectives of this first phase

After discussions with the project donor it was agreed that the results of the first phase would determine if and how the other identified project phases would be implemented. The primary objective of this phase was to collect indigenous knowledge about the cultivation and use of indigenous vegetables from farmers and rural residents in the selected areas around Uganda. Given the focus of the project the Ugandan researchers sought indigenous knowledge pertaining to the following topics:

- crop diversity;
- farming systems employed;
- agronomy;
- water use and harvesting;
- integrated pest and disease management;
- seed technology;
- *in-situ* conservation practices;
- role in household nutrition;
- processing, storage and utilisation practices of indigenous vegetables.



The knowledge generated about these topics was to be analysed and used to identify important areas for future research.

During the first phase the role of the Ugandan researchers was to:

- identify the areas that were to be used for the collection of indigenous knowledge;
- develop a brief checklist of desirable information;
- analyse the results and compile reports.

My role as the representative of the South African partner, during the first phase, was to:

- assist the Uganda partners in using the RRA / PRA tools in the process of generating and recording indigenous knowledge in the test district[1], as well as in two other districts. The results from one of these districts is reported here;
- make suggestions regarding methodological best practices and alternatives;
- assist with analysing the indigenous knowledge recorded in the two districts in which I was involved;
- assist with structuring and writing two of the reports, so that the Ugandan researchers could complete the research in the remaining six districts;

Purpose and limitations of this research

To achieve the primary objective outlined for the first phase of this research, it was necessary to gather indigenous knowledge regarding the cultivation practices and use of indigenous vegetables in Uganda. Some knowledge on indigenous vegetables was available from some of the participating researchers. However, it was felt that this knowledge was insufficient for the current purposes as it was largely based on limited activities carried out on the research station. Knowledge was sought from local smallholder farmers, many of whom grew indigenous vegetable crops and had done so for generations, making them good sources of information. It was further envisaged that the collection of this knowledge would locate the cultivation and utilisation of indigenous vegetables within the livelihood practices of the Ugandan smallholder farmers, both the commercial and predominantly subsistence farmers, thereby indicating its significance and the relevance of the need for further research. To this end the first phase of the research collected indigenous knowledge across seven broad areas:

1. identification and prioritisation of indigenous vegetables;
2. cultivation practices from soil preparation to harvest;
3. pests and diseases;

[1] While it is not customary to pilot-test the RRA / PRA tools, in this instance it was decided that the entire group would spend one day together in a selected district using the tools to ensure that all the researchers had some practical familiarity with their use. While one Ugandan researcher had no familiarity with the tools the others had only used the tools as part of their training in Kenya at the end of 2001 and had limited practical exposure to their uses and flexibility.

4. seed harvesting, improvement and storage;
5. water harvesting and irrigation technologies;
6. storage and value-adding activities;
7. consumption preferences and other uses of indigenous vegetables.

Given the time and other resource constraints for collecting the desired information, the primary purpose of the research was to collect data that could be used for the following purposes:

- *Baseline data*

  If the proposed research project was viable and received subsequent funding, it would be necessary to evaluate it and determine the impact it has had on the intended end users: the Ugandan smallholder farmers. The data collected during the first phase of the project was to be used as baseline data for comparison during the subsequent summative evaluation (evaluation of impact) process. By involving the farmers in the process during the first phase, they were in the position to indicate what is important to them and to identify the criteria for the evaluation of impact; i.e. criteria relevant to them. The data collected could also be used during monitoring activities and compared to data that would be collected during the course of the larger project.

- *Situation and context analysis*

  Any research and technology development initiative that proposes to support and assist community members, in this case Ugandan smallholder farmers, needs to take account of the context or situation in which the intended beneficiaries currently exist. There was a need to understand the reasons for the existence of the current situation. It was also important to understand the potential links between history, the current situation and possible future scenarios in which farmers might find themselves. The RRA tools lend themselves to this type of analysis. To supplement this information some general local problems were identified. Gender roles are also important in rural societies especially when gender differentiation is manifested in the delegation of power, responsibility, differentiation of labour and the ways these are related to the distribution of goods and services upon which the household depends for its survival.

To give value and meaning to all this information it needed to be obtained from the perspective of the local residents. It was believed that such an understanding would assist in the development of appropriate technology. Local farmers, local residents and agricultural officials in the parishes were asked to assist in analysing the local situation so that all present, especially the research team members, understood it and its importance to future technology development.

- *Indigenous Knowledge relating to the cultivation and use of indigenous vegetables*
  Conventional approaches to development and to agricultural development in particular have failed to realise the desired results in the developing world. This is largely due to their inappropriateness and failure to recognise the knowledge possessed by local people (IIRR, 1996). To overcome this development workers and researchers of all disciplines need to *"start with what the people have"* and to *"build on what the people know"*. This practice allows for the development of appropriate, sustainable assistance and technology in collaboration with rural and urban users. Ugandan researchers were aware that the bulk of existing knowledge relating to the cultivation and utilisation of indigenous vegetables was in the hands of the rural growers and users. To prevent unnecessary costs relating to the duplication of knowledge - and to ensure that future assistance is based on what people have and know - the importance of collecting and understanding indigenous knowledge relating to the indigenous vegetables was identified as a key to the success of the larger project. The researchers were also aware that for any future research to have optimal value to the rural producers and Ugandan consumers, it would have to be based on local knowledge, experience and requirements. Furthermore, it would have to be carried out by them on their terms.

Methodology

The importance of indigenous knowledge

Recent studies elsewhere in Africa on the diversity of traditional leafy vegetables (Chweya and Eyzaguirre, 1999) indicated that indigenous vegetables (or traditional vegetables[2] as they are often known in other countries) have always been important to rural inhabitants as a means to meet their food security and nutritional requirements and are compatible in use with the starchy staples that tend to form the mainstay of the African diet. In addition the fact that they can grow wild or as volunteer crops, grow quickly, require very few inputs besides labour and can be harvested within a very short time makes them desirable to rural households, which tend to be poor (Chweya and Eyzaguirre, 1999). They also offer a variety in diet and in farming systems giving them the potential to be beneficial to the diverse farming systems encountered in most of rural Uganda.

Despite these potential benefits and the local roles that indigenous vegetables play in rural culture their conservation and utilisation is often ignored. In some African countries their rural origin associates them with the generally poor rural lifestyles and consequently conveys a low status towards consumers (Chweya and Eyzaguirre, 1999). Ugandan researchers were aware that government policies, research organisations and extension services had previously ignored these plants in their agricultural and food security policies and development strategies. Greater attention was given to more recently introduced vegetables (exotic vegetables) and other commercially oriented crops, about which volumes of local and international research exists or is currently work in progress.

Given this general neglect of the diversity of indigenous vegetables and the realisation by the research team that very few of the indigenous vegetable genetic properties had been characterised, evaluated and stored in genebanks and breeding programmes at national research stations it was considered vitally important to include the current custodians of these resources, the farmers and female rural residents who had an important role in the cultivation, processing and preparation of these vegetables, in the research. Of utmost importance was

[2] The FAO (1988) defines traditional vegetables as all categories of plants whose leaves, fruits and roots are acceptable for use as vegetables being widely consumed and being crucial to food security having the same significance and characteristics associated with those plants described as indigenous vegetables by Ugandans and parish residents. Consequently, the terms can be used interchangeably.

their indigenous knowledge relating to the diversity, cultivation, processing, consumption, conservation and commercialisation of indigenous vegetables. To have excluded this knowledgeable group would make such a project on genetic diversity of indigenous vegetables worthless. Chweya and Eyzaguirre (1999) cite similar reasons for the inclusion of farmers and those knowledgeable of indigenous knowledge in their study.

Areas selected for the collection of indigenous knowledge

For the purposes of the first phase of the larger project eight districts were selected, representing Eastern, Central and Western Uganda. One parish was selected in each of the eight districts as the site for the collection of indigenous knowledge. The Ugandan researchers identified the selected districts based on their knowledge of the general farming system utilised in each district. Each parish was selected by the extension staff in the district and sub-county in consultation with parish elders and district officials. The selection criteria were that the selected parishes had to be those with the highest levels of indigenous vegetable cultivation for both household and commercial purposes. One parish was selected from each district. This was done in order to obtain a focus group type setting for the research team. In the interests of the larger project it was important to collect information from different districts and parishes around Uganda to determine:

a) the extent of the existence and predominance of the different types of indigenous vegetables available;
b) the extent and variations in terms of the scarcity of indigenous vegetables in different areas and reasons for this;
c) the significance of indigenous vegetables in the different localities;
d) the differences in knowledge relating to the cultivation and utilisation of similar and differing indigenous vegetables.

The Terra District was selected for the study covered in this thesis. It is situated within a broader intensive banana, coffee, lakeshore farming system. Based on the selection criteria noted above, the district officials, extension officers and elders selected Gameru parish in this district for the study.

Team composition for the indigenous knowledge research

The following professional disciplinary categories of personnel were included as team members for the larger research project for collecting indigenous knowledge in the eight parishes in Uganda:

1. Plant Breeder
2. Biotechnologist
3. Nutritional Biochemist
4. Seed Technologist
5. Agricultural Economist
6. Plant Pathologist
7. Agricultural Engineer
8. Food Technologist
9. Agricultural Sociologist - (only present during the research in two of the eight parishes.)
10. Postgraduate Agricultural Economics student – (only present during the research in two of the eight parishes.)

The selection of this group was based on their knowledge, experience and relevance to the multidisciplinary team approach to collecting indigenous knowledge, their knowledge and interest in indigenous vegetables and their future roles in the proposed project.

In order to cover the eight identified sites in the time available for the first phase this group of researchers was split into two teams. The team that collected indigenous knowledge on indigenous vegetables in Gameru parish was made up of the following six people, while the remainder conducted fieldwork in a parish in another district:

1. Plant Breeder
2. Nutritional Biochemist
3. Agricultural Economist
4. Agricultural Engineer
5. Agricultural Sociologist
6. Postgraduate Agricultural Economics student

The size of the participatory research facilitation team depends to some degree on the number of participants and the size of the groups that carry out the exercises. Larger local groups would require more facilitators. Generally each exercise must have one facilitator, who is responsible for facilitating the exercise and is well versed in participatory research methodology and group skills. During the study the agricultural engineer acted as the facilitator as he had been trained in group facilitation skills and was fluent in the local language.

A scribe and an observer usually assist the facilitator. The scribe records the content of the exercises while the observer records the actual process. In conjunction with the facilitator these people usually form the core RRA / PRA team (Mascarenhas, 1990c). The agricultural economics student acted as the scribe during the research in this parish. The agricultural sociologist and economist acted as the two observers. However, they were also involved in co-facilitation activities and preparing the tools, so their roles as observers were not conducted very effectively.

Depending on the nature and purpose of each exercise the core group should be supported by the appropriate subject specialists who assist with the analysis and interpretation of the generated data once the participants completed each exercise. In this study the plant breeder and the nutritional biochemist performed the roles of subject matter specialists. The other team members also performed these roles during the study and especially during the transect walks. This team could have benefited from the inclusion of a soil scientist and a plant pathologist. Depending on the skills of the team members the facilitating, scribing and observation roles can be interchanged as required for each exercise.

To avoid intimidating the local participants the RRA / PRA team should never be larger than the number of local participants; preferably the number should be less. For observations of the interactions of the group members, for facilitation of the process and to reduce the risk of non-participation and boredom the insider group must not be too big and the outsider group should not be so small that it cannot carry out the various roles and activities. In this study the problem faced by the team was that the local group was considerably larger than the team. Due to limited facilitation experience and also due to local language constraints within the team, the team leader did not allow the local group to be split into smaller more manageable

groups of about twenty participants. This prevented us from noticing apparent differences and from encouraging greater participation in the activities. During the study about thirty parish residents actively participated in the discussions, although the actual group present at the workshops sometimes totalled more than seventy; many of whom did not actively contribute to the process.

The equipment used by the team to generate and record indigenous knowledge was very basic, although hi-tech equipment such as tape recorders, video cameras and ready-made kits have been used to carry out exercises and to record data in other similar studies (IIED, 2000). As one of the philosophies of participatory approaches is to make use of readily available materials and to ensure that local people are empowered to continue the process on their own and to initiate new processes the following list can be construed as a basic RRA / PRA kit when used in conjunction with local resources:

- Pieces of newsprint or brown paper;
- Sheets of multicoloured paper;
- Scissors;
- Pencils, felt-tip markers and crayons;
- Sticky-tack, glue & masking tape;
- Paint powders and chalk;
- A creative mind and the ability to be flexible.

In this study all the above were used except for paint powders and chalk, as these were not required given the high level of literacy amongst the participants. Many of those participants who did not actively record data on newsprint actually took their own notes during the process, so we actually had more than one scribe.

The tools and process used to collect indigenous knowledge

Initially it was proposed that a Participatory Rural Appraisal (PRA) be carried out as part of the process to collect indigenous knowledge about the use and cultivation of indigenous vegetables. PRA tools were to be the main source of generating, capturing and analysing the information.

Due to the following reasons, the proposed process was changed:

- In terms of the amount of work that had to be done, the time allocated made it impractical for a PRA to be carried out to its conclusion. Eight parishes had to be visited during the dry season as the roads were said to be virtually impassable during the rainy season and the report of the process had to be completed before the onset of the next dry season. This meant that only three months were available in which the research team could actually visit the parishes. Only five days were budgeted for and allocated to data collection in each of the parishes. Five days was an extremely short period of time in which to achieve significant farmer participation, mobilise stakeholders, gather in-depth indigenous knowledge and present a summary analysis to external stakeholders, residents and farmers. Furthermore, the local residents and farmers were not usually able to sacrifice five consecutive days to participate in the knowledge generating activities. In this parish the time that farmers and other residents made available to participate in indigenous knowledge generation and collection was reduced from five to four days, because many residents reported being unavailable on the Sunday as it was a national public holiday.
- The limited budgets of the Ugandan and South African partner organisations were specifically for the purpose of generating indigenous knowledge within the allocated time frame of five days in each parish. All the researchers also had obligations to other projects which required their attention;
- The allocated time frame required that the South African partner facilitated the initial indigenous knowledge collection process over a short period in two different parishes. A total of three weeks, of which one week was allocated for the analysis of the relevant data and writing of the draft reports, was set aside for my involvement;
- The main purpose was to collect indigenous knowledge relating to a specific crop within a limited amount of time as opposed to doing a PRA that would involve continued participation and eventually result in self-mobilisation and social transformation. While this is important to development projects there was no time to carry out the research in such a fashion, in any of the eight parishes, so that this

could be achieved by the end of the research period. It was hoped that if the donor agreed to the subsequent phases, after the report on this phase was submitted, then the project would be designed to ensure a higher level of participation.

Preferably, the research team should have visited the parish and farmers over a longer period of approximately ten to fifteen days, at various intervals, as this would have allowed the local people to participate to their fullest by supplying, recording and analysing the data (Waters-Bayer *et al*., 1995).

The process and the tools for generating indigenous knowledge relating to indigenous vegetables in Terra District were adapted to fit in with the above constraints without seriously affecting the validity, reliability and value of the generated indigenous knowledge. However, the quantity and depth of the data was reduced because of the time constraints and the fact that people often spoke in general terms about their activities and did not always identify specific practices for each identified indigenous vegetable. Where specific information was provided, the available time limited the amount of significant detail that could be recorded. In some cases, where conflicting statements were made, it was not possible to crosscheck and confirm all the statements as the detailed analysis of the data only occurred after each field visit had been concluded, on the team's return to Kampala every evening. Some of the team members would spend the evening going through the notes and newsprints trying to identify contradictions and gaps. The team's observers would also report on any observations they had made within the group of participants when discussions were taking place that they felt required further attention. Identified issues were then clarified during the field visit the next day. Subsequent analysis indicated that some information had not been collected (see especially with regard to Tables 1 – 5 in Chapter Four).

While many of the RRA / PRA tools were used, a more rapid, as opposed to completely participatory approach was adopted in light of the abovementioned constraints. Consequently the process used was more extractive than participatory and I therefore refer to it as a RRA rather than a PRA. To this end the following adaptations were made which emphasise the more extractive nature of the process:

a) the members of the research team recorded most of the information after explaining the purpose of the RRA / PRA tools; and

b) some of the RRA / PRA tools were exchanged for group discussions with the participants while the research team made notes on the information generated from these discussions. While most of the information was recorded on newsprint as it was generated those notes that were not so recorded were subsequently not on display for the local participants to give their final verification. In some instances the team's scribe checked on the information with the participants.

These adaptations allowed the indigenous knowledge recording process to be completed within the allocated time frame but reduced the participatory emphasis of the process. Accordingly, the information generated was not always subject to verification with people outside of the core group of participants. Neither was it analysed with the participants in such a manner that their empowerment and self-mobilisation could be facilitated. Grenier (1998) indicates that often the need is to obtain intimate knowledge of the local area before embarking on PRA. To this end she advocates the use of RRA as a means to get to this position more quickly. It was with this in mind that adaptations to the research process were made.

The following RRA / PRA tools were used to collect contextual information relating to the district and parish for the situational analysis. They were also used to generate and record indigenous knowledge concerning the local cultivation and utilisation of indigenous vegetables:

- Transect walks;
- Social and natural resource mapping;
- Livelihood mapping;
- Time lines;
- Pair-wise ranking;
- Trend charts;
- Seasonal calendars;
- Proportional diagrams
- Matrices
- Semi-structured interviews with groups and individuals (Individual and focus group interviews were held with district agricultural officials, parish chairpersons and local farmers).

It is appropriate when collecting indigenous knowledge to identify a number of specific question areas beforehand to ensure that information relevant to the indigenous vegetable research was generated and recorded (for more details on indigenous knowledge collection processes see IIRR, 1996; Grenier, 1998; Langill and Ndathi, 1998; Langill, 1999). This practise was followed during this study and its general value is discussed in Chapter Six.

The validity and reliability of the data

In order to validate the data generated and subsequently recorded, the research team carried out the following activities:

- The tools were used in a fashion that allowed for triangulation of the data collected, thus ensuring that all data was verified and cross-checked, at least with other tools when not with all the participants. One example of this was the use of the transect walk to observe the practices carried out and to have discussions with some of the farmers who were not present at the meetings. However, those practices that occurred during other times or seasons could not be validated by observation.
- Large numbers of local people were involved and allowed to freely agree or disagree on the information they presented, whereby the data generated was verified. However, the reader is cautioned that in such a process a dominant element within the group can dictate the theme and other equally important information is played down or ignored. To overcome this to some extent, individual interviews were had with randomly selected officials and farmers (the reader is referred to Grenier (1998) for a more detailed discussion on the strengths and weaknesses of group and individual interviews).
- On the last day of fieldwork (unless otherwise stated) all the information was presented to the farmers and local officials for verification of the data collected by the research team and of the team's subsequent analysis of this data. It was also recommended to the project leader that copies of the final indigenous knowledge report for the specific area be given to farmer representatives and officials in the parish and district. This would allow them the final say in the content and analyses

contained in the report. It is understood that this recommendation was not followed.

The level of community involvement in this process

Approximately seventy members of the Gameru parish were present at the workshops held over the four-day period and many shared their knowledge of the local conditions, agricultural practices and indigenous vegetable cultivation and utilisation during the four days. The number of active participants in the group discussions ranged from twelve to about forty-four. Seventy participants is an extremely large number and is not recommended as people get bored and many do not participate. It is difficult to facilitate a group of this magnitude. Grenier (1998) has pointed out that groups of more than forty are unmanageable and suggests that between eight and twelve is often considered ideal. As explained earlier time constraints and constraints regarding the number of facilitators and team members prevented us from splitting up the group into smaller groups. The number of farms and farmers visited during the transect walks was believed to be satisfactory. Approximately eight farmers and their farms were visited during the transect walks.

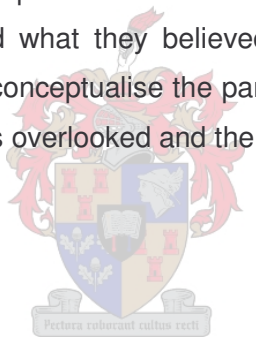
The fieldwork process of generating and recording indigenous knowledge was as follows:

- Day one
  An interview was had with the Chief Agricultural Officer of Terra District. Following this the local Agricultural Extension Officer facilitated the introduction of the research team to the parish leadership, farmers and local residents. Contextual information relating to the parish was collected from farmers and the situation analysis was concluded.
- Day two
  Large group discussions were held with local residents and farmers concerning local circumstances and indigenous knowledge relating to the varieties, cultivation and use of indigenous vegetables.
- Day three
  Transect walk of selected areas in the parish that were identified by the farmers as areas they thought that we should see. Individual interviews were carried out with farmers and some of their household members visited during the transect walk.

Some interviews with farmers and household members also took place before and after the transect walks.

- Day four
  Local residents celebrated Heroes Day and the farmers were unavailable to meet with the researchers. The research team met to go over the data and analyse the research findings. Gaps were identified and notes were made to explore these on the following day.
- Day five
  More social and demographic trends were collected and clarity was sought on a number of topics relating to indigenous vegetables and general needs. The research team presented the main findings and analysis to the farmers, residents, committee members and local agricultural officials for verification.

It would have been valuable to enquire from farmers and residents how they would like a future project to be designed and what they believed their involvement should be. Such information would have helped to conceptualise the participatory processes to be included in the next phases. However, this was overlooked and the information was not acquired.



Conclusion

In research or development activities involving local people - and seeking to bring about improvement and change to their lives - it is desirable that there should be full participation of the people in all facets of the research and development process. This implies that the local people decide on the direction and content of the discussions and the rules governing their interaction with the research team. We noted in Chapter Two that such a process should be conducted in a manner that encourages empowerment and self-mobilisation:

- The research team should facilitate this process and assist in the recording of the data generated.
- It is preferred that the research team does not dominate the discussion, but ensures that all areas of interest to both the local people and the researchers are covered in depth.

- Where possible it is considered best practice to analyse the recorded information with the local people so that the analysis occurs as the process unfolds and that the local participants are part of this process.

These were the underlying principles that guided the research team during the collection of indigenous knowledge of indigenous vegetables in Uganda. Unfortunately, due to the constraints discussed above, in some cases the recording of information and data analysis did not always occur in this fashion. Given that the time frame for the first phase activities was very short the process was not facilitated in such a way that empowerment and social transformation was an outcome. However, despite these constraints and the adaptations to the process, it is believed that a satisfactory process of recording indigenous knowledge using the basic RRA tools was conducted. Currently there is a debate about the use of these tools in recording indigenous knowledge and this issue will be discussed in more detail in Chapter Six. The value of their use in this study is discusses in Chapter Seven. We now need to look at the information and indigenous knowledge that was recorded using the RRA method. This is information is presented in detail in Chapters Four and Five.

CHAPTER FOUR

THE CONTEXTUALISATION OF INDIGENOUS KNOWLEDGE - AN OVERVIEW OF THE LOCAL HISTORY AND EXISTING CIRCUMSTANCES IN THE PARISH

Introduction

In Chapter Two we noted that one of the assumptions for using RRA techniques for collecting indigenous knowledge is that they are also able to provide a sufficient means of recording and analysing data pertaining to local circumstances and in many cases elicit the reasons for the existing situation. It was also suggested that the techniques are highly suitable for carrying out an analysis of difference and specifically the diversification of gender roles and responsibilities. Much of the data presented here and in Chapter Five can be used as baseline data, especially when combined with more technical detail and data such as water and soil content analysis, which must still be collected and analysed during the next phase. This baseline data can be increased and used throughout the duration of the project for the purpose of project evaluation – including monitoring and impact assessment. To optimise the use of this baseline data, especially for evaluating impact, participatory planning would need to be carried out with the farmers before the larger project is implemented, allowing them to define indicators of impact (Waters-Bayer *et al.*, 1995; Bayer and Waters-Bayer, 2002). The type of baseline information collected includes local resources or assets, local trends, and livelihood activities and sources.

This chapter presents the research results relating to the situation analysis, including the gender analysis, and in so doing presents some of the actual tools that enabled the generation and recording of the data during the fieldwork. Local problems and needs can also be identified and prioritised by means of the RRA techniques and while this process was not completed during this study the reasons for this and some provisional results are presented here. It is common practice in RRA reports to include the tools and the data recorded in them (Adebo, 1993) so this format has been followed in the presentation of this chapter and Chapter Five.

Location and short history of the parish

Location

Gameru is situated about 45 km (25 miles) south-east of the Ugandan capital of Kampala and lies in the in Goloko sub-county of the Terra District. Parish residents indicated that the villages in the parish had always been in existence and probably originated from the various kingdoms that emerged in the area now known as Uganda during the 15th and 16th centuries.

Main agricultural practices

Farmers[3] in Gameru parish and in the district practised diverse and complex farming systems in which the production of livestock, crops and natural resources were integrated. The products and by-products of these systems had multiple uses and the waste products of one sub-system were used as inputs in other subsystems. This coincides with Pretty's (1996) definition of sustainable agricultural practices discussed in Chapter One. Within such integrated systems different farmers employ different strategies depending on their needs and available resources. The farming systems in this parish made use of few external inputs while relying heavily on local resources and inputs derived from these resources. Farmers reported using minimal commercially available synthetic inputs and relied heavily on remedies that the household developed and organic inputs such as ash, compost, and mulching. From observations and farmers' reports it seemed that they were following sustainable agricultural practices or at least low external input agriculture practices. Such practices tend to work in harmony with the environment and while making optimal use of the local environmental and human resources they do not damage them to the extent that is possible with the use of inorganic or synthetic practices. Ecosystems and socio-cultural systems are intertwined with one another and are largely left intact when low external input practices are used.

Farmers categorised their agricultural activities into the production of exotic vegetables, indigenous vegetables, traditional food crops, traditional cash crops and livestock (see Tables 1 to 5). Farmers were asked to rank these production categories and subsequently identified

the following order of priority based mainly on commercial significance, but acknowledgement was given to their general importance for livelihoods and household food security.

1. Exotic Vegetables
2. Traditional Cash Crops
3. Indigenous Vegetables and Traditional Food Crops
4. Livestock

Exotic vegetables and traditional cash crops enjoyed primary importance due to their economic significance. Indigenous vegetables were next as they also enjoyed some economic importance although most were grown for household consumption, as were the traditional food crops. Livestock were important but because few farmers had any significant numbers they were not considered to have great and usable economic value at present. According to Figure 1 residents had historically included livestock in their farming systems. However, the violent conflict of the 1970s and 1980s resulted in invading soldiers killing or confiscating all the local livestock. Figure 8 indicates that the residents of Gameru parish were starting to replenish their livestock herds including cattle, sheep, goats, pigs and poultry.

The lists of crops and livestock that were produced at the time of the study were generated with the farmers and residents using open-ended matrices as described in Chapter Two (see Grenier (1998) for support of this use). The results of this process are presented in Tables 3 – 7. The main manner in which the various crops and livestock were produced in the parish (grown / reared or wild), the sex of the people mainly responsible for production and the main reasons why they were produced were also recorded on these matrices. In Tables 3 and 4 the scientific names were added later in an attempt to facilitate analysis by the research team (In Chapter 5 it is noted that the local classification of indigenous vegetables is more complex than that typically used by the researchers and the inclusion of scientific names, where this was possible, generally made classification easier for the researchers). This process enabled the researchers to understand the plants and crops in the same manner as the local residents and farmers did. This avoided the likelihood of future confusion. If a plant was indicated as growing wild this seemed to imply that it was a volunteer crop whose presence was a result of the high seed-bank present in the soil. Such a high seed-bank might occur naturally or it

[3] Farmers were normally considered to be the head of the household and could be either male or female. However, only male farmers and household heads were encountered in this parish so

might have occurred over a number of years, as the particular crop was being introduced, and grown locally and regularly in a specific area. Indigenous crops that we found to be of exotic origin were often termed indigenous because of their 'volunteering' nature in some areas.

Table 3

A list of twenty-five indigenous vegetables identified as being available in the parish

List Indigenous Vegetables	Common Name	Scientific Name	Grown / Wild	Gender Responsible	Reason Why
Doodo	Amaranthus	*Amaranthus blitum*	W	Neither	Household
Ebugga	Amaranthus	*Amaranthus dubius*	G	M/F/c	Market
Ejobyo	African spider-flower	*Cleome gynandra*	W/G	F/M/c	Market/ Household
Ensuga	Leaves of Nightshade / Wonderberry	*Solanum nigrum Complex*	W	Neither	Household
Nakati	Leaves of the African Eggplant	*Solanum aethiopicum*	G	F/m/c	Market
Entula enganda	Biter berries or tomatoes of the African Eggplant	*Solanum aethiopicum gilo*	G	M/f	Market/ Household
Enyanya entono	Small tomatoes	*Lycopersicon esculentum*	W	F	Household
Emboga enganda	Amaranthus	*Amaranthus sp.*	W - but not readily available	Neither	Household
Obiyindiyindi	Lima beans	*Phaseolus lunatus*	G	F	Household
Ekigaga	Leaves of Lima beans	*Phaseolus lunatus*	G	F	Household
Enkolimbo	Pigeon peas	*Cajanus cajan*	G	F	Household
Empande	?	*Erucastrum sp.*	G	F	Household
Ensuju	Young pumpkin fruit	*Cucurbita maxima*	G	F	Household
Esunsa	Green leaves of pumpkin plant	*Cucurbita maxima*	G	F	Household
Egobe	Cowpeas	*Vigna unguiculata*	G	M/f	Household/ Market
Etimpa	Cocoyam leaves	*Colocasia esculanta*	G	F	Household/ Market
Enderema	Malabar Spinach	*Basella alba*	W	F	Household
Emboge	Amaranthus	*Amaranthus graecizans*	G	F	Household
Obutungulu	Onion bulb	*Allium cepa.*	G	F	Household/ Market

subsequently they are referred to here as being male for the sake of simplicity.

Table 3 (Continued)

A list of twenty-five indigenous vegetables identified as being available in the parish

Elinyebwa	Groundnuts	*Arachis hypogea*	G	M/f	Household
Ebijanjalo	Common green beans	*Phaseolus vulgaris*	G	M	Household/ Market
Empinde Enganda	Cowpea pods	*Vigna unguiculata*	G	F	Household/ Market
Obutungulu Obuganda	Leaves of onion plant	*Allium cepa*	G	F	Household
Komurali	Hot or Chilli Pepper	*Capsicum frutescens L.*	W	F	Household
Ebisiboza	Leaves of the common green bean plant	*Phaseolus vulgaris*	G	F	Household

? = The name is unknown or precise identification was impossible because of the season when the research took place
G = grown/cultivated by farmers
W = mainly found in the wild/reproduces itself
M = male
F = female
C = child
Lowercase letters indicate that the role of that particular sex or age group is less for this activity
Combined uppercase letters indicate that the activities are more or less equally shared
Note: The scientific names were provided by Ugandan colleagues

Table 4

A list of exotic vegetables currently available in the parish.

List Exotic Vegetables	Common Name	Scientific Name	Grown / Wild	Gender Responsibile	Reason Why
Biringanya	Brinjal / Eggplant	*Solanum melongena*	G	M/f	Household/ Market
Kamurali exotic	Chillies	*Capsicum frutescens*	G	M/f	Market
Emboga enjugu	?	?	G	M/f	Market
Cucumber	Cucumber	*Cucumis sativum*	G	M/f	Market
Okra	Okra	?	G	M/f	Market
Sukuma wiki	Kale	*Brassica sp.*	G	M/f	Market
French beans	French Beans	*Phaseolus vulgaris.*	G	M/f	Market
Sega lettuce	Sega lettuce	?	G	M/f	Market
Avocado	Avocado	*Persea americana*	G	M/f	Household/ Market
Soybean	Soybean	*Glycine maximum*	G	M/f	Household/ Market
Sewie	?	?	G	M/f	Market
Cowpea	Cowpeas	*Vigna unguiculata*	G	M/f	Market
Doodo exotic	Spinach	*Amaranthus lividus*	G	M/f	Market

? = The name is unknown or precise identification was impossible because of the season when the research took place
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Lowercase letters indicate that the role of that particular sex or age group is less for this activity
Combined uppercase letters indicate that the activities are more or less equally shared
Note: The scientific names were provided by Ugandan colleagues

Table 5

Other food crops available in the parish

Food before 1940	Common Name	Grown / Wild	Gender Responsibile	Reason Why
Ensuju	Pumpkin	G	M/f	Food
Amayani	Yam	G	M/f	Food/sale
Emiboga omojugu	?	G	M/f	Food
Matoke	Banana	G	M/f	Food/sale
Lumonde	Sweet Potatoes	G	M/f	Food/sale
Endagu	Yam	G	M/f	Sale

? = The name is unknown or precise identification was impossible because of the season when the research took place
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Lowercase letters indicate that the role of that particular sex or age group is less for this activity
Combined uppercase letters indicate that the activities are more or less equally shared

Table 6

A list of crops grown in the parish for predominantly commercial purposes

Other crops	Grown / Wild	Gender Responsibility	Reason Why
Coffee	G	M/F	Market
Vanilla	G	M/F	Market
Emiyembe (Mangoes)	G/W	M/F	Household/ Market
Oranges	G	M/F	Household/ Market
Jack fruit	W/G	M/F	Household/ Market
Pineapples	G	M/F	Household/ Market
Empofu (English?)	W	M/F	Household
Passion fruit	G	M/F	Household/ Market
Amapera (Guavas)	G/W	F/M/c	Household
Cassava	G	M/F	Household
Sugar cane	W	M/F	Household/ Market

? = The name is unknown or precise identification was impossible because of the season when the research took place
G = grown/cultivated by farmers
W = mainly found in the wild/reproduces itself
M = male
F = female
C = child
Lowercase letters indicate that the role of that particular sex or age group is less for this activity
Combined uppercase letters indicate that the activities are more or less equally shared

Table 7

A list of livestock currently farmed in the parish

Livestock	Gender Responsibility	Reason Why
Indigenous cows	M	Cash Requires a lot of care Lot of responsibility
Goats	F	Food/Cash Requires a little care
Indigenous hens	F/c	Food/Cash Require a little care
Sheep	F	Food/Cash Requires time and care
Pigs	F	Food/Cash Requires time and care
Ducks	M/F/c	Food Requires time and care
Rabbits	C – boy	Food, Boys enjoy caring for them

? = The name is unknown or precise identification was impossible because of the season when the research took place
G = grown/cultivated by farmers
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A short history of Agricultural practices in Gameru Parish

From the time line of Gameru parish (Figure 1) and the livelihood resource trend diagrams (Figures 3 – 8) we see that the local agricultural activities (at least since British occupation and prior to independence) centred mainly on indigenous vegetable cultivation and food crop production with a small amount of traditional cash crop production and the husbandry of small numbers of livestock. This changed with President Amin's declaration of economic war in the 1970s and subsequent expulsion of all Asians from Uganda. Prior to this, virtually all business had been in the hands of Asian traders and businessmen. Ugandans now became aware of the commercial value of agricultural produce and many farmers started commercialising their agricultural production activities. For example, more people started producing coffee and cotton, the traditional cash crops while exotic vegetables, such as peppers, lettuce, cabbage, etc, were also introduced and farmed almost exclusively for commercial purposes. As the number of people living in Kampala increased after independence in 1962, so the demand for

indigenous vegetables gradually increased and these crops were slowly farmed on a commercial basis to supply the growing urban population.

By the 1990s corruption had taken its toll on commercial agricultural activities and many of the support structures, such as cooperative societies collapsed. The liberalisation of trade, which was introduced in the 1990s, negatively affected local farmers. The number of traders increased, but many had no real experience of agricultural trade and often quality control standards were dropped or overlooked. Consequently, Uganda lost a major proportion of their coffee export quota to the European Union and other countries.

Only in the 1990s did district extension services start reaching farmers in Gameru parish and their commercial activities increased with the introduction of new knowledge and crops. Again farmers started increasing their incomes derived from the production and sale of agricultural produce. At the time of the study the agricultural activities in the parish still predominantly focused on household food security with a small proportion of specific crops and livestock being employed for commercial purposes. Farmers were dependent on agriculture for household survival in terms of food security and the money derived from their commercial activities was predominantly spent on services, such as health and education, transport and essential goods such as soap, salt and clothing.

Figure 1

Time Line Gameru Parish

Period	Events	Comments
1947	People of Gameru parish were growing a few food crops • Beans • Maize • Bananas • Cassava • Egg plants (Biringanya) • Ground nuts Cash crops were few and were on a small scale • Coffee (mainly) • Cotton (some) Buying and selling of cash crops were in the hands of the local Asians (mainly Indians)	Production was on a small-scale and was mainly for home consumption
1948	Monopolisation of agricultural cash crop trade by Asians resulted in a protest strike by the local Ugandans. This led to introduction of Cooperative Societies, organised by farmers who now started buying and selling agricultural produce. Private traders (Ugandans) were allowed to participate in trading of agricultural products. This practice continued until 1971 when Amin came to power.	Introduction of societies and the allowing of private Ugandan individuals to participate in trade increased the farm-gate prices of agricultural produce, especially coffee.
1971 – 74	Amin became president of Uganda Declared economic war and all Asians were expelled from Uganda and their properties and businesses were nationalised. Farmers improved their scale of production mainly for comercial purposes. Major crops were coffee and cotton.	The declaration of economic war in 1972 enlightened people. People started realising the importance of money. Cash crop producers increased their scale of production of these crops while other farmers started to enter the coffee and cotton production and trading activities.
1974 – 79	After the expulsion of the Asians and the nationalisation of their property the people of Garabi Nakisaja Zone and the rest of the country faced shortage of essential products at the market, especially sugar, soap and salt. Most people substituted local products for essential products like soap. The sap from the leaves of the paw-paw (papaya) tree, which contains a bleaching agent, was used as soap.	This was due to breakdown of infrastructure, shutdown of industries and closure of shops initially owned by Asians.
1980 – 84	After overthrow of Amin's regime in 1980 many things changed • Products gradually started appearing in the market • Local shops started selling essential commodities like sugar, salt and soap to the people. • Supply of essential products increased Commercial farming activities increased. People started to produce traditional food crops for both home consumption and surplus for sale. People also started rearing livestock such as cows	These came as a result of people appreciating the importance of money and trade. However pests and diseases started attacking crops – especially cassava, sweet potatoes and Nakati and reduced the yield of these products

Figure 1 (Continued)

Time Line Gameru Parish

1984 – 86	Civil strife (bush war) in Luwero triangle affected the cooperative societies that were trading in agricultural products. Most were looted by rebels and opportunists who took advantage of instability and lack of security Union leaders, cooperative society managers and government officials also contributed to their collapse by embezzling funds. Also the breakdown in production of major crops and infrastructure like roads complicated the operations of the cooperative societies.	By the late 1980s all cooperative societies had ceased to exist.
1990s	Trade liberalisation policies and the removal of state controlled parastatals allowed private firms to trade in major cash crops – especially coffee, beans and maize. Farm-gate prices of crops, particularly coffee, increased. (in 1994 coffee was now selling at 1400 Ugandan shillings) More traders entered trade during 1990s However prices eventually dropped.	Due to increased number of players in agricultural produce marketing who were inexperienced and were exporting semi-dried coffee. Lack of quality controls – export demand and price for coffee significantly reduced.
1990 – 96	Agricultural extension services started to be extended to farmers in zone.	Production increased Incomes for farmers improved Farmers started diversifying production activities.
2000	Other services including electricity, schools, health facilities, water were extended to people in rural areas, improving their standards of living	Despite these efforts by government in improving livelihoods of people in rural areas a lot of challenges/constraints are still experienced by rural dwellers. There is still a lack of enough market (demand) for some agricultural products, especially sunflower, silkworms, rabbits, avocados and other locally produced products.

Livelihood sources and local levels of access

In order to discover how people survived in the parish the residents were requested to identify the livelihood resources that they believed to be important to their existence. The resources were grouped into those that were available in the parish (this was also their point of access to them), those that were found both in and outside the parish and those that are found exclusively outside of the parish and normally had to be obtained from outside the parish. The

livelihood map (Figure 2) below indicates the various resources and where they were normally found.

Figure 2

Livelihood Map of Gameru Parish

Main resources in parish	Available in and outside parish	Only available outside
Indigenous vegetables	Schools (Secondary and Primary)	Fish bones for soup
Exotic vegetables	Health Centres (Clinics, Drug shops	Meat
Primary school education	and Hospitals)	Rice and Posho
Food (except Posho -maize flour and	Churches	Transport Vehicles
Rice)	Mosques	Domestic utensils
Water		Paraffin
Fruits		Salt
Horses		Sugar
Milk		Clothes
Housing/Shelter		Books

Following the completion of the Livelihood Map residents were asked to indicate the trends for the local livelihood resources that they deemed most important and were found within the parish. This was to enable the researchers to determine if the access to or the volume of the main local livelihood sources were increasing or decreasing. The main livelihood resources available in the parish were identified as the availability of primary educational facilities, availability of water, availability of indigenous and exotic vegetables, availability of food and access to adequate housing.

The trend line diagrams (Figures 3 - 8) for each of the identified livelihood resources located within the parish indicate that the availability of educational facilities, food and access to adequate housing has increased since the 1930s until the present (see Figures 3, 6, 7). Residents pointed out that the availability of water from wells (the primary source) had remained much the same during the past seventy years (Figure 4). The local availability of indigenous vegetables had decreased somewhat. While more were actually being produced, some of the more popular indigenous vegetables no longer formed a major part of the local diet. As a result of their increased commercial demand these were sold in Kampala to generate income. Similarly, some were no longer available and a preference for other varieties had occurred – examples are provided in Chapter Five. Despite increased production the trend indicated that less were available for consumption by parish residents. We will see below that constraints regarding access to land and a general lack of resources prevented farmers from increasing production. In any event, given the commercial value of

these popular varieties it is likely that attempts would be made to sell any increased yield before considering it for household consumption. The availability of exotic vegetables had increased and these were produced predominantly for commercial purposes. Prior to the 1970s these vegetables were not produced or eaten in this parish in significant quantities. However, since the awareness of their value as a commercial commodity they were increasingly produced in the community (see Figure 1 and Figure 5). Residents noted that most exotic vegetables were still not consumed locally in significant amounts, as the purpose of their cultivation was for sale in Kampala.

Residents noted that availability of housing was generally increasing as was its quality. This was reported to be a result of increased government efforts to provide housing (see Figure 7). This is discussed in greater detail in the next section. In the Livelihood Map the only livestock mentioned were horses. When probed about this the farmers reported that horses were used for local transport and were available for local use. However, other livestock were usually used as sources of food and given the fact that they were currently in the process of replenishing their stock these were not considered an important livelihood source. Figure 8 indicates that the numbers of livestock in the parish decreased during the main period of unrest from about 1970 to 1990 and that they are now increasing.

Figure 3

Trend Diagram of Availability of Primary Educational Facilities in the parish

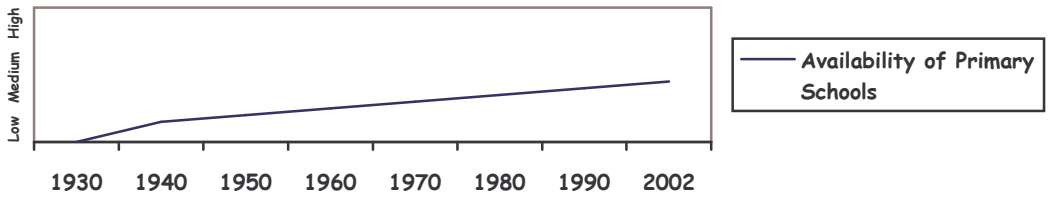


Figure 4

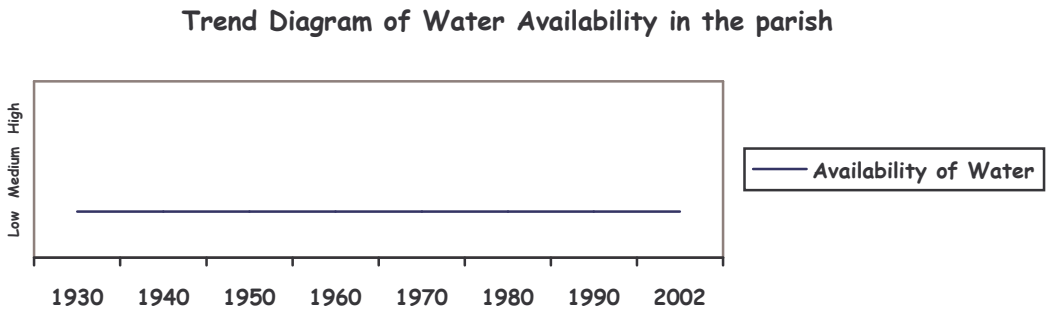
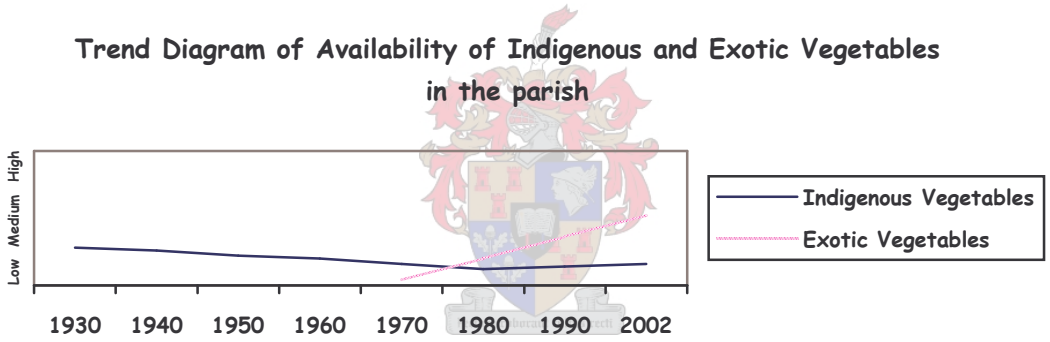


Figure 5



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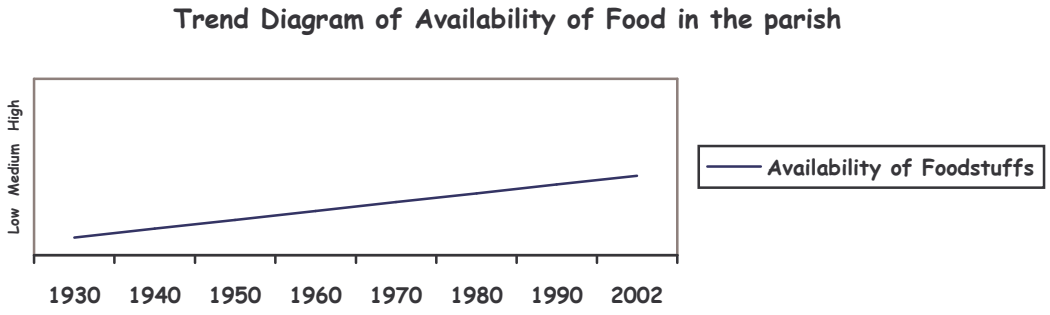


Figure 7

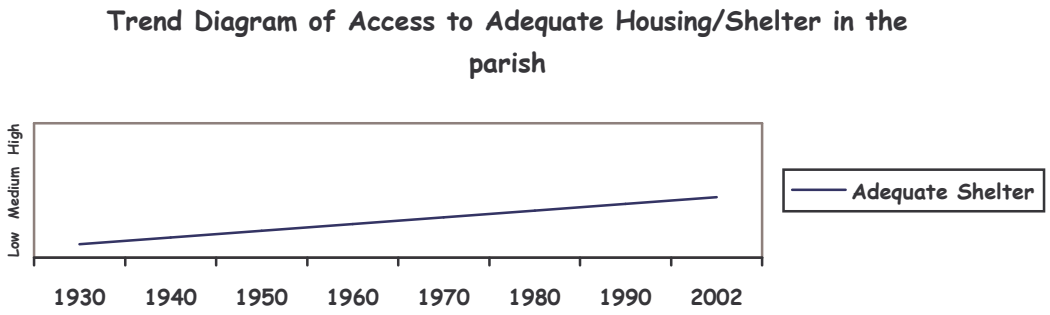
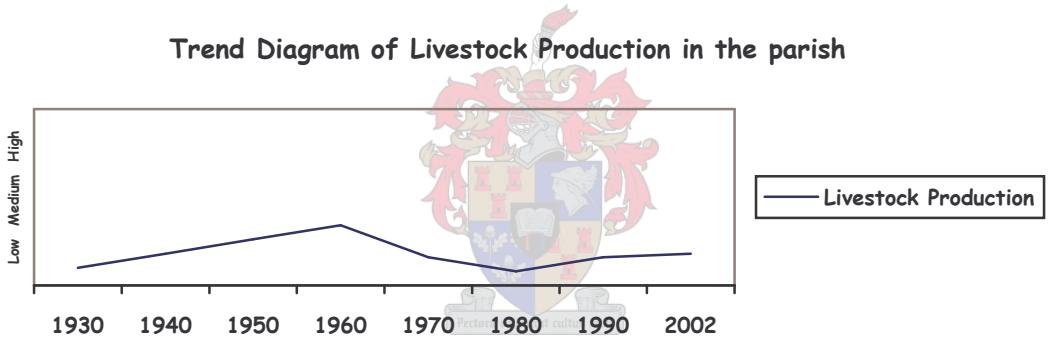


Figure 8

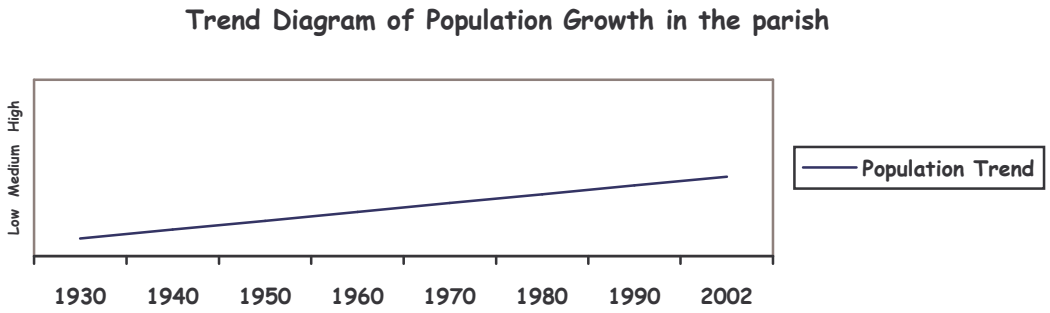


Social, economic and physical circumstances in the parish

Population

While precise population figures were not readily available during the study period the researchers were informed by the District Chief Agricultural Officer that the sub-county, in which the Gameru Parish lies, had an average population density of between 100-149 people per square kilometre. This was considered about average as most sub-counties in the district had less than 200 people per square kilometre. The population trend line in Figure 9 indicates that the population has continued to grow consistently since the 1930s.

Figure 9



To get an approximate indication of gender and age categories in the parish, residents were asked to indicate the proportion of adult males and females, and male and female children in terms of the current total population of the parish. This is indicated in proportionality diagram below (Figure 10). Percentages were not asked for and were not forthcoming from the residents.

Figure 10

Proportionality Diagram of the current estimation of population by gender and age

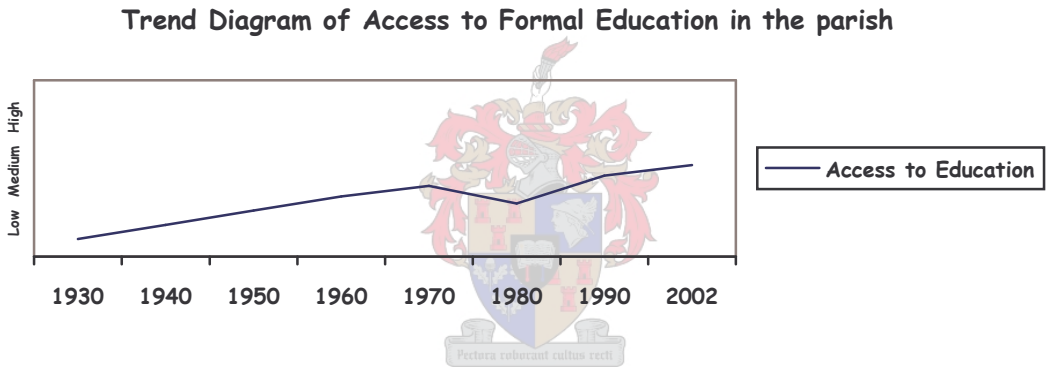
The proportionality diagram (Figure 10) indicates that the greater proportion of the parish population consists of female adults and female children; a lesser proportion is made up of male adults and male children. Individually and combined the boy and girl populations were larger than their adult counterparts. This could be a result of some adults dying from illness, as they grew older. However, based on discussions with parish residents it was more suggestive of a trend of out-migration, by the youth, from the parish to the cities and other areas due to the increasing desire to seek opportunities elsewhere; preferably in urban areas. If the population growth continues to increase along the lines indicated in Figure 9 the land will not be able to support all those who are born there until they die so natural out-migration is required, irrespective of whether the opportunities that are sought outside actually materialise. Tertiary education was only available outside the parish and it seemed that

students were categorised as youth or adults rather than as children. The preciseness of this definition and further in-depth probing on this subject was overlooked due to time constraints. If this is correct then it supports the likelihood that out-migration rather than death was the reason for the greater proportion of children in the parish.

Education

During group discussions it was reported that there were three primary schools and one secondary school in the area. The social and natural resources map drawn a few days later confirmed these figures (see Appendix 1). A trend line was drawn in order to get an idea of the trend of access to education in the parish (see Figure 11).

Figure 11



The trend line indicates that access to education had increased since the 1930s. The first primary school was established in the parish in 1936. Residents reported that access to education was disrupted due to the political instability during the presidency of General Amin in the 1970s and the bush war of the early 1980s. This political instability and armed conflict disrupted the education process and reduced the number of people who regularly attended schooling during this period. However, when stability returned to the region the growth in the proportion of people who attended schooling resumed its upward trend. During the group sessions the parents stressed that a large proportion of their income, derived from commercial farming activities, was spent on the education of their children. This was because education was expensive (especially secondary and tertiary education) and local people attached great value and importance to the education in the hope that it would enable children to get jobs that would release families from their existing situations of poverty. Residents were of the opinion that the number of schools available was inadequate relative to

the number of parish residents requiring these facilities. The proportionality diagram (Figure 10) shows that children make up the majority of the parish residents. Probing indicated that most of these were children of a school-going age. Residents felt that one Secondary School was inadequate to cope with the number of children requiring this level of education.

Health, housing and security

Residents informed researchers that a large part of their income, obtained from commercial farming activities, was spent on health services. They stressed that such services were expensive and that most people were affected by poor health. The social and natural resources map indicated that there were three primary health clinics in the parish (see Appendix 1) while the nearest hospital was situated in the district's main town. It is also important to note that there was no running water in the parish. Residents used pit latrines, situated outside each residential structure. Household water for both domestic and agricultural use was obtained from wells, or from harvesting rainwater. Residents felt that the water and sanitary conditions were inadequate and unhygienic, leading to illness and disease.

Shelter and housing structures were made of either baked clay-brick structures with tin roofs, mud-brick and wooden structures with tin roofs or mud-brick and wooden structures with grass / thatch roofs. Baked clay-brick structures were said to be permanent and people believed that these were increasing in number, although not dramatically (see Figure 7). Although, a well-being or wealth analysis was not carried out the residents did provide the researchers with the criteria that indicated the different levels of wealth. The type of structure in which a resident lived was one of the criteria that indicated his / her status in the parish. The wealthier were said to own brick structures with tin roofs, the middle to poor group usually rented brick or mud structures with either a tin or grass roof, while the very poor did not have access to shelter of their own and had to seek assistance from the other residents. Some members of the poor group were said to sleep in mud/grass sheds. This latter type of structure was usually considered to be an inadequate means of shelter as it was exposed to the elements and was seen as being a health risk.

There was no police post in the parish, the nearest one being the sub-county police headquarters in the sub-county's main town. Local policing activities were under the

jurisdiction of the local defence units (see next section). Other emergency services were situated at the main town in the district, approximately twenty-five kilometres from the parish. Access to and from this town involved using a single gravel road which was said to be extremely difficult to navigate during the rainy season.

Social institutions and assets

* *Places of worship*

There were two Christian churches and one Islamic mosque located in the parish. These were the only places of worship identified by local residents. Sites and the practice of ancestral or animistic worship were neither mentioned nor observed during the study.

* *Local Leadership*

Throughout Uganda a decentralised system of governance existed in the following descending order from the national to the local political arenas:

- Parliament (National Level)
- District Councils also known as Local Council 5 (LC5)
- Local Councils (LC1-4)

Local Councils are comprised of the following:

* County (LC4)
* Sub-county (LC3)
* Parish (LC2)
* Village (LC1)

The village council (LC1): Village residents, eighteen years or older, could be elected as members the village council. The village council had a management committee of nine members. These included a Chairperson, Vice-chairperson, General Secretary, Secretary for Defence / Security, Secretary for Mass Mobilisation, Secretary for

Finance, Secretary for Youth, Secretary for Women and a Secretary for Production. Agricultural activities fell under the Secretary for Production. The Secretary for Mass Mobilisation was responsible for mobilising local people to attend and participate in various local activities of a political and developmental nature. This person played an important role in facilitating our access to the farmers and residents in the villages.

The parish council (LC2) had the same type of management committee, but the council was made up of representatives of the various LC1 committees in the parish.

The sub-county (LC3) had the same type of management committee, but the council was made up of all the LC 2 committees.

The county council (LC4) had the same type of management committee, but was made up of representatives of the sub-counties.

The district council (LC5) had the same type of management committee structure. The council was made up of county representatives.

Sub-county and district levels were considered to be the most powerful areas in local politics. All positions on the management committees at all levels were elective.

* *Farmers Associations*

Gameru parish had no formal farmers' associations or groups. Interested farmers got together to share knowledge, attend presentations, etc. when they pleased. Farmers pointed out, during the workshops and meetings, that farmer cooperation was a problem in the area. Farmers did not usually work together except to occasionally share seeds and to organise transport to the market. However, these activities usually only occurred amongst friends and neighbours. Agricultural services, including veterinary and extension services were located at district level in the town of Mpigi and these services fell under the auspices of the Secretary for Production at all the various local council levels. The researchers observed a good relationship between the farmers and the local extension officer, who was praised for his continued assistance and support.

Stakeholders and service providers

Besides the agricultural and health services, the various district, sub-county and parish management committees were responsible for ensuring that the services that they represented (finance, health, security, education, etc.) were conducted in the local council areas. All complaints and praise for service provision were typically directed to them at the various levels. The research team was unable to determine what other stakeholders such as non-government organisations and similar service providers were operating within the parish, as local residents did not mention these. Again time constraints prevented further inquiry into this topic. Regarding agricultural service provision it was mentioned that only extension and veterinary services were available in the parish. It was also pointed out that there was no agricultural research service active in the parish and that this research team's visit was the first to this area by an agricultural research team.

Physical infrastructure

The road between Gameru parish and Kampala was tarred. However, in many areas it was in a poor condition with numerous potholes and with sections of asphalt missing. Farmers complained about the condition of this and other roads leading to and from the parish. The distance between Kampala and Gameru parish is only 45km (25 miles) but the journey takes an hour and a half when travelling in a 4X4 vehicle or minibus taxi. None of the farmers visited during the transect walks had their own motor vehicles. They reported that they normally hired transport from wealthier farmers / residents to get their produce to the market in Kampala. Minibus taxis were used when farmers were not able to travel in the same vehicle as their produce *en route* to the market.

The main types of transport locally available were motorbikes / scooters (known as *boda-boda*) and bicycles. The scooters seemed to travel within and between the parish and other areas while the bicycles travelled within the parish and the sub-county. Minibus taxis were available for longer hauls. A railway line ran along the eastern boundary of the parish but no trains were scheduled to stop at this or other parishes, as stations were mainly located in urban areas. Consequently, farmers could not use this as a means of transporting their produce to Kampala. The line carried both passenger and goods trains but Ugandan rail

services mainly focused on inter-urban and inter-country linkages in East Africa. Horses were mentioned as a means of transport that were used within the parish but no further mention was made of their use and none were actually seen during the fieldwork visit. Their existence and availability to household members needs to be explored in order to determine their current and future potential.

Farmers pointed out that one of their main problems was the absence of a storage facility for their agricultural produce, especially cold storage, as they were unable to store produce after harvest until required by the market. They were also unable to store the produce until such time as they could demand a better market price.

No dams or irrigation infrastructure existed in the area and no major rivers were mentioned during discussions. One stream existed to the west, on the parish boundary, but was not indicated as a source of water. Water was predominantly obtained from hand drawn wells, various water harvesting activities and rainfall; none of which the residents considered to be hygienic.

Non-agricultural economic activities

Parish residents practised various non-agricultural activities on a small-scale. Some reported relying on these activities as their main source of income. These non-agricultural activities were the following:

- some residents who did not have access to land sold their labour to local farmers;
- some people brewed and sold an alcoholic banana beverage that they called 'Ugandan Wine';
- charcoal and firewood were manufactured from indigenous and exotic trees and sold both locally and outside of the parish;
- fired clay and mud bricks were made and sold locally;
- some residents were involved in construction work in the parish and county, erecting a range of buildings and structures upon request.

The residents stressed that no single activity was more important than another one because all activities contributed to the livelihood of the household and therefore sustained its

existence. It was noted that a very small number of people worked as paid officials in the district.

Employment and unemployment

Residents were asked to estimate the proportion of people that worked in the parish and the number who worked outside of the parish. Farmers who worked in the parish for either household (subsistence) or commercial agricultural purposes were considered to be employed in the parish. The result of this exercise on location of employment is indicated in the proportionality diagram below (Figure 12).

Figure 12

Proportionality Diagram of all parish residents employed within the parish versus those employed outside the parish

Most people were self-employed within the parish, and most depended on agricultural activities (actual cultivation of agricultural produce or the sale of their labour for agricultural purposes) or the sale of agricultural and other products such as 'banana wine' and charcoal to generate an income. Residents were predominantly subsistence farmers who utilised the products derived from their agricultural activities to sustain the household. While no mention was made as to precisely what activities those people who worked outside the parish did it is likely that they were employed in commerce, as officials in the government, labour on other farms or had their own micro-enterprise as many of these were observed in the towns in this and other districts.

Social and economic stratification (classes)

While a wealth-ranking exercise was not carried out for all the residents in the parish, given the huge numbers that would be involved, the local residents identified the following levels of wealth and associated indicators:

Very Poor – These people had no shelter of their own; i.e. they neither owned nor leased housing or shelter. They relied exclusively on the charity of other parish residents for accommodation and could be found staying in reed thatched shelters or sheds on the property of other residents. Those who were fortunate enough to work were usually employed in the parish as casual labour. When not employed by commercial producers they would exchange their labour for foodstuff. This group was said to be the minority in the parish. On reflection, given that this group was dependent on employment in commercial agricultural activities for an income, the research team should have examined the poverty trend within the parish to determine if it was increasing or decreasing.

Poor – They rented or owned a house that had an iron roof. This house was not really a permanent structure as it was made from mud bricks placed within a wooden support framework. Access to land was typically between one and two acres. Most of the people we encountered felt that they belonged to this group.

Rich – These were the landowners, living in permanent brick structures with an iron roof and were said to have liquid cash at their disposal. They could own up to ten acres of land within the parish and were known as the landlords. They had sizable plantations which included cassava, coffee and banana trees. They also owned a number of livestock. Many of the local residents rented land and shelter from them. Farmers reported that about 90% of the local residents were tenants who rented land from these landlords. The rich also seemed to be the only residents who had their own motorised transport. Although, this was not mentioned as a distinguishing characteristic during the wealth ranking exercise, it was noted during subsequent discussions and household visits.

It is possible that there existed a type of middleclass that lay between the poor and the rich. This class probably owned or rented a better quality of shelter and a larger portion of land than those categorised as poor. The few commercial indigenous vegetable farmers that the research team visited seemed to fall into this category. The residents did not make such a distinction but it was alluded to during discussions. Again, time constraints prevented adequate exploration of this subject.

Main sources of income and areas of income expenditure

The main source of income and most important livelihood resource seemed to come from local agricultural activities. The household consumed a large proportion of agricultural produce but there seemed to be an increased trend towards producing a surplus and selling this. Income thus generated was used to pay for essential goods and services. There was a trend towards concentrating on crops that had a known commercial value, once the household food requirements were taken care of or in conjunction with household food security needs. The upward trend in exotic vegetable production and the increased allocation of land and labour for growing these crops and commercially sought after indigenous vegetables were indicators of this. The existence of commercial agricultural practises enabled those without either direct or indirect access to land to sell their labour to other farmers in the parish. Agricultural produce seemed to be the main source of food and all those households represented at the workshops grew some foodstuffs for household consumption; especially bananas (*plantains*) locally known as matoke, cassava and sweet potatoes. As mentioned previously, income was also derived from making bricks, charcoal, 'banana wine' and carrying out construction work.

Income seemed to be spent on some externally produced commodities such as fish-bones (from which they made soup), essential goods such as soap, sugar, salt and clothing. We did not notice any fish husbandry in this parish, probably because its relatively close proximity to Lake Victoria made access to fish-bones relatively easy. The fact that fish-bones were indicated as one of the livelihood resources only available outside the parish seemed to confirm the interpretation that fish husbandry did not occur in the parish, or at least not on a significant scale. Fish bones, including heads, were cheaper than fish fillets and were therefore, more sought after by local parish residents. Most of the households' local food requirements were derived from their farming activities. Farmers and their wives indicated that after they had sold any surplus and commercial produce, most of the income derived from sales was used to pay for the education of their children and the household health care. These were considered to be the most important areas of expenditure and income was spent on little else, including agricultural inputs.

Land tenure – ownership and access patterns

Access to land was by virtue of landownership or tenant status. Approximately 90% of the Gameru Parish residents were tenants. They leased the land and houses from landlords who either resided locally or in other areas. At the time of the fieldwork local houses were rented out at a cost of approximately 20 000 Ugandan Shillings (/=) or twelve US Dollars a month. Most of the parish residents leased the land upon which they resided and farmed. A few people, the very poor, were neither tenants nor landowners but depended on these two groups for access to land or agricultural produce in exchange for their labour. On average farming units were said to be approximately two acres per household. However, landlords could own ten or more acres and some of the wealthier tenants had access to more than two acres while others had access to about one acre, further supporting the idea that a middle class existed. Female residents did not seem to own or rent land and only got access to it by virtue of their husbands. When land was sold, the husbands kept the money and the women had no role in the selling and buying of land.

Land use trends - general history of land use

As far back as residents could remember the land in the parish was always used for agricultural purposes with some being natural or fallow land and forests. For agricultural purposes the land had been used for livestock husbandry, production of traditional food-crops, traditional cash crops, indigenous vegetables and (since the seventies) exotic vegetables. Forests and natural lands were a source of rabbits and other small game for household consumption as well as a source of household fuel. Indigenous forests and some exotic trees provided the resources from which charcoal was manufactured. These practices still continued at the time of the study although the forests were said to be getting smaller. According to residents, more and more land was being used for agricultural and residential purposes. This could result in a possible threat to local biodiversity and diminished resources such as naturally occurring fuel and food (flora and fauna) for the poorer residents.

Gender analysis

Introduction

Respondents were initially asked to discuss the presence of various interest groups within the parish. They only made mention of the existence of some women's groups in the parish. Their main purpose was for informal savings and lending of money amongst members. It was unclear as to whether there were any local projects specifically for women that received government, non-government or foreign aid. This topic seemed to be confusing for the residents and it was decided not to pursue the issue at the time. It is possible that women did not want to divulge their activities in such a large or diverse group. From observations and communication with officials it is believed that no such projects existed in the parish at that time. To examine the local social differences and similarities between the two sexes a detailed gender analysis was done with the residents. This enabled the determination of gender differentiation in terms of responsibilities, activities and access to key resources. The RRA tools used in this process were time lines and group interviews.

Differentiation of labour and daily activities

Adult male and female household members were asked to indicate their typical daily activities on a time line. They decided to do these in terms of typical weekday activities. Weekends usually involved socialising, occasional shopping in Kampala and attending local worship services; activities which they tended to do together or as a family. The daily activities for males and females are detailed in the time lines of Figures 13 and 14 respectively.

Figure 13

Time Line of typical male daily activities and associated time allocations

Time Period	Activity	Comment
6:00am	Men wake up and go to the fields	
12:00 – 2:00pm	Resting and lunch	
3:00 – 6:00pm	Men go back to the field to harvest produce for the market	
6:30 – 10:00pm	Collect harvested produce from field	
11:00pm	Take produce to market in town	
12:00 – 7:00am	Selling products in the market	Each farmer has to sell his own products to the traders and must oversee their products until such time as the traders buy them

Note: This time clock indicates only those activities that the males considered important to their role. They also only provided a general impression of their activities during a typical weekday and the subsequent inconsistencies are a result of this. Men did not go to the market everyday. This usually occurred on a daily basis during harvesting season for the commercial crops. When they were not going to the market they worked in the fields in the afternoon and returned home after 6:00pm. At the time of the study the farmers were moving towards the end of the harvesting season for Nakati and Entula, both commercial crops. The fact that they were currently busy with some harvesting of commercial indigenous vegetables indicates why they considered harvesting a part of their typical daily pattern. Males retired to bed at about the same time as the females. On weekends the activities were different with less time spent in the fields and more time socialising.

Figure 14

Time Line of typical female daily activities and associated time allocations

Time Period	Activity	Comment
6:30 - 8:00am	Wake up and prepare the homes	
8:00 – 11:30am	Digging in the fields	
11:30am	Prepare lunch Take livestock to the pastures	
2:00 - 2:30pm	Lunch	
2:30pm	Check on livestock	
3:00pm	Back to the fields to dig	
5:30pm	Collection of livestock and preparing supper	
7:00pm	Bathing	
8:00pm	Converse with husbands and children Prepare for sleep	
11:30pm	Sleeping	

Note: This time clock indicates only those activities that the females consider important to their role and represents main activities on weekdays. On weekends the activities are different with less time in the fields.

Farmers and their wives gave the following reasons for the different time schedules for the different sex groups:

1. Men were responsible for taking produce to towns and for selling it to traders. This was primarily because the activity involved night travel and staying in Kampala. It was considered unsafe and unwise for women to travel unaccompanied by their men-folk at night and their staying out alone at night was unheard of. Similarly women were responsible for the care of the household and were subsequently expected to remain at home to fulfil this obligation.
2. Men did not partake in the preparation of meals because this activity coincided with the time that they were in the field working or harvesting. Residents noted that in many cases the women were also involved in the harvesting of the vegetables, but took time off to prepare the meals or did so after the harvesting for the day was completed. Further clarification suggested that harvesting was the men's responsibility and while women assisted with the harvest they had to ensure that food was prepared for the household. As noted previously the men usually departed with their harvest to Kampala and the women made them food to take on their trip.

Besides preparing meals, cleaning the house, supervising the children, looking after livestock and working in the fields female parish residents were also responsible for the following activities, either directly or indirectly by supervising the activities of the children:

1. collecting firewood and fuel;
2. fetching water;
3. cleaning the house and washing the household utensils and clothing.

Men on the other hand did not seem to have many other defined responsibilities beyond those relating to agriculture. The impression was that the majority of people on the local management committee were male, so it was likely that the men had a role in overseeing the daily village and parish affairs. Men also introduced outsiders to the residents. During the workshops and transect walks the women entered the discussion freely but other than this

they only seemed to engage directly with outsiders (such as the research team) after male had made the introductions.

Agricultural activities

Men were almost solely responsible for clearing fallow land which entailed the clearing of trees and brush and is said to require intense physical labour and strength. Women cleared the cultivated land between the harvest and the subsequent planting season, as this did not require as much physical strength. After the fallow land had been cleared and the brush burnt, then the women were responsible for ploughing the land and ploughing-in the ash and other organic matter such as compost and manure. Men sometimes helped with this. The men and women usually shared the responsibilities of planting / sowing, cultivating, weeding and spraying. There did not seem to be any 'hard and fast rule' relating to the gender differentiation of these activities. During the transect walks in the parish we noticed mainly women working in the fields of some farms. When we visited one of the commercial farmers we noticed a man doing all the work with regard to tending to the indigenous vegetables he was growing for commercial consumption. However, when we visited another farmer who was cultivating exotic vegetables for commercial consumption he had male and female children tending these crops; it was a Saturday and his wife was cleaning the house. Consequently, during the short period of fieldwork, it was difficult to determine whether or not there was really any particular hard and fast rule regarding gender based differentiation of labour. The general pattern that emerged was that harvesting was definitely a male supervised role and the actual transport to and selling of the crops at the Kampala market was solely their responsibility. A further impression was that the women carried out the greater share of the agricultural labour under the supervision of the men, while men assumed greater responsibility for commercial oriented crops but did not necessarily do all the labour required. Women assumed the main responsibility for the crops produced exclusively for household consumption.

A similar pattern seemed to emerge for the production of livestock. Men again assumed the main responsibility for the more commercially oriented livestock, such as cattle. Women on the other hand assumed almost sole responsibility, along with the children, for the livestock reared for household consumption and those considered to be of lesser commercial significance, such as chickens, goats, pigs and sheep, of which they sold the surplus

products to generate an income. However, the income derived from these sales was not as significant as that from cattle. Figure 14 shows that women were responsible for ensuring that all livestock (including cattle) were cared for, tethered and fed. Consequently, it was uncertain as to what the men's main responsibility was with regard to commercially oriented livestock (cattle) but it seemed to be mainly involvement in the sales of livestock. The allocation of resources, discussed below, informs us that the men took the income derived from the sale of cattle or cattle products.

Gender activities relating to indigenous vegetables

Generally both men and women were responsible for the cultivation of indigenous vegetables. However, men assumed a more prominent supervisory role with regard to those indigenous vegetables that were produced mainly for commercial purposes. Women have almost sole responsibility for the production of indigenous vegetables that are grown more or less exclusively for household consumption. As indicated in Table 1, both sexes had a role to play in the cultivation of all indigenous vegetables. The predominance of these gender-associated roles depended largely on the activities required and to some extent on the purpose for which the crop was being produced. As mentioned previously men were exclusively responsible for selling commercial indigenous vegetables at the market in Kampala. Women were responsible for locally selling the surplus of indigenous vegetables produced predominantly for household purposes.

Gender Allocation of resources and income

Various resources and especially money are typically unequally distributed between members of the opposite sex in many societies (Sims Feldstein and Jiggins, 1994). To obtain a picture of the gender allocation of various resources in Gameru parish local households were asked to indicate the local patterns of access to resources. The respondents placed their emphasis on finances, livestock, crops and land.

- Although the bulk of income obtained from the sales of indigenous vegetables in Kampala went to the men the expenditure of this income was said to be planned by both males and females.

- Sometimes men would take all the income from a specific commodity (as in the case of cattle and coffee but exactly how often and for which of the other agricultural commodities this happened was not disclosed during the study). In such instances the income obtained was never shared with the women. Men seemed to spend money on themselves and on agricultural inputs such as labour and implements.
- When income was shared, men usually took the larger portion.
- Women took all the earnings from their produce, including certain livestock (goats, hens, rabbits and pigs) and crops, but they used this predominantly for the benefit of the household - to buy food and essential items, and to pay for school fees and medical expenses.
- Land and access to land was in the control of the men; women obtained access to land through their husbands or men-folk. As mentioned previously the income from selling land went to the men. We failed to enquire whether unmarried women and widows could own or inherit land.

Generally women obtained the income from crops and livestock that were considered to have a lower commercial value and which were predominantly cultivated for household consumption with only the surplus being sold. Women carried out these sales, all of which were transacted locally. Men retained all the income from the crops and livestock that were considered to have a high or exclusively commercial value. They were responsible for the sale of these crops which took place mainly at the market in Kampala. The implication was that the males had access to, received and controlled the larger portion of income that the household produced. It was noted that in some instances men and women made joint decisions regarding the expenditure of some of the men's income. Often they made joint decisions on the expenditure of women's income. The bulk of the women's income almost always went exclusively for the benefit of the household to buy food and essential items, and to pay for school fees and medical expenses.

Unfortunately, we did not ask the parish residents and farmers to describe the proportion of the total household income that was derived from the different agricultural activities and other sources. Consequently, it is impossible to indicate what proportion of expenditure of income falls under the sole decision-making control of the males, what belongs exclusively to the females and what is shared.

Locally experienced problems

Introduction

During the workshops local residents were asked to indicate the problems that they faced as a group. These included both agricultural and other locally experienced problems. The research team was divided on the issue of the importance of considering solutions to the identified problems within the current study of indigenous knowledge about indigenous vegetables. Some members of the research team were also hesitant to include the identification of problems at all during this stage, as they feared that it would raise expectations, especially as the future of the larger project was uncertain. The counter argument, which later prevailed, was that problems relating to indigenous vegetable production had to placed into the general problems experienced by the farmers in order to obtain an indication of their local significance. As a result of these concerns a trade-off occurred in which solutions were not ranked and tested for feasibility but where some local general and agricultural problems were identified. Farmers were also asked to identify the different types of research topics they would be interested in obtaining information about.

Advice required from future research activities

At the final meeting between the researchers and the local residents they requested more information on the following five topics:

- organic and in-organic farming methods;
- the disease known as *cassava mosaic* which was affecting their cassava crops;
- the various caterpillars which were threatening the cultivation of both exotic and commercial indigenous vegetables;
- the actual nutrient content of the fifteen indigenous vegetables that they had prioritised as the most important ones locally produced and consumed;
- techniques to preserve or store indigenous vegetables for use during times of shortage.

While many of these requests were not directly indicative of problems they informed us of agricultural issues that the local residents considered important. These requests refer to assistance needed not only with regard to indigenous vegetables but also beyond this subject, substantiating the fact that the RRA tools could be used in a way that encouraged the farmers to list issues that they felt important and not necessarily those only considered important to the researchers.

Local Problems

Initially the residents in the parish did not distinguish between those problems solely relating to agriculture and those relating to broader community issues. In this parish the community and its existence was intricately tied to agriculture and the land; it was largely an agrarian form of existence. As a result the residents considered it impractical to separate their problems into two distinct categories. The following list of problems was identified and agreed upon by a group of approximately fifty parish residents. However, it is not in any order of priority:

1. theft of food crops, cash crops and livestock;
2. lack of money to employ labour;
3. lack of agricultural inputs (such as improved, resistant and hybrid seeds, and money to hire labour for ploughing and harvesting);
4. lack of effective pest and disease control measures;
5. lack of irrigation facilities (lack of enough water for those farming on upland slopes and technology for appropriate irrigation methods);
6. lack of greater and consistent markets for produce;
7. lack of processing plants;
8. lack of high yielding crop varieties and animal breeds;
9. a high level of local poverty;
10. the lack of electricity (due to the high cost of installation and the service fee, rather than it not being made available);
11. a lack of health facilities;
12. the high cost of health services;
13. the poor conditions of the roads in and around the parish, particularly during the rainy season.

Following a discussion about the identified problems the fifty residents present at the meeting reinterpreted some of the above problems and prioritised the most serious of these in the following order.

1. human diseases – these were not adequately attended to by the local clinics;
2. transport shortage – transport was expensive and that which was available was generally unsuitable during the rainy season ;
3. high market costs and fees – these resulted in smaller profit margins;
4. a lack of funds to start self-help projects, especially for the local youth;
5. lack of improved crop and animal breeds;
6. welfare services for the aged.

Most of these prioritised six problems related to poverty, as residents felt that if they had sufficient money they could afford these things or could establish them independently of external support and inputs, upon which they were now becoming increasingly reliant because of their prevailing poverty. The agricultural problems indicate a desire to increase income and profit. Again it is important to note that the lists include agricultural and other problems, reinforcing the fact that the tools have been used in a more participatory fashion so as to allow for the generation and inclusion of this information. This practise encouraged participation and permitted the research team to be privy to various local problems. These problems, such as human diseases, can have a future effect on any future agricultural research work done in the area. This reinforces the significance of the tools to place the information within a broader context.

Agricultural constraints

The research team was primarily interested in agriculture in the parish so we separated out the general problems identified by local farmers and parish residents into those pertaining to agricultural activities. These include the following and are not in any order of priority:

- theft of food crops, livestock and cash crops;
- lack of money to employ labour;
- lack of external agricultural inputs;

- pest and diseases;
- lack of sufficient water during dry season and lack of irrigation systems;
- lack of alternative markets for produce;
- lack of processing plants for alternative products;
- lack of high yielding crop varieties and animal breeds

Following discussions with farmers, most of these problems were linked to a lack of financial resources to obtain commercial inputs such as synthetic fertilisers and pesticides and drought and disease resistant crop varieties. The need for such inputs seemed to result from the introduction of exotic crop varieties thirty years ago, the associated farming practices and the increasing incidence of crop pests and diseases, which some farmers believed had become intolerant to some local and synthetic inputs. Farmers seemed to believe that the commercial practices, relying on high volumes of external inputs, which they could not afford, were better than their own low external input practices and solutions. This was despite the problems that they were experiencing and that they associated with the introduction of exotic vegetable farming practices in the 1970s. Livestock associated diseases tended to be minimal and this was probably a consequence of the low number of livestock present in the parish, of which most of the larger types were said to be indigenous (the only evidence of exotic breeds in the parish seemed to be rabbits). While agricultural practices tend to be extensive, some crops were being produced intensively by some of the farmers. This seemed to bring about more problems than those experienced prior to the introduction of exotic vegetables and the commercial monocropping practices during the 1970s and 1980s. External inputs were sought in the hope that they would reduce the problems farmers faced, thereby increasing yield and income. In light of the currently employed farming systems this seems unlikely and it is believed that external inputs might bring about more long-term problems than they will resolve. Intensive production of monocrops in some areas resulted in the need for greater access to water for crop irrigation purposes. The availability of water and household water demands on this resource remained more or less constant, while the agricultural demands have increased. The implication is that there was insufficient water for all the various demands and also insufficient means of harvesting water in the parish.

Conclusion

The RRA tools have provided us with a large amount of information on the context in which parish farmers and residents find themselves, including gender roles and relationships, how and why they carry out certain agricultural practices, some of the local problems that they encounter and agricultural topics on which they require further information and research. We also have an indication of the past and current trends in the parish with regard to agriculture but also a number of social issues such as housing and education. This information provides us with a context in which to place the indigenous knowledge and the role and significance of indigenous vegetables in the parish. A lot of information was generated and recorded so that the exact significance of indigenous vegetables with regard to other agricultural crops and activities could be understood.

The contextual information that was generated on the various topics is voluminous but the question might be asked as to how valid and reliable it is given the rapidity of the process. This is a methodological issue that requires further discussion. It can also be asked about the information obtained on indigenous vegetables, presented in Chapter Five, because the same method was used. Before discussing this issue in Chapter Seven we need to first look at the quality and quantity of the information (indigenous knowledge) obtained about indigenous vegetable production and utilisation. This information is now presented and discussed in Chapter Five.

CHAPTER FIVE

INDIGENOUS KNOWLEDGE AND EXPERIENCE OF CULTIVATING AND USING INDIGENOUS VEGETABLES

Introduction

Given the local context in which farmers and residents lived in the parish and the various changes that have occurred during the past seventy years we need to look at how they developed and adapted a system that would allow them to survive in these changing conditions and changing resource base. These survival strategies and practices can be regarded as part of their indigenous knowledge, which as we saw in Chapter One is generally believed to consist of various dimensions including, technical, social and cultural. The primary objective of the first phase of the research project on the genetic diversity of Ugandan indigenous vegetables was to gather indigenous knowledge on indigenous vegetables. More specifically information was sought on the topics of agronomy, water use and harvesting, integrated pest and disease management, the farming systems employed in production, seed development technology, crop diversity, *in-situ* conservation practices, the role of indigenous vegetables in household nutrition and the processing, storage and utilisation practices. In fulfilment of this primary objective the residents' and farmers' indigenous knowledge relating to indigenous vegetables were generated and recorded using RRA techniques. The information obtained is now described. The format used in Chapter Four is followed in this chapter and the RRA tools used in the process are included in the discussion.

Understanding indigenous knowledge in the local context

Identifying indigenous vegetables

Farmers and residents of Gameru parish classified local indigenous vegetables as being those vegetables that were available in the parish before the 1940s, irrespective of whether

or not the vegetables were known by locals and scientists alike to be exclusively of Ugandan or exclusively foreign origin. The reason for this was that the current residents had always experienced the vegetables as growing in the area, often appearing to occur naturally. According to the International Institute for Rural Reconstruction (1996) such a distinction for identifying indigenous knowledge or an indigenous item is perfectly acceptable. Indigenous knowledge, and in this instance by extension the classification of indigenous vegetables, is something that is particular to a specific locality. This does not imply that it must originate from that area since time immemorial and that it must be free of influence from external elements (IIRR, 1996; Grenier, 1998; Langill, 1998). I would also postulate that this does not imply that it cannot be found elsewhere, although there might be some variation around the knowledge attached to it. Knowledge is dynamic and is continually changing, making it impossible for it to be free from external influences. For the purpose of our references to indigenous vegetables in this discussion the definition provided by the residents of Gameru parish is accepted and used, i.e. the plant has been cultivated in the area or seemingly occurs naturally in the area for as long as the current residents could remember. On the other hand the Gameru residents identified exotic vegetables as those vegetables whose origin was definitely not local and were usually foreign to Uganda but had been introduced into the parish during the lifetime of the current residents. According to the historical time line (Figure 1) and the trend diagram of exotic vegetable cultivation (Figure 17) this introduction occurred from the 1970s onward.

Residents who attended the workshops were asked to identify and rank the indigenous vegetables that were found in the parish. Initially the participants identified twenty-five types of indigenous vegetables. After obtaining clarity regarding this number it was realised that the different varieties actually referred to foodstuffs that were derived from the plants rather than twenty-five different plant species. A single plant can provide different foodstuffs which were eaten at different times during the lifecycle of the plant. In some cases more than one part of the same plant was eaten (leaves, stems and fruit) at different times and each part was given a different name and locally identified as a separate indigenous vegetable resulting in the appearance that each vegetable referred to a different plant species. In other cases the same part was eaten at different times during the life-cycle and was given different names. It was also realised that parts of some plants, which we would term exotic vegetable plants and whose origin was known as being exotic (for example, the pumpkin plant), and which had grown in Uganda for a number of decades and at least prior to the 1940s, were also

categorised as indigenous vegetables. Examples of this were the indigenous vegetables known as Esunsa and Ensuju. The young green leaves of the pumpkin plant were eaten and given the name Esunsa, while young pumpkins were eaten and known as Ensuju. According to scientists on the research team the plant was originally produced for its fruit (the pumpkins) and is definitely of exotic origin. Further examples are the pods of the cowpea plant that were eaten when green and known as Empinde enganda, while the young leaves were eaten locally and known as Egobe (see Tables 3 and 4). This also applied to a popular bean variety, as the leaves were known as Ebisiboza and the beans were identified by their common name, green beans or French beans, suggesting their exotic origin. Farmers also pointed out that the Doodo referred to in the study, which was locally grown and harvested, was not really original to Uganda. It came from Sudan but replaced the local variety, Doodo enganda, and was considered throughout the district to be an indigenous vegetable, mainly because it grew freely and easily in the area.

At times it became difficult to distinguish the exact differences in origin between a few of the varieties and sometimes the data appears conflicting as a result. While attempts were made to capture all the different names, it was realised that more time than was available was required to do this accurately. The completion of this activity would allow for the distinction to be made between the different parts of a plant, their use as foodstuffs and actual differences between plant varieties. In light of the current data this has been attempted in Chapter Seven but it probably needs further verification with the plant samples. In this parish, then, an indigenous vegetable was not necessarily a particular plant but rather a particular part of a plant and a foodstuff derived from a specific plant. One plant sometimes produced more than one indigenous vegetable during its life-cycle and one part could be a different indigenous vegetable at different times during its life-cycle. The various products derived from the various plants were given local names, were known as indigenous vegetables and therefore were identified as such when enquiries were made about indigenous or local vegetables. This is an entirely acceptable trend in indigenous knowledge classification systems which has been encountered in other parts of the world but differs from the generally simpler classificatory systems usually practised by conventional scientists at formal academic and research institutions (Mettrick, 1993; IIRR, 1996; Grenier, 1998).

Pair-Wise ranking of indigenous vegetables

Residents based the ranking of indigenous vegetables on how important they were in terms of generating an income, i.e. commercial demand was given primary priority over other criteria. However, availability within the parish was used to distinguish the priority of those vegetables that had a lower commercial demand, as only about four of the identified vegetables were cultivated almost exclusively for the market. Hence, the most important indigenous vegetables were those that had greater economic value, followed by those which were the most widely available in the parish. Discussions with individual farmers suggested that availability was to some degree based on economic value and on popularity in terms of taste and versatility. Residents attempted to shorten the list of those ranked to include only parts or products of plant varieties that were considered important. As a result of the local classification system, some exotic plants that had grown in the parish for generations were included in the list because those parts which were consumed, were considered locally to be indigenous vegetables. The pair-wise ranking matrix (Figure 15) illustrates the ranking preference for the seventeen most commonly available indigenous vegetables in this parish.

From this exercise the eight most popular indigenous vegetables were ranked in order of priority as follows:

1. Nakati
2. Entula
3. Ebugga
4. Ejobyo
5. Enyanya entono
6. Doodo
7. Egobe
8. Enkolimbo

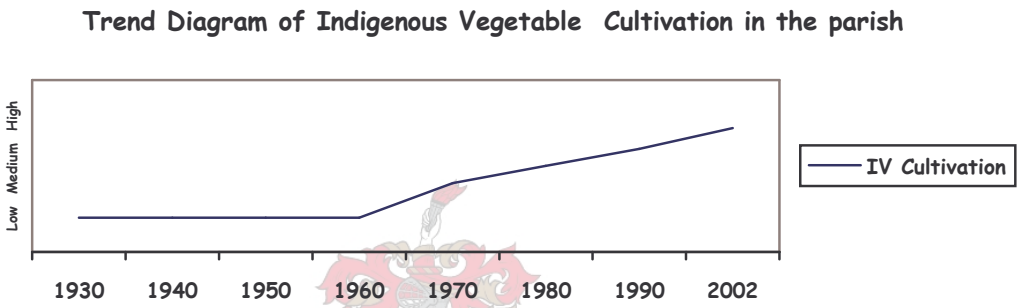
Figure 15: Pair-wise ranking matrix of Indigenous Vegetables – the 17 most commonly used by parish residents

List Ivs	Grown / Wild	Gender Responsibilie	Reason Why	Doodo	Ebugga	Ejobyo	Ensuga	Nakati	Entula	Enyanya entono	Emboga enganda	Obiyindiyindi	Ekigaga	Enkolimbo	Empande	Esunsa	Egobe	Etimpa	Enderema	Emboge	Score	Rank
Doodo	W	Neither	Household	_	Ebugga	Ejobyo	Doodo	Nakati	Entula	Enyanya	Doodo	Doodo	Doodo	Doodo	Doodo	Doodo	Doodo	Doodo	Doodo	Doodo	11	6
Ebugga	G	M/F/c	Market	Ebugga	_	Ebugga	Ebugga	Nakati	Entula	Ebugga	Ebugga	Ebugga	Ebugga	Ebugga	Ebugga	Ebugga	Ebugga	Ebugga	Ebugga	Ebugga	14	3
Ejobyo	W/G	F/M/c	Market/ Household	Ejobyo	Ebugga	_	Ejobyo	Nakati	Entula	Ejobyo	Ejobyo	Ejobyo	Ejobyo	Ejobyo	Ejobyo	Ejobyo	Ejobyo	Ejobyo	Ejobyo	Ejobyo	13	4
Ensuga	W	Neither	Household	Doodo	Ebugga	Ejobyo	_	Nakati	Entula	Enyanyo	Ensuga	Obiyindiyindi	Ekigaga	Enkolimbo	Empande	Esunsa	Egobe	Etimpa	Ensuga	Ensuga	3	
Nakati	G	F/m/c	Market	Nakati	Nakati	Nakati	Nakati	_	Nakati	Nakati	Nakati	Nakati	Nakati	Nakati	Nakati	Nakati	Nakati	Nakati	Nakati	Nakati	16	1
Entula	G	M/f	Market/ Household	Entula	Entula	Entula	Entula	Nakati	_	Entula	Entula	Entula	Entula	Entula	Entula	Entula	Entula	Entula	Entula	Entula	15	2
Enyanya entono	W	F	Household	Enyanya	Ebugga	Ejobyo	Enyanya	Nakati	Entula	__	Enyanya	Enyanya	Enyanya	Enyanya	Enyanya	Enyanya	Enyanya	Enyanya	Enyanya	Enyanya	12	5
Emboga enganda	W	Neither	Household	Doodo	Ebugga	Ejobyo	Ensuga	Nakati	Entula	Enyanya	_	Obiyindiyindi	Ekigaga	Enkolimbo	Empande	Ensunsa	Egobe	Etimpa	Enderema	Emboge	0	
Obiyindiyindi	G	F	Household	Doodo	Ebugga	Ejobyo	Obiyindyindi	Nakati	Entula	Enyanya	Obiyindiyindi	_	Obiyindiyindi	Enkolimbo	Obiyindiyindi	Ensunsa	Egobe	Etimpa	Obiyindiyindi	Obiyindiyindi	6	
Ekigaga	G	F	Household	Doodo	Ebugga	Ejobyo	Ekigaga	Nakati	Entula	Enyanya	Ekigaga	Obiyindiyindi	_	Enkolimbo	Ekigaqga	Esunsa	Egobe	Etimpa	Ekigaga	Ekigaga	5	
Enkolimbo	G	F	Household	Doodo	Ebugga	Ejobyo	Enkolimbo	Nakati	Entula	Enyanya	Enkolimbo	Enkolimbo	Enkolimbo	_	Enkolimbo	Esunsa	Egobe	Enkolimbo	Enkolimbo	Enkolimbo	8	8
Empande	G	F	Household	Doodo	Ebugga	Ejobyo	Empande	Nakati	Entula	Enyanya	Empande	Obiyidiyind	Ekigaga	Enkolimbo	_	Esunsa	Egobe	Etimpa	Empande	Empande	4	
Esunsa	G	F	Household	Doodo	Ebugga	Ejobyo	Ensugsa	Nakati	Entula	Enyanya	Esunsa	Esunsa	Esunsa	Esunsa	Esunsa	_	Egobe	Etimpa	Esunsa	Esunsa	7	
Egobe	G	M/f	Household/ Market	Doodo	Ebugga	Ejobyo	Egobe	Nakati	Entula	Enyanya	Egobe	Egobe	Egobe	Egobe	Egobe	Egobe	_	Egobe	Egobe	Egobe	10	7
Etimpa	G	F	Household/ Market	Doodo	Ebugga	Ejobyo	Etimpa	Nakati	Entula	Enyanya	Etimpa	Etimpa	Etimpa	Enkolimbo	Etimpa	Etimpa	Egobe	_	Etimpa	Etimpa	8	
Enderema	W	F	Household	Doodo	Ebugga	Ejobyo	Ensuga	Nakati	Entula	Enyanya	Enderema	Obiyindiyindi	Ekigaga	Enkolimbo	Empande	Esunsa	Egobe	Etimpa	_	Emboge	1	
Emboge	G	F	Household	Doodo	Ebugga	Ejobyo	Emboge	Nakati	Entula	Enyanya	Emboge	Obiyindiyindi	Ekigaga	Enkolimbo	Empande	Esunsa	Egobe	Etimpa	Emboge	_	2	

Cultivation trend of indigenous vegetable crops grown in Mutubagumu Ttiribogo parish

The researchers needed to determine the duration for which local farmers and residents had been cultivating and using indigenous vegetables in order to determine the amount of experience that they would have on the subject and the level of its importance to the residents. Workshop participants were asked to provide an indication of this by means of a trend diagram. A trend line of indigenous vegetable cultivation in the parish during the past seven decades is indicated in the chart below.

Figure 16



Based on the trend diagram in Figure 16 and information obtained from the farmers during visits and interviews, indigenous vegetables were produced in the parish for many years; at least from the 1930s and this production seemed to have increased since the 1960s and 1970s. The introduction of President Idi Amin's policy of "economic war" in the 1970s, stressing the commercial value of agricultural produce, brought about an increase in the local production trend. Production has continued to increase with the liberalisation of trade and the steady demand for indigenous vegetables in the urban areas since the 1970s. However, Figure 5 indicates that at approximately the same time the local production of indigenous vegetables was overtaken by introduction and increasing production of exotic vegetables for commercial purposes. Farmers continued to cultivate indigenous vegetables because there was a local demand within the parish and a small external commercial demand outside the parish. The local demand was based on the belief that indigenous vegetables were hardier, more resilient to pests and diseases than exotic vegetables, were nutritious and most importantly, they were an important means of low-cost and easily accessible sustenance for the local households, which seldom eat exotic vegetables. Only four indigenous vegetables, Nakati, Entula, Ebugga and Ejobyo seemed to be sold consistently at the Kampala market

and are actively produced for their commercial value. The elderly and female residents were attributed with playing an important role in preserving the use of the indigenous vegetables as it was said they were aware of the nutritious value of these crops and their importance to household food security. Men were said to be more interested in those four indigenous vegetables that had commercial value.

The extinction or scarcity and conservation of local indigenous vegetables

Farmers and other residents identified a number of indigenous vegetables that they believed were either extinct or very scarce. They also identified vegetables that were available but no longer consumed for various reasons. These vegetables and the reasons for their extinction, scarcity or disuse are listed in Tables 8, 9 and 10.

Table 8
A list of the indigenous vegetables that used to grow in the parish

List IVs used to grow	Grown/ Wild	Reasons Why No longer Available
Embuga enganda (Indigenous cabbage)	W	There is a lack of seeds They is no longer any market or local demand Pests and diseases have removed it from the area
Nakati enganda (Indigenous Nakati)	G	There is a lack of seeds They is no longer any market or local demand Pests and diseases have removed it from the area
Endokwa (?)	G	They were grown by old people - few of these people are still here / alive Majority of the current generation do not know how to prepare it and are not interested in it
Empede (?)	G	They were grown by old people - few of these people are still here / alive Majority of the current generation do not know how to prepare it and are not interested in it

Table 9
A list of indigenous vegetables that are becoming increasingly scarce in the parish

List Scarce IVs	Grown/ Wild	Reasons Why Scarce	Local Conservation Methods
Emboga (Amaranthus spp)	W	Currently people's preference is for emboge rather than emboga	It is grown by a few people on a very small scale
Enderema (Malabar Spinach	W	Not a preferred vegetable Nakati replaced it as the preferred vegetable	None
Ensuga (Nightshade / Wonder Berry)	W	It is eaten by very few people because it is bitter It is considered as a medicine and has associated taboo People are not aware of its nutritional value	Old people occasionally grow this on a very small scale
Obuyindiyindi (Lima Beans)	G	It is eaten by very few people because very few people know how to prepare it	Occasionally grown by members of the older generation

Table 10

A list of indigenous vegetables that are in very short supply and are no longer used in the parish

Name IVs which are no longer used	Explain why no longer being used
Enderema (Malabar Spinach)	Because of cultural problems (taboo) associated with it
Emboga (Amaranthus spp)	It has been replaced by emboge because of taboo Unlike emboga, emboge is more preferred for taste and can be eaten in the house

The lists in Tables 8, 9 and 10 suggest a trend towards producing and using indigenous vegetables, which have the following criteria:

1. are of commercial value;
2. are usually easy to prepare; and
3. are considered to be both nutritious and tasty.

Those indigenous vegetables that do not meet these criteria tend to be replaced; this also the case if the vegetable is the preference of a specific age or gender group that is in the minority (such as the elderly) or is considered to be less influential or dominant (such as females) and if it has taboos associated with its use. Taste preferences will probably continue to change implying that the popularity of different varieties of indigenous vegetables will also fluctuate. The market demand suggested a preference for certain tastes as most of those that were sold were those considered to be tasty, nutritious and have medicinal properties rather than those used exclusively for rituals (see Table 15). It is evident from Tables 8, 9 and 10 that very little active conservation was being carried out on the part of local parish residents, largely a result of the lack of current interest in and / or knowledge of the scarce plants. There is a possibility that many will disappear over time, due to natural deterioration as their continued growth is not encouraged nor is it monitored and protected. Their existence was because they were volunteer crops. Eventually the seedbeds in the soil will be depleted after occasional harvesting or weeding and the seasonal ploughing activities. Livestock grazing, residential patterns and expansion of cropping systems might also remove these plants from the area. At the time of the study more and more land was being used for the cultivation of other crops, which were given a higher priority, and this will probably result in the extinction of those indigenous vegetables that are not considered important and whose scarcity is increasing.

Residents believed that on the whole the conservation of indigenous vegetables was important for a number of reasons:

- They were easier to grow;
- They were more readily available and some appeared voluntarily in certain areas;
- They had important nutritional benefits;
- Indigenous vegetables played an important part in local ritual and the social system.

They suggested the following ways that could help with active in-situ conservation of indigenous vegetables:

- People must be educated about the nutritional value of these crops;
- The researchers need to give local residents advice on how to optimise their production and use in order to increase the nutritional benefits;
- The active preservation of seeds for future generations.

Farmers and residents were generally trying to increase food production of all the crops that they considered important for household consumption and the increase in indigenous vegetable production was also part of this strategy.

Climate and weather patterns suitable to indigenous vegetable production

Farmers felt that the local weather patterns had changed slightly in recent years and were slightly less favourable for their indigenous vegetable production activities. They indicated that the most suitable type of weather pattern for indigenous vegetables was moderate sunshine and moderate rainfall. The locally observed changes in the weather patterns tended to be increased rainfall at certain periods during the rainy season and longer periods of hot and dry spells during the dry season. These changes were considered unfavourable because they disrupted the growing season and in extreme cases caused damage to the crops. However, none of the farmers noted any significant crop failures as a result of these changes in the weather patterns. Possibly the farmers have already gradually adapted their production practices to compensate for these changes. Unfortunately, the likelihood of this was not pursued during the study.

Production trends and practices

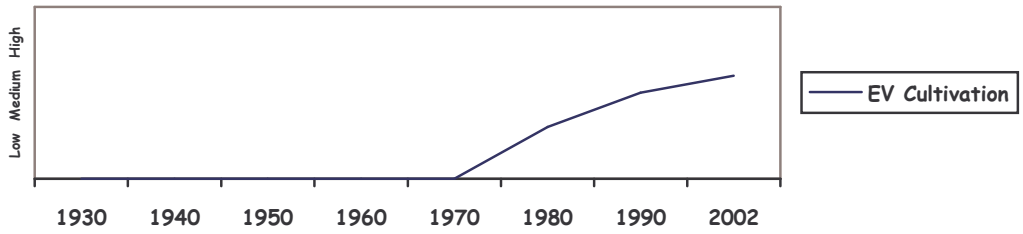
Annual production trends, land required and seasonal availability

Farmers were unable to give monthly or annual proportions of the amount of land that they used for indigenous vegetable production because of the common practice of intercropping a couple of crops rather than the monocropping of a single crop on a specific piece of land and the fact that they used different areas during different seasons as these became available. The size of the area allocated to a particular crop depended on the amount of land available at planting time, household needs and expected market demands. However, those farmers who attempted to sell most of their harvest of commercial indigenous vegetable varieties, tended to monocrop small areas of land, but were still unable to say how much land was allocated per year / season as it was spread out over the farm. Generally, most farmers used all the land to which they had access. Observations during the transect walks indicated that the largest proportions of the land were still allocated for food production, including indigenous vegetables. However, indigenous vegetables were not always allocated the largest proportions of land used for the total production of food crops; in fact no such case was observed. Generally banana and cassava trees, whose produce form a significant part of the basic staple food, required and were given the larger areas of land. These crops were also sold. Often groundnuts were also grown on these sites as cover crops. From the transect walks it appeared that local farmers used less land for producing indigenous vegetables than they used for exotic vegetables. Common intercropping and companion planting practices made it difficult to accurately determine the ratios of the different types of crops. During group sessions farmers pointed out that they were annually increasing the quantity of both indigenous and exotic vegetables and also the amount of land used for their production. Despite this, fewer indigenous vegetables were available for household consumption because those being produced in large quantities were sold in Kampala. Farmers often expanded their production onto areas of land that were not previously used or that they considered to be under-utilised. This and the common practice of intercropping allowed them to increase their production. Some farmers hired extra land outside of the parish when they could not obtain it within the parish.

The trend lines in Figure 5 indicate that the production of vegetables was increasing, with greater emphasis being placed on exotic vegetables because of their greater market value. Figure 17 shows the pattern of the increasing cultivation based on the market demand for exotic vegetables.

Figure 17

Trend Diagram of Exotic Vegetable Cultivation in the parish



The seasonal diagram below (Figure 18) and the reasons given by the farmers during discussions, indicate that for most of the eight prioritised indigenous vegetables in this parish, the growing seasons coincided with the rainy seasons (from March to May and again from August to December). Enyanya Entono seemed to be the only indigenous vegetable that was grown predominantly during the dry season and was available throughout the year, providing a yearlong source of sustenance.

With the exception of Entula, which was only available for four months of the year, the four most popular indigenous vegetables were available for about nine months of the year and there was no single month when none of these were locally available.

Figure 18

Seasonal Diagram of the times when Indigenous Vegetables are grown and harvested in a year

IV	J	F	M	A	M	J	J	A	S	O	N	D	Reason Why
Nakati	H	H	X	X	XH	H	H	X	X	XH	XH	XH	Main growth period during rainy seasons. Harvested after 3 months and then throughout the year
Entula	H		X	X	XH	H		X	X	X	X	XH	Main growth period during rainy seasons. Harvested after 3 months and then throughout the year

Figure 18 (Continued)

Seasonal Diagram of the times when Indigenous Vegetables are grown and harvested in a year

Ebugga	H		XH	XH	XH	H		X	XH	XH	XH	XH	Main growth period during rainy seasons. Harvested 3-4 weeks from planting
Ejobyo	H		XH	XH	XH	H		X	HX	XH	XH	XH	Main growth period during rainy seasons. Harvested 3 weeks after planting
Enyanya entono	XH	XH	H	H	XH	XH	XH	H	H	H	H	XH	Main growth period during rainy seasons. Harvested after 2-3 months then throughout the year
Doodo	H		X	XH	XH	H		XH	XH	XH	XH	XH	Main growth period during rainy seasons. Harvested after 1-2 weeks
Egobe	H		X	XH	XH	H		X	XH	XH	XH	XH	Main growth period during rainy seasons. Harvested after 1 month
Enkolimbo	H	H	X	X				X	XH	XH	H	H	Main growth period during rainy seasons. Harvested After 4-6 months for most of the year for next 3 years

H = Harvest period each month. It includes commercial harvest as most households produce mainly for own consumption and sell any surplus when available and if the market requires it. Accordingly the commercial harvest and household harvest takes place during the same periods as indicated in the seasonal diagram.

X = Growing periods for the eight most significant indigenous vegetables in this parish.

A blank space indicates that the vegetable is not available during that month.

IV = Name of the indigenous vegetable

J, F, M etc = the months of the year starting with January

The local process of indigenous vegetable production

Farmers in Gameru parish did not distinguish between the activities that they undertook to cultivate different varieties of indigenous vegetables. They explained that the process of cultivation was very general with almost no variation between the different varieties. Local farmers followed approximately seven steps in cultivating indigenous vegetable crops. Differentiation of labour occurred at different times during the different steps. In Table 9 the cultivation process is outlined for each of the eight vegetables that were given the highest priority by local producers. Given the very slight variations in production practices a general

summary is presented here. The first step was for the farmers to clear a field of fallow land for the crop. The cleared shrub was burnt and this ash and other organic matter were ploughed into the soil, using hand-held hoes, to fertilise it. A few weeks were allowed to pass and then the field was again ploughed using the hand-held hoes. Seeds and seedlings, usually propagated by the household, were planted or transplanted from seedling beds into the prepared soil. Seed collection was done after the previous season and the sowing of seeds for producing seedlings, in those cases where this was required, was usually done before the preparation of the land was started. Weed, pest and disease control was done by hand throughout the rest of the growing period. As the leaves matured and the fruits ripened the plants were harvested at different times of the year. Harvested leaves or fruit were either consumed or sold, depending on the type of indigenous vegetable and its commercial value. During this process the farmers did not indicate irrigation as one of the production steps suggesting that they usually relied on rainfall. When questioned, the farmers mentioned that they only irrigated the plants in the dry season and that this activity was seldom carried out during this season.

Agricultural implements required

Farmers, household members and labourers indicated that the main implements used for the cultivation of indigenous vegetables were:

- Axes and machetes (*pangas*) to clear the fallow land when first planting – especially if the land had not been used before or for a number of years;
- Hand-held hoes to turn over or plough the soil before every planting period;
- Knives to cut off the leaves and fruit during the harvest.

No animal or mechanised traction was used in the ploughing process and all labour was done by hand. The lack of animals for many agricultural labour purposes was said to be due to the history of recent conflict in the area in which most livestock were slaughtered or confiscated by invading Tanzanian and government troops. Interestingly, the farmers did not own any animal traction implements, suggesting that this activity was never practised in the area or at least not for a number of decades. Spraying of indigenous vegetables and other crops, to control for pests and diseases, was done by hand and manual spray pumps were not used. Homemade or synthetic pest and disease control solutions were mixed in containers (plastic

jerry-cans) and thatch or grass brushes were dipped into the solutions and used to sprinkle it on the leaves and around the base of the plants.

Technical inputs required

Table 11 indicates that minimal technical inputs were used in comparison with modern industrial farming methods – reliant on mechanisation, skilled labour and volumes of external inputs. Interviews with individual farmers and observations of farming practices during the transect walks confirmed that this was the case. No mechanised or animal traction was used; only manual labour of which females carried out most of the day-to-day tasks. Very few synthetic agro-chemical pesticides, herbicides and fungicides were used. However, they were sometimes used for exotic vegetables and in recent years also with indigenous vegetables grown for commercial purposes. All seeds for indigenous vegetables were produced within the household or seedlings were obtained from the wild at the beginning of the season and were then transplanted in the prepared fields. Farmers were unable to provide financial figures relating to the costs incurred in the production of indigenous vegetables. Most of the inputs were obtained from within the household so the main cost seemed to be household labour and time. Some farmers hired labour (specifically the landowners and the larger commercial farmers) but most said that they could not afford to do so and relied solely on household members.

Table 11

The steps undertaken to cultivate indigenous vegetables and the inputs / implements used

Indigenous Vegetable	Steps	Description of Steps	Gender Roles	Inputs used
Nakati	• Collect own seeds • Brush clearing of fallow field • Ploughing • Planting • Weeding • Spraying	• Clear fallow land and burn dried plant matter • Turn over matter using hoe • Scatter seeds • Weed by hand • Some spray with ash/water solution others use Kenulati[1]	Males clear fallow land Females & Males do other activities together	Labour Machete Hoe Own seeds
Entula	• Collect own seeds • Prepare nursery bed and sow seeds • Brush clearing of fallow field • Ploughing • Planting of seedlings in cleared field • Weeding • Spraying	• Clear fallow land and burn dried plant matter • Turn over matter using hoe • Scatter seeds • Weed by hand Some spray with ash/water solution others use Kenulati	Males clear fallow land Females & Males do other activities together	Labour Machete Hoe Own seeds
Ebugga (Same process as Nakati)	• Collect own seeds • Brush clearing of fallow field • Ploughing • Planting • Weeding • Spraying	• Clear fallow land and burn dried plant matter • Turn over matter using hoe • Scatter seeds • Weed by hand • Some spray with ash/water solution others use Kenulati	Males clear fallow land Females & Males do other activities together	Labour Machete Hoe Own seeds
Ejobyo (Same process as Nakati)	• Collect own seeds • Brush clearing of fallow field • Ploughing • Planting • Weeding • Spraying	• Clear fallow land and burn dried plant matter • Turn over matter using hoe • Scatter seeds • Weed by hand • Some spray with ash/water solution others use Kenulati	Males clear fallow land Females & Males do other activities together	Labour Machete Hoe Own seeds
Enyanya	• Brush clearing of fallow field • Ploughing • Collect ripe fruits • Planting • Weeding • Spraying	• Clear fallow land and burn dried plant matter • Turn over matter using hoe • Squeeze ripe fruits and spread the seeds in the field • Weed by hand • Some spray with ash/water solution others use Kenulati	Males clear fallow land Females & Males do other activities together	Labour Machete Hoe Own seeds
Doodo	Grows wild	None because mainly grown wild	None	None
Egobe	Grows wild or seeds are planted by scattering in the fields and following similar steps as described above	• None if wild • Clear fallow land and burn dried plant matter • Turn over matter using hoe • Scatter seeds • Weed by hand • Some spray with ash/water solution others use Kenulati	Males clear fallow land Females & Males do other activities together	None if wild Or Labour Machete Hoe

[1] Kenulati is a local pesticide but we were unable to identify its registered name at the time of the study.

Table 11 (Continued)

The steps undertaken to cultivate indigenous vegetables and the inputs / implements used

Enkolimbo	• Collect own seeds and dry them • Brush clearing of fallow field • Ploughing • Planting • Weeding • Spraying	• Clear fallow land and burn dried plant matter • Turn over matter using hoe • Scatter seeds only around the edges of broader gardens • Weed by hand • Some spray with ash/water solution others use Kenulati	Males clear fallow land Females & Males do other activities together	Labour Machete Hoe Own seeds

Water resources and irrigation

Water availability and water use

Farmers relied mainly on rainfall to irrigate their crops. During the rainy seasons from March to May and again from August to December they considered the rainfall pattern to be sufficient for their agricultural requirements. They remarked that in recent years there were times when they got too much rainfall during the rainy season. This damaged crops and washed some away, but none of the households could recall having lost large portions of their crops as a result. The area received very little rainfall for most of the dry season. Farmers complained that sometimes this resulted in some plants withering and dying.

The social and natural resource map of the parish (Appendix 1) shows that there were fifteen wells spread throughout the parish from which local people could draw water for household and irrigation purposes. There was also a small stream that runs along the western boundary of the parish but none of the farmers contacted during the study used this river water for either agricultural or household purposes as it was some distance away and flowed inconsistently during the dry season. Sometimes residents drew water from wells to irrigate crops during the dry season but commented that this usually did not help the situation; the plants continued to whither.

Some farmers irrigated using watering cans; others took grass brushes and used these to sprinkle water on the plants, much in the same fashion that they carried out their pest control spraying activities. None of the farmers had drip irrigation systems and none used flood irrigation, as the water sources prevented these from being used. Farmers did not distinguish between the different types of indigenous vegetables or between indigenous and exotic

vegetables when discussing irrigation practices. They noticed a difference in crops that received dryland irrigation and those that received manual irrigation. According to the farmers the crops receiving dryland irrigation seemed to develop better as they received more water in this manner than when manual irrigation was applied. Farmers did not water their crops in the rainy season and mainly carried out irrigation practises during very dry periods. However, the amount of water given to the plants during these periods was minimal because the labour involved in collecting the required amount of water and carrying out the irrigation was significant. While water in the wells seemed to be available throughout the year the problem was to get it to the fields so that it could be used to irrigate the crops. This stemmed from the fact that the household depended almost solely on the water from the wells for household requirements. During the dry season women and children had to go more often to the wells to get water for both the household and agricultural needs. This increased their labour time spent collecting water and irrigating. The farmers considered the amount of water that they collected for irrigation purposes to be insufficient because it did not seem to help the plants that received it. Not only did the plants not improve but also the collection of irrigation water used up scarce household labour.

Consequently, the minimal irrigation that was practised by some farmers had no real effect and in some cases if too much water was applied then the crops in fact did worse and had a withered appearance. This suggests that the sources of irrigation water during the dry season might be less than desirable. It would be an idea to analyse the water in the wells to determine its chemical and nutrient composition as it could have a high saline content that increased during the dry season and caused it to have a negative effect on the plants when used for irrigation purposes. It must be noted that typically in a study such as this water, soil and plant samples would be taken. However, these were only budgeted for as part of the second phase and were subsequently not taken during this phase. The availability and allocation of funds to projects and phases is one of the realities and constraints of agricultural development research and influenced much of the data collection during this phase.

According to the farmers adequate irrigation was very important to ensure that the plants grew optimally and this was said to be at its best during the rainy season when the plants only received dryland irrigation.

Water harvesting and conservation techniques

Some of the farmers visited during the transect walk had 44 gallon metal drums next to their houses which were rain-fed by means of down-pipes attached to the gutters on the roofs of their houses. From observations it was evident that this water was used for household and livestock purposes. Some households placed enamel and plastic containers outside during rainy periods and collected water for household purposes in this fashion. As mentioned previously, crops are only irrigated in the dry season and only some farmers practised this because of the associated labour and time costs, and the lack of any visible improvement.

During the transect walk it was noticed that farmers had placed dried bamboo fronds and other organic matter around and over some exotic vegetables (cauliflower and lettuce in the observed cases) to serve as mulch. When questioned, farmers pointed out that the mulch:

- Controlled weeds;
- Conserved water by keeping the soil damp for longer periods;
- Using dry mulch and palm fronds allowed most of the rain to seep into the soil before evaporation;
- Plant mulch would decompose and return organic material to the soil;
- Trees were planted strategically in fields to provide shade, act as windbreaks and prevent evaporation of the water – the plants were watered in such a fashion that they received most of the water, rather than the tree taking most of the water.

Farmers said that mulching was only used to reduce evaporation and to control weeds but they seemed to cover the plants with cut palm fronds and leafy branches of other trees to provide shade and also protection from birds. Farmers stressed that this was not the purpose of mulching but that they did apply palm fronds and leafy branches over seedling beds for shade and protection purposes. The use of mulching was not observed in the case of indigenous vegetables in this area. On reflection this seemed strange because mulching was a very common practise for almost all the other crops that were produced in the parish. When questioned, the farmers explained that the indigenous vegetable crops were hardier crops and mulching had very little effect on their development, making the work involved in applying mulching unnecessary.

The transect walks indicated that farmers also dug terraces and made ridges around plants to conserve and control water in gardens and fields. Paspanema[2] grass was planted along field borders to prevent erosion and control the flow of top-soil and water out of the gardens and fields. It was said to be especially effective in preventing erosion during the rainy season.

Important research areas worth considering here will be to investigate drought resistant varieties that will also grow optimally during the rainy season and ways of conserving enough water to meet both the agricultural and household needs of the farmers during the dry months. Furthermore, the actual water use and irrigation application patterns need to be studied in detail if further research on this crop occurs, in order to get an accurate idea of when and how irrigation is carried out. Possibly changing the times and the volumes of when irrigation is applied might be more effective.

Agronomy

Local soil types

The parish had a range of different soils that included sandy soils, clayey soils, swampy soils and loamy soils. Unfortunately a soil scientist was not part of the research team during this study but during the second phase soil samples will be taken in areas where the indigenous vegetables are grown and the content analysed for pests and diseases, chemical and nutrient composition. This analysis is especially important in light of the fact that farmers and extension officials considered the local soil to be infertile and of extremely poor quality. No reasons for this were given and when questioned the response was that more types of plants would grow better if the soils were better. It is possible that this soil was not suitable for exotic vegetables and that this is what they were referring to as the comment was made during a discussion of general agricultural practices (also note the discussion below on the effect of indigenous and exotic vegetables on the soil).

[2] Unfortunately I was unable to find out the common and scientific names for this grass. It is used in a similar manner to Vetiver grass (*Vetivera zizanioides*), but is not believed to be this grass.

Indigenous vegetable soil preference and effect of soil on indigenous vegetables

Farmers pointed out that dark loamy soils were preferable for all local crop cultivation. This could be because of the higher organic matter content, higher moisture / water retaining ability and better drainage ability of such soils. Farmers also pointed out that the nature (organic and nutrient content) of the topsoil had an effect on the cultivation of the indigenous vegetables. From their experience they believed that the higher the nutrient content (based on soil colour and texture) the better the plant grew and subsequently the better the yield from the indigenous vegetables and other crops grown in that soil. According to farmers many of the locally cultivated indigenous vegetables had shallow root systems. This enabled them to be grown satisfactorily in shallow soil and sandy areas around the parish.

Effect of indigenous vegetables on the soil

Farmers indicated that indigenous vegetables provided benefits to local soils. Various exotic vegetable crops were rotated with indigenous vegetable crops because farmers observed that the exotic vegetables grew better when they were planted in soil that previously hosted indigenous vegetables. They indicated that the periodic resting of the soils would be the best strategy to follow but they seldom did this because of their need to maximise the use of their scarce lands and that rotating some exotic vegetables with indigenous vegetables compensated for this by producing a higher yield in comparison to when these crops were not rotated with one another. The example was given that beans, Ebugga and tomatoes were rotated in this order because the Ebugga seemed to add beneficial properties to the soil that made the other two crops grow better. Ebugga neutralised the soil when it was planted after beans thereby preparing the soil for the tomatoes. Farmers pointed out that some indigenous vegetables extracted nutrients from the soil. These nutrients were essential to their continued optimal growth and that rotation with exotic vegetables seemed to allow the yield of the indigenous vegetables to remain good when they were later replanted, in comparison to if they had not been rotated. Again Ebugga was cited as an example. It seemed that in some cases the exotic and the indigenous vegetables aided one another's mutual development and optimal growth. Farmers pointed out that re-working indigenous vegetable plant matter back into the soil after harvest increased the nutrients in the soil as the indigenous vegetables had a high organic matter content that aided the soil. This was deemed to be beneficial, as the farmers generally did not rest the soil in-between seasons because of the small sizes of the

land that they had and the need to continuously use it to produce crops for sale or household consumption.

Crop protection

Pests and diseases and their control

The farmers identified a number of local pests and diseases. Table 12 provides a list of those pests and diseases that they felt were the most important based on the fact that they were the most difficult to control. However, the verification and determination of the names of the causal agents needs to be done in the second phase. The causal organisms were given in the local languages and the descriptions were often not clear to members of the research team. Most of the descriptions and names came up in the discussions and not during the transect walks so it was difficult to ascertain the actual pest / disease and causes of damage. The best way to do this would be to carry out a participatory pest and disease survey during appropriate seasons. Our team lacked both a plant pathologist and an entomologist, preventing us from obtaining preliminary English names of the pests and diseases.

Table 12
A list of pests and diseases considered problematic in the parish

Pests, Weeds and Diseases	Effects	When Occurs	Control
Obusenyi (?)	Eats leaves	As soon as leaves appear	Hot pepper and ash solution
Kowaluzi (?)	Eats leaves & stems	After germination of seedlings	Hot pepper and ash solution
Moggo (?)	Eats the fruit	After fruits have been formed	Hot pepper and acacia leaves solution
Ebisolo (Wild animals)	Eat leaves	As soon as leaves appear	Traps/Hunting
Ekigege (?)	?	?	?
Ekiwotoko (?)	Withering & drying of plant	During growth of plant	None
Muweke (?)	Leaf curl & stunted growth of stem	During dry season	Hot pepper solution
Kibabuko (?)	It burns leaves	Anytime during growth stage	Tea leaves

Note: The ? indicates where information was unclear.

Farmers practised very little pest and disease control measures on their indigenous vegetables and those that were used tended to be indigenous and predominantly organic remedies. Farmers did not consider them to be as effective as they would have preferred. One farmer acknowledged using a synthetic pesticide during the initial growth stages of the plants, but felt that it made no difference to the plants' development and was not a good protective measure. This chemical is known as DITHANE® and it is supposed to be used to control for pests on certain exotic vegetables. The farmer mentioned spraying this chemical on Ebugga and Entula, but again stated that it had no visible effect. In fact he stressed that it was no more effective than the indigenous compounds that he made and used for similar purposes. He also noted that DITHANE® was no more effective when used as it was intended to be on exotic vegetables. If a plant pathologist had been a member of this team it could have been pointed out that DITHANE® is supposed to be used as a fungicide and not a pesticide, explaining its ineffectiveness when used as a pesticide. Other farmers mentioned spraying exotic vegetables with AMBUSH® to control for both pests and diseases, but did not consider it to be any more effective than local remedies. It is possible that these farmers applied the incorrect quantities and concentrations, and also the incorrect pesticides to the incorrect plants. Such practises tend to be common amongst smallholder farmers in developing countries (PAN, 2002).

Generally, local farmers sprayed crops using a solution of peppercorns infused in water. Sometimes they mixed the peppercorns with urine as they said that this speeded up the effect. This solution was used to control pests and diseases and farmers considered it to be relatively effective, but said that they would prefer something that removed all pests and diseases. Another local remedy was to mix pepper and ash with water and to sprinkle this solution on the plants. While this mixture was used to control pests it was not considered to be very effective. The spraying action was carried out by dipping a grass brush into the solution and sprinkling the solution onto the plants in much the same way as irrigation was carried out.

Observations by the research team during the transect walks tended to support the farmers' perceptions that the indigenous vegetables seemed to be less susceptible to diseases and pests than the exotic vegetables in that they exhibited far fewer signs of damage[3]. This was

[3] This was at least for the period when this study was carried out and it is possible that the pests and diseases that more aggressively affect indigenous vegetables can occur at another period.

despite the fact that they received less synthetic agro-chemicals and other pest and disease control treatment than the exotic vegetables. Exotic vegetables have been subject to many years of international research so extension officers were able to provide farmers with recommendations for pest control. Given the scarcity of research carried out on indigenous vegetables extension officers could not provide such information for these crops. Farmers reported that they gave less attention to indigenous vegetable crops once planted, allowing them to put their effort into other crops that required more attention and realised a greater profit.

Seed production

Preferences and sources of seed varieties produced and purchased by households

Local farmers used their own seeds for all varieties of indigenous vegetables that they cultivated. They collected the seeds from the plants they cultivated and occasionally from wild or volunteer plants. Some farmers said that they transplanted wild seedlings into their fields, or transplanted their own seedlings and sowed their own seeds. Occasionally they might buy seeds but no specific incidences of this were given nor was reference made to the prices they would pay for the different varieties. Based on group discussions the impression was that seeds were only bought from neighbours or other local farmers and only if some misfortune had befallen the buyer's seed supply. Farmers preferred their own seeds because they were easy to propagate, were therefore affordable to the household, and in the past they were observed to grow better under local conditions than seeds brought in from other areas outside of the parish.

The process of raising of seeds

The process of raising seeds for seven of the most popular indigenous vegetable varieties in Gameru parish is described in Table 13. The reasons for the steps followed and the gender of the person / people most responsible for the seed raising process are also indicated in this table. The farmers did did not give the actual time required for the steps involved in raising seeds, so this information is not included. However, the trend followed by the farmers was to harvest the seeds during one season in order to plant them during the next.

Seeds were generally raised in the following three distinguishable ways:

1. the seeds were extracted from ripe fruit and then dried;
2. the seeds were extracted from the seed pods, which usually expelled the seeds when they dried on the plant. Certain plants were selected and the area around them was cleared and swept clean so that the expelled seeds could be easily collected;
3. old plants that have flowered were uprooted, dried and then thrashed so that the seeds fell away from the plant.

Once dry the seeds were sorted for quality. Only those considered to be of a high quality were used as experience indicated to the farmers that only truly dried seeds tended to germinate properly. During storage all seeds were periodically dried to ensure that they remained dry until planting.

Table 13

Steps and Gender Roles involved in raising seeds in the parish

IV	Description of Steps	Reason for steps	Gender Roles
Nakati	• Extract seeds from ripe fruits • Dry seeds • Sort seeds • Plant by scattering	Traditional practice	M/F
Entula	• Extract seeds • Prepare seedbed • Plant seedlings into garden	Because of the size of their stems	M/F
Ebugga	• Uproot old plants • Dry plants • Thrash, collect and sort dried seeds • Scatter seeds	Traditional practice	F/M
Ejobyo	• Uproot old plants • Dry plants • Thrash, collect and sort dried seeds • Scatter seeds	Traditional practice	F/M
Enyanya (Indigenous tomatoes)	• Extract seeds from ripe fruit • Dry seeds • Scatter seeds	Traditional practice	M/F
Egobe	• Plucking of fruits • Dry seeds • Peel dried seeds • Scatter seeds	Traditional practice	F
Enkolimbo	• Collect seeds • Dry seeds • Peel dried seeds • Scatter seeds	Traditional practice	F/M

Note: Doodo generally grew as a volunteer crop so seeds were seldom harvested. If a farmer wanted to plant his own crop of Doodo he would harvest seeds in a similar manner to that used for Ebugga or he would transplant volunteer seedlings into a prepared bed.

Male and female adults seemed to share the seed production process more or less equally. Men had the overall responsibility of producing seeds for Nakati, Entula and Enyanya, while this was the women's responsibility for Ebugga, Ejobyo and Enkolimbo. Women were exclusively responsible for raising the seeds of Egobe. No reasons were given for this and if we look at Table 3, Pair-Wise Ranking Matrix (Figure 15), and Table 16 it is clear that these allocations with regard to gender do not strictly relate to any immediately evident locally attached significance or to commercial value as each gender group was responsible for two of the indigenous vegetables grown for commercial purposes and one grown for household purposes. No gender-associated taboos were mentioned. This distinction in the seed raising process can be explored during the next phase to determine if it has specific social importance. Similarly the actual indicators of high quality seeds such as colour and shape can be explored.

Seed storage practices

Farmers indicated that seeds were stored in calabashes, tins, bottles and bags, which were hung in the kitchen near the fire as this was perceived to be the warmest and driest part of the house. This practice prevented pests getting to them and kept the seeds dry and free of moisture. Dried banana skins were also used as storage containers and hung near the fire. Farmers suggested that wrapping the seeds in dried banana skins was the better practice, but this stored very few seeds, thereby increasing the number of containers required and the amount of space used for storage purposes. This took up space in the kitchen and was not considered practical so other containers tended to be more commonly used.

Farmers were aware of the problems associated with storing seeds in plastic (polythene) bags. They indicated that once stored in plastic bags those seeds that have not been dried properly generate moisture, causing the other seeds to go mouldy and they then fail to germinate after planting.

Problems encountered in the process of making and storing seeds and local solutions to identified problems

A number of problems were identified in the process of making seeds.

1. The drying process occurred outside and occasional strong winds would blow the seeds away.
2. Unexpected rains during the drying process sometimes made the seeds germinate.
3. If a farmer wished to obtain seeds for scarce varieties it was always difficult to get seeds.
4. Storage problems were encountered as pests sometimes destroyed the seeds while they were stored. The main pests were rats and cockroaches.
5. Exposure to cold weather during storage negatively affected the future germination of seeds after planting. This often resulted in the late germination or the complete failure of the seed to germinate.

Despite this none of the farmers reported experiencing problems relating to obtaining seeds which suggests that this was fairly simple, while storage was a more pressing problem. The storage problems seemed to be resolved by a number of actions on the part of the farmers. The manner in which they stored seeds, in warm areas and in dry containers, prevented pests getting to them and also reduced the effect of cold weather. Farmers also took steps to prevent loss from winds and rains but they seemed unsatisfied with these actions, as wind and rain could not be planned for and the subsequent actions were not as effective as they desired. However, these losses tended to be minimal in comparison to those that resulted from improper storage practices.

Sowing of seeds

In the case of Ebugga, Emboge, Entula and Nakati the seeds were normally sown into seedbeds from which the seedlings were transplanted into rows in the fields. For Doodo, Ejobyo and other indigenous vegetables the seeds were scattered in the field. In some instances the seeds of different indigenous vegetables that could be grown at the same time were mixed and then scattered resulting in a mixed intercropping pattern. The general pattern

for indigenous vegetables that were grown for commercial purposes was to monocrop (see the transect walks in Appendices 3 a – c). In many instances the seed banks in the soil were high and many of the indigenous vegetables grew as volunteer crops. Doodo is an example of a volunteer crop, but occasionally the farmers actively grew it, especially when it did not appear voluntarily in their fields.

Harvesting Practices

Harvest times and methods

Farmers did not differentiate between main and peak harvest times. They harvested when they perceived that the crops were ready to be harvested. However, we shall see that in the case of some indigenous vegetables they distinguished between the methods used for harvesting depending on the post-harvest uses of the indigenous vegetables: harvesting for household consumption and when harvesting for commercial purposes.

- Nakati was effectively harvested for eight months of the year. These months were January, February, May to July and October to February. Farmers mentioned that if the plants were very well cared for and only the leaves were harvested they could be harvested for up to twelve months, but actual examples of this seemed rare. In this process the leaves were harvested by means of removing them from the stem either by hand or by using a knife. However, this crop was primarily sold for commercial purposes and in line with this the entire plant was uprooted and was therefore unlikely to be available for more than six to eight months of the year for the commercial producers. Eight months was the average figure given by the farmers at workshops. The farmers did not stagger the planting intervals of Nakati so that they could harvest it for commercial purposes during the entire year, as this practice seemed problematic.
- Entula was only harvested for four months of the year during January, May, June and December. It was harvested once the fruit started to ripen. The exact duration of the harvest period was dependant on the care given to the plants after planting. Little care resulted in a low yield and short harvest period. The fruits were harvested by picking them from the plant, either by hand or by using a knife.

- Ebugga was harvested for nine months of the year from March to June and again from September to January. This indigenous vegetable was harvested by means of either uprooting the plant or plucking the leaves, either by hand or with a knife, once the plant was approximately 30cm high. Harvesting of the leaves allowed each plant to be harvested for a period of approximately one month.
- Ejobyo was also harvested for nine months of the year and like Ebugga this also occurred from March to June and again from September to January. Ejobyo was harvested in two ways. If the entire plant was uprooted this occurred as soon as it was approximately 30cm high. The leaves were plucked from the stems of the plant, either by hand or by using a knife. This was usually the practice for household consumption and the harvest period ranged from between three and four weeks. However, this depended on the quality of the soil. According to local farmers good soil produced a higher yield and lengthened the harvest period.
- Enyanya Enganda was harvested throughout the year. The fruit were harvested just before they started to ripen. As with Ebugga the exact duration of the harvest period was dependent on the care given to the plants after planting. Little care resulted in a low yield and short harvest period. The fruits were harvested by picking them from the plant, either by hand or by using a knife.
- Enkolimbo was harvested for six months of the year during January, February and from September to December. The leaves were plucked during harvesting and this was done either by hand or by using a knife.
- Doodo was harvested for nine months of the year from April to June and again from August to January. Each Doodo plant was harvested for a period of one month as soon as it either reached a height of 30cm or the farmers considered the leaves to be the correct size. As this vegetable was harvested for household consumption only the leaves were plucked during harvesting and this was done either by hand or by using a knife.
- Egobe was harvested for eight months of the year from April to June and again from September to January. This indigenous vegetable was harvested for a period of three months by means of plucking the leaves from the stems, either by hand or by using a knife, once they reached the appropriate size.

All varieties were available during the months of December and January. There was no time during the year when none of the indigenous vegetables was available. The least number of

varieties were available during February (Nakati, Enyanya and Enkolimbo), July (Nakati and Enyanaya) and August (Enyanya and Doodo). Enyanya was the only indigenous vegetable that was available during all three of these months and was actually the only vegetable that was available throughout the year.

When harvesting Nakati, Ejobyo and Ebugga for commercial purposes we were informed that the entire plant was uprooted. This practice is not sustainable when compared to harvesting for household purposes, whereby only the leaves were plucked as and when required, leaving the plant to produce more leaves. Farmers believed that uprooting the entire plant made it easier to transport to the market. The plants were tied together to form bunches and were sold in these bunches thereby avoiding expensive packaging, which farmers could ill afford and was difficult to acquire even if it was wanted. Sustainable harvesting practices were therefore exchanged for reduced packaging costs.

Maturity indicators

Indigenous vegetables were harvested when they exhibited certain criteria that local residents believed were indicative of their readiness for harvesting and subsequent consumption. From Table 14 we see that the maturity of the indigenous vegetables was generally based on the following criteria:

- the length of the period since planting;
- the size of the plant;
- the size of the leaves or the fruit, depending on which plant and the part of the plant that was harvested;
- the colour of the fruit;
- plants should be harvested before flowering, otherwise the quality of the vegetable is reduced.

These indicators are similar to those generally used for most crops and because no form of cold storage was available local residents harvested the crops when they required them.

Table 14

The indigenous vegetable maturity indicators and harvesting practices in the parish

List IV	Maturity Indicator	How long do you harvest it	Describe method of Harvesting	Gender Role
Nakati	• Length of period after planting • When the plant starts flowering it is old	1 month after planting when plants are uprooted 6-12 months if the leaves are plucked from the stems	• Uprooting the whole plant • Plucking the leaves from the stem	M/F
Entula	• Length of period after planting • Size of the fruit • Colour of the fruit	6-12 months depending on the care and attention paid to the plants	• The picking of fruits before they ripen	F/M/c
Ebugga	• Size • Height of plant is usually one foot (30cm)	1 month	• Uprooting the whole plant • Plucking the leaves from the stem	F/M
Ejobyo	• Height of plant is usually one foot (30cm)	3-4 weeks depending on the soil quality	• Uprooting the whole plant • Plucking the leaves from the stem	F/M/c
Doodo	Height of plant (1 foot or 30cm) and size of leaves	1 month	Plucking leaves	F
Egobe	Size of the leaf	3 months	Plucking leaves	F

Post-Harvest Practices

The post-harvest practices for six of the indigenous vegetables are now described. Generally the farmers divided the practices into three discernible categories, which were based on the immediate post-harvest purpose of the vegetable i.e. immediate sales, immediate household consumption or storage for later household consumption. All the vegetables were consumed after harvest and the different consumption and preparation processes are described in Tables 15 and 16, respectively. Besides immediate household consumption four of the vegetables we have discussed were also sold, and two were also stored for later consumption.

Nakati, Ebugga, and Ejobyo were tied in bundles and then taken to the market. Transportation from the farms to the collection point on the Kampala road was done using bicycles. Enyanya Entono (the small indigenous tomatoes) were picked and placed directly into baskets. They were then taken to the market in the baskets. The shelf life of these tomatoes was given as not more than one week.

Enkolimbo was dried outside in the sun and once dry it was pounded and stored in bottles or similar sealed containers. These were kept near the fire in the kitchen and were said to be stored in this manner for up to one year, after which the powder would lose its flavour. During

this storage period the powder was regularly dried in order to ensure that it was free from moisture and pests. Egobe was also dried but it was lightly steamed and then dried and pounded. It was then sorted and stored in a bottle or similar container.

Harvest and post-harvest problems

Farmers felt that they did not have any real problems during the actual harvesting activities. The problems seemed to occur after harvesting and were related to storing fresh produce, transport and marketing. Farmers and their spouses mentioned that the bundles of indigenous vegetables they harvested for commercial purposes were extremely heavy making it difficult to carry on their heads from the field to the road where they were collected for transportation to the market. This necessitated that they use bicycles and sometimes they had to borrow these resulting in them incurring extra costs or obligations to other residents. They also pointed out that the roads from their parish to the market in Kampala were in a poor state and increased the maintenance of transport. This in turn increased the costs of transport to the market as vehicles were consequently expensive to hire due to their high maintenance costs. They believed that local cold storage facilities would also allow them to only take crops to the market when the demand was good and could mean that they would go less often, i.e. not after every harvest, but after every two to three harvests and could possibly demand a higher price. They felt that in any event this would reduce their costs. A number of problems were noted in terms of marketing indigenous vegetables and these are discussed below in the section on marketing.

Local Use of Indigenous Vegetables

Availability of indigenous vegetables during the year and local consumption patterns

Figure 19 (a seasonal diagram) shows the local availability of several indigenous vegetables. Its purpose is to indicate the times of high and low availability of the various indigenous vegetables and when local households considered them to be plentiful or in short supply. This seasonal calendar suggests that only Nakati and Entula are available in above average quantities. This coincides with the local emphasis put on these two varieties as they were considered the two most important commercial products amongst farmers in the parish.

Further probing of the local residents did not indicate that these more than average quantities resulted in large amounts being consumed locally but rather that slightly more were consumed and the remainder sold. It must be remembered that according to the farmers the purpose of producing these two crops was predominantly for commercial reasons. The purpose of the seasonal diagram is to give an indication of probable consumption patterns rather than an accurate picture of consumption patterns. It is also interesting to note from the seasonal diagram in Figure 19 that Nakati and Entula were more available during the latter part of the rainy seasons (May and December) as they moved into the dry seasons. Farmers pointed out that all crops were negatively affected by the dry seasons. It is possible that Nakati and Entula were more adaptable to the rainfall pattern during these latter months than the other indigenous vegetables included in Figure 19. This needs to be verified by means of further research with the farmers for these two vegetables might have a higher tolerance to drier conditions.

Figure 19

Seasonal Diagram of local availability of eight Indigenous Vegetables

IV Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Nakati	X	X		X	XXX	XX	X			X	XX	XXX
Entula	X		X	XX	XX	X		X	XX	XX	XX	XXX
Ebugga			X	X	X	X		X	X	X	X	X
Ejobyo			X	X	X	X			X	X	X	X
Enyanya Entono	X	X				X	X	X				X
Doodo			X	X	X	X		X	X	X	X	X
Egobe				X	X					X	X	
Enkolimbo									X	X	X	X

The pattern of abundance is indicated by means of the number of X's
XXX = this particular indigenous vegetable is in abundance
XX = this particular indigenous vegetable is available in reasonable amounts
X = this particular indigenous vegetable is available in very small amounts
A blank space in the Seasonal Diagram indicates that the vegetable is not available at all for consumption.
IV = Indigenous Vegetable

The availability of indigenous vegetables to meet household food requirements

An analysis of the seasonal diagram in Figure 19 indicates that there did not seem to be a real shortage of the eight preferred indigenous vegetables. However, farmers believed that they were unable to produce enough indigenous vegetables to meet their household needs. They sold a large proportion of the four most popular indigenous vegetables to generate an

income. Consequently, very few of these indigenous vegetables remained for household consumption. Farmers and other local residents said that they would prefer to have more of the four most popular indigenous vegetables available for their own consumption, as they considered these to be the most tasty and nutritious of all the vegetables. They said that this was the reason for their strong market demand. Farmers believed that if they only produced for household consumption purposes they would have enough for their own requirements but the possibility of selling these crops resulted in there not being enough for household consumption. The general feeling amongst residents was that given the current level of their production of the four primary commercial indigenous vegetable crops even value adding the present quantities would not solve their problems and satisfy their needs regarding availability for household consumption (according to Table 16 approximately 90% or more of the seasonal yield is sold). The household food requirements seemed to be the issue for the farmers rather than their ability to meet the market demand. The latter was given preference at the cost of meeting household food requirements. Therefore, it is understandable that farmers were annoyed when the market did not consume all the produce that they supplied, and it subsequently perished because they could not store it for their own consumption or take it home with them. The discussions with the farmers suggested that they would always sacrifice one of the four main commercially oriented indigenous vegetable crops for the market if they could get a good price. They replaced household supplies with alternative indigenous vegetables or other foodstuffs. Despite this they missed the previous abundance of indigenous vegetables in their household. The bottom line is that farmers would like to have enough for their own needs as well as to be able to produce enough for the market to ensure a steady income from sales. Their commercial focus prevented them from doing so and according to farmers it was compounded by a number of other factors, including land, labour and financial constraints. These were similar to the reasons given for being unable to produce enough exotic vegetables and included the following:

- They did not have enough labour to produce more vegetables, either because they had no money to pay for the labour or the labour was not available;
- They did not have sufficient seeds of a good quality – while they had seeds they did not have enough to increase their production and sometimes they had problems with their seeds not germinating;
- They did not have enough money to buy the chemicals for fertilisation and for spraying the vegetables, thereby ensuring maximum yield.

Access to extra land also seemed to be a problem for some of the farmers and prevented them from producing enough indigenous vegetables to meet their own needs as well as those of the market. A trade-off regarding the various resources and inputs usually determined what could and could not be grown and how this would occur.

The availability of exotic vegetables to meet household food requirements

Exotic vegetables were seen as an important local livelihood resource and were grown in the parish. Residents acknowledged that both the local cultivation and availability of exotic vegetables was increasing. Cultivation was mainly for commercial purposes and the income derived from the sales of these crops was used to sustain the household. Exotic vegetables were only considered important to the household for their commercial value and not as a household foodstuff. However, some households did acknowledge eating small amounts of the exotic vegetables that they produced. Prior to the 1970s exotic vegetables were not produced or eaten in this parish in significant quantities. However, when parish residents became aware of their value as a commercial commodity, they started producing them and this trend increased to such an extent that exotic vegetables were being produced in greater quantities than indigenous vegetables (see Figure 6). The transect walks (Appendices 3 a – c) also suggested that this was the case.

Fluctuation in the market demand and crop seasonality affected the production of exotic vegetables and in turn the prices obtained for them. At the time of the study these vegetables enjoyed greater market attention than the indigenous vegetables, but the prices fluctuated enormously, as did the demand for them at different times of the year, especially before and after the main harvest seasons.

Substitutes for indigenous vegetables

When indigenous vegetables were scarce or seasonally unavailable parish residents said that they replaced them with the following foodstuffs:

- Green beans which they produced locally;

- Fresh fish bones that they bought at markets and stalls and from which they made a broth;
- Groundnuts that they grew locally – often as a cover crop between the banana trees.

Exotic vegetables were not mentioned as substitutes for indigenous vegetables. This is an indication that the households only used very small amounts and that generally they were not preferred for home consumption; confirming the statements made by residents regarding the production of exotic vegetables primarily for commercial purposes. A seasonal diagram was not requested for their seasonal availability but it is possible that exotic vegetables were seasonally available at the same times as similar varieties of indigenous vegetables. During times of scarcity indigenous vegetables tend to be replaced by crops that are locally available, with the exception of exotic vegetables which are never used to replace indigenous vegetables.

Local sales and patterns of use of indigenous vegetables

Minimal amounts of indigenous vegetables seemed to be sold locally. This was even more so in the case of indigenous vegetables that were given commercial importance for, with the exception of Entula – the indigenous eggplant - the research team did not notice any indigenous vegetables for sale at the stalls in the parish. Farmers mentioned that sometimes, if there was a surplus, very small quantities of indigenous vegetables would be sold to parish residents who did not produce their own vegetables and to people passing through the parish on the road linking the parish to Kampala. While a few people had stalls along the road to Kampala it was uncertain what the demand was like from passing traffic. Given our observations at different times during the study it was not considered to be very high. Rather it seemed to be high enough to demand that only ten stalls operated on weekends and weekdays. Most households in the parish tended to produce for their own consumption and did not report buying from the local stalls, so the local market is not expected to be large.

Besides being sold and consumed locally as a foodstuff, some indigenous vegetables were believed to have medicinal properties, others were used in the performance of cultural rituals, and a small number had various cultural taboos associated with them. These different uses are now discussed.

Preferred eating form

Residents of Gameru parish preferred their vegetables fresh as these were considered to be tastier and more nutritious but the general preference was for fresh vegetables to be cooked rather than eaten raw. It is not known what effect the cooking had on the nutritional content of these vegetables. Some residents mentioned eating them raw as a salad and consumption in their raw state was the preferred choice when they were used for medicinal purposes (see Tables 15 and 16). The indigenous vegetables that were eaten raw for medicinal purposes were identified as Entula, Ejobyo and Enyanya. Probing elicited that Entula and Ejobyo were actually used to make infusions that were drunk for medicinal purposes. The leaves of the Enyanya were placed on peoples' eyes to soothe them or mixed with paraffin to soothe muscle aches and inflammation. These practices suggested that the local residents considered the health properties to be greater in uncooked fresh vegetables in comparison to cooked fresh vegetables. Egobe and Enkolimbo seemed to be the only two that were consumed in a dried state. Table 15 lists the fifteen indigenous vegetables, identified as being the preferred ones that were eaten locally. Four of these were predominantly sold at the market in Kampala, although families did have a preference for eating these when there were some available for the household. All of the remaining identified vegetables were mainly eaten locally with very small portions being sold, as in the cases of Egobe and Etimpa; of which only about twenty percent of the harvest was sold (see Table 16).

Table 15 indicates that residents preferred to eat certain indigenous vegetables in specific forms. Most vegetables were consumed in their cooked state soon after they were freshly harvested and were said to be both nutritious and tasty when consumed in this fashion. Those indigenous vegetables that were consumed in their raw state were usually done so to obtain and maximise their medicinal properties. Egobe was the exception to these eating preferences, as the preference was to consume it in its dried state when other vegetables were scarce. Its dried powdered form was also added to stews. Both genders and all age groups consumed most of the vegetables, with only three being exclusively consumed by female residents; this was largely to aid in soothing conditions associated with pregnancy and menstrual cramps. The elderly residents predominantly consumed Ejobyo, Ekigaga, Egobe and Etimpa.

Table 15

Household consumption patterns and preferences of Indigenous Vegetables

List all the IV vegetables that you eat	What form do you prefer to eat it in	Why this Preference	Gender or Age Preference
Nakati	Freshly cooked or Raw	Considered to be more nutritious and tasty	All ages and both genders
Ebugga	Freshly cooked or Raw	Considered to be more nutritious and tasty	All ages and both genders
Entula	Freshly cooked or Raw	Considered to be more tasty	All ages and both genders
Ejobyo	Raw or freshly cooked	Considered to be more tasty	The elderly of both genders
Enyanya Entono (Small tomatoes)	Raw	Considered to be more nutritious and tasty	All age groups and both genders
Enkolimbo	Raw or dried	Considered to be more nutritious and tasty when raw When dried it is believed to assist with child birth for women in labour	Pregnant women
Ekigaga	Raw	Considered to be more tasty There is only a small production in the parish	The elderly of both genders
Egobe	Dried	Used mainly during times of shortage of other vegetables.	Mainly old people of both genders seemed to have supplies of the dried product
Etimpa	Freshly cooked	When there is a shortage of other vegetables	The elderly of both genders
Ensusa	Freshly cooked	Considered to be more nutritious	All age groups and both genders
Ebisiboza	Raw and freshly cooked	Considered to be more nutritious	Adults of both genders
Doodo	Raw and freshly cooked	Considered to be more nutritious	Adults of both genders
Esuga	Raw and freshly cooked	Considered to be more nutritious	Old women and pregnant women
Enderema	Raw and freshly cooked	Medicine	Pregnant women
Emboge	Raw and freshly cooked	Medicine and during shortage of other vegetables	The elderly of both genders

Preparation of Indigenous Vegetables for consumption

Farmers and other residents utilised their vegetables in a number of ways for a number of household purposes, including food and medicinal purposes. These are highlighted in Table 16 and confirm the information in Table 15 on the preferred eating form. We already noted that when used as a food the preference was for fresh, cooked vegetables with only some being consumed in their raw and dried states. When the leaves were cooked and eaten the preparation process was described in the following steps:

1. The leaves were removed from the stem;
2. The leaves were sorted and rinsed;
3. The selected leaves were chopped;
4. These were then stewed, boiled or steamed as the residents preferred.

When the fruit from the indigenous vegetable plants were cooked and eaten the preparation process was carried out in the following steps:

1. The fruits were picked from the plant;
2. They were rinsed and then most were peeled but sometimes they were not peeled;
3. Sometimes the fruit would be sliced before cooking or cooked whole
4. The fruit were then boiled, steamed or stewed.

There was no significant difference in the process of preparing the leaves and the fruit of the vegetable plants.

When the leaves of the indigenous vegetables were dried for storage and later consumption the process was slightly different:

1. The leaves were picked;
2. In some cases the leaves were lightly steamed, in others they were only rinsed;
3. The leaves were dried;
4. The dried leaves were ground to form a coarse powder;
5. This powder was put in a sieve and continuously ground until most of it passed through the sieve;
6. The fine powder was then stored.
7. It was either consumed in the dried form or added to other foodstuffs and cooked.

Observations of local practices and comments made by the farmers and residents indicated that most indigenous vegetables were usually mixed with other indigenous or exotic vegetables and food crops when consumed as a meal.

Table 16

Household utilisation of Indigenous Vegetables

List the vegetables that you produce	Home consumption	Sell	Eat raw or Cooked	Preparation before eating	Name/Describe use
Nakati	1%	99%	Cooked	• Remove leaves from stem • Washed • Chopped • Stewed	• Medicine for skin diseases such as eczema and external ulcers • Reduces high blood pressure
Ebugga	1%	99%	Cooked	• Remove leaves from stem • Washed • Chopped • Stewed	• Medicine for skin diseases • Reduces high blood pressure
Entula	10%	90%	Cooked and raw	• Pick fruits • Sort • Wash • Cook	• Reduces high blood pressure • Cures worms in young children • Clears hangovers
Ejobyo	10%	90%	Cooked and raw	• Pick fruits • Sort • Wash • Cook	• Reduces high blood pressure • Cures worms in young children • Treats malaria • Treats convulsions
Enyanya	100%	-	Both but Best cooked	• Pick leaves • Wash leaves • Chop • Cook/Fry	• Leaves are used to soothe sore or inflamed eyes • Mixed with paraffin and poured over sore muscles to soothe pulled muscles and reduce inflammation
Enkolimbo	100%	-	Cooked	• Pick fruits • Peel • Wash • Boil	• Cures worms in young children • Helps with labour/ childbirth
Ekigaga Obiyindiyindi	100%	-	Cooked	• Pick fruits • Peel • Wash • Boil	• It treats trachoma
Egobe	80%	20%	Cooked	• Picking • Steaming • Drying • Grinding • Sieving • Cooking or raw	• Ceremonial in that it is cooked for in-laws • Acts as a quick source of food and is tasty and easily prepared.
Etimpa	80%	20%	Cooked	• Picking • Steam	• Not Mentioned
Esunsa	100%	-	Cooked	• Picking • Steam	• Medicine for headache (put leaf in cold water) • Appetizer using stalk and leaves in cold water
Ebisoboza	100%	-	Cooked	• Picking • Cook	• As a foodstuff
Doodo	100%	-	Cooked	• Remove leaves from stem • Washed • Chopped • Stewed	• Anaemia

Table 16 (Continued)
Household utilisation of Indigenous Vegetables

Ensuga	100%	-	Cooked	• Remove leaves from stem • Washed • Chopped • Stewed	• Improves appetite
Enderema	100%	-	Cooked	Mix with Doodo and steamed or fried	• Helps with labour/childbirth • Assists with breast feeding • Treats measles
Emboge	100%	-	Cooked	• Pick leaves from stem • Washed • Chopped • Steamed	• Kills or chases snakes from houses (ground and mixed with water and sprinkled in house)

Cultural rituals and taboos associated with indigenous vegetables

A number of locally produced indigenous vegetables were identified as having some cultural rituals and beliefs associated with them. The primary rituals and beliefs are now described for the relevant vegetables.

Empande: Farmers reported performing a number of rituals when they planted it because failure to perform these rituals was believed to bring about misfortunes in the weather, such as thunderstorms that might destroy the crops on the fields. Hailstorms were another of the misfortunes that might occur if the rituals were not performed.

Enkolimbo: This indigenous vegetable was often associated with bad luck, especially for people who got too close to it while on their way to collect money from debtors. It was believed that in such instances the debt collector had very little chance of collecting the debt. For this reason Enkolimbo was grown as a border crop near other crops at strategic places around the homestead through which all visitors would pass *en route* to the house.

Emboga: This crop was not supposed to be brought into the house in case it brought bad luck. The nature of this bad luck was not explained. Consequently Emboga is prepared and eaten outside the house and all that is cooked must be consumed in one sitting; leftovers may not be kept for later consumption as this was also said to bring about bad luck. As a

result of the associated taboos it has been almost completely replaced with Emboge, which at the time of the study, did not have these, or other taboos associated with it.

Enderema: It is believed that this vegetable has a negative affect on the sexual prowess of men so they stay away from it. We also note from Table 15 that only pregnant women consumed it and Figure 15 (the pair-wise ranking matrix) indicates that they were solely responsible for cultivating this vegetable.

Entula: The stems of Entula were supposed to be carefully disposed of after harvesting and food preparation. It was believed that if a man stepped on the stems his sexual organs and in particular his testes would be adversely affected. Consequently his sexual strength will be weakened. However, we can see from Table 15 that men ate Entula and from Figure 15 (the pair-wise ranking matrix) we see that they also cultivated this vegetable. Unlike Enderema it was the manner in which the stems were used after harvesting that was a problem for men and not the actual vegetable itself.

Sales and Marketing outside village/district

At the time of the study the bulk of the sales of the four commercial indigenous vegetable crops occurred at the market in Kampala. The vegetables were sold to traders who in turn sold the vegetables directly to the public, restaurants and hotels. No other market existed (except for an extremely small local market which was solely reliant on passing traffic) and there was no indication that the farmers or local officials were aware of any other existing or developing markets to which they would be able to supply their produce.

Table 17

Commercial Sales, Markets and Prices

List the IV vegetables that you sell	Where sold	To whom sold?	Price	Responsible Household member
Nakati	Kampala	Traders	2000-7000 /= per bundle	M/f
Ebugga	Kampala	Traders	5000-7000 /= per bundle	M/f
Entula	Kampala	Traders	2000-20 000 /= per bundle	M/f
Ejobyo	Kampala	Traders	200-2000 /= per bundle	M/f

The symbol /= refers to Ugandan Shillings. At the time of the research, June 2002, one US Dollar was equivalent to approximately 1750 Ugandan Shillings and one South African Rand was equivalent to approximately 110 Ugandan shillings.

The farmers indicated that both males and females were responsible for selling the four main indigenous vegetables produced for this purpose. However, upon further enquiry it was found that males were predominantly responsible for taking the vegetables to the market and dealing with the traders. The women were responsible for assisting with the harvest, tying up bundles and selling the vegetables locally if the men were unavailable. Some women operated stalls on the road to Kampala but they very rarely sold these vegetables. Therefore, the women's responsibility for selling these four varieties was considered to be much less than that of the men

Market access

Access to the market at Kampala was not considered to be a problem except for the high market fees and the transport costs involved in getting the farmers and their produce to the market. Despite these issues, access to the market was open to all. The main problems seemed to be inconsistent and low sales at certain times of the year and the farmers' desire for a greater market demand for the currently produced and possibly new indigenous vegetable products. Table 17 indicates that for at least one of the indigenous vegetables the price can increase up to almost ten times depending on the market demand and local supply. All the districts surrounding Kampala utilised the market in Kampala. Discussions with the farmers indicated that the supply always exceeded the demand. Only when misfortune befell a district could the farmers from other districts obtain a better price. The farmers could not recall such an event having happened in recent years.

Marketing and sales problems

From the group and individual discussions it was clear that farmers did not have any formalised marketing strategy and relied heavily on the terms dictated by the market and the consumer demand for their vegetables and effects, such as the seasonality of the commodities. They pointed out that if there was an abundance of indigenous vegetables at the market they usually ended up throwing away their unsold quantities. They indicated that this problem was at its worst during the peak harvest time for Nakati and Ebugga, which occurred during the rainy season. Farmers believed that availability and access to cold storage facilities might resolve this problem so that vegetables could be stored for longer periods until the market demand was more in their favour. They acknowledged that

processing techniques for the indigenous vegetables might allow them to develop new and stable products which in turn would allow them to demand higher prices and corner other areas of the market. However, some farmers argued that they lacked the facilities and skills to do this and pointed out that there was no market for processed indigenous vegetables. People preferred to eat the four main commercially sold types in their fresh state. Farmers noted that Ejobyo had no marketing problems associated with it because it was produced in small quantities and the supply met the demand. Therefore, whatever was produced was in fact sold. Farmers also pointed out that a lack of cooperation amongst themselves as an interest group prevented them from optimising their impact on and manipulating the market for their own benefit. When asked for suggestions, they were unable to state how they would improve the situation and how they could manipulate the market.

Conclusion

Farmers and residents in the parish made use of approximately twenty-five plants, or different parts of plants which they identified as indigenous vegetables. The six most popular indigenous vegetables were Nakati, Ebugga, Entula, Ejobyo, Enyanya Entono and Doodo. Ninety-nine percent of Nakati and Ebugga were sold at the market in Kampala. Ninety percent of the produced crops of Entula and Ejobyo were also sold there. While the bulk was sold in Kampala, the household consumed the remainder of the harvest. Enyanya Entono and Doodo were produced solely for household consumption making them the two most commonly eaten indigenous vegetables in the parish. The significance attached to Nakati was based on the commercial demand for it in Kampala. This demand seems to be based on taste preferences. The use of the RRA tools to analyse the indigenous knowledge enables us to understand that the most significant and popular indigenous vegetables are not those that are eaten in greater numbers by parish residents but are those which are sold, given their existing commercial value and demand.

According to farmers they were increasing the quantity of indigenous vegetables they produced (see Figure 16). From discussions it was evident that indigenous vegetables enjoyed some priority as a local commercial crop in that some varieties were produced almost exclusively for commercial purposes. The trend indicating an increase in production was based on both commercial and household consumption requirements. For the latter

requirement it was said that indigenous vegetables enjoyed a priority over exotic vegetables which were seldom consumed by household members. Indigenous vegetables formed a significant part of the local vegetable diet and were deeply interwoven with local customs and beliefs. Despite the introduction of commercial exotic vegetable crops in recent years indigenous vegetables retained their presence and continue to be cultivated for household consumption. They have actually increased in terms of the quantities cultivated although this is not in terms of the quantities consumed locally. They have enjoyed an increasing commercial market. Based on the information obtained from parish residents it is believed that the indigenous vegetables will continue to enjoy significance, although some varieties might disappear and be replaced by others over time, as has happened in the past. It is therefore important that their indigenous knowledge be assessed and that good elements be retained and where possible improved to ensure that production is optimal and sustainable.

While the precise origin of most indigenous vegetables was unknown to the residents, discussions with local farmers indicated that some of the indigenous vegetables identified in this parish could be found in other parts of Uganda and in this East African region. Before reflecting on this issue in Chapter Seven, in terms of how it relates to our understanding of indigenous knowledge, we need to first consider the usefulness of the RRA tools in generating and recording indigenous knowledge. This is now considered in Chapters Six and Seven.

CHAPTER SIX

CONSIDERING INDIGENOUS KNOWLEDGE IN CONTEXT

Introduction

The information presented in Chapters Four and Five shows that using a simple set of tools (the RRA tools) in a fairly rapid fashion enabled the generating and recording of a vast amount of information relating to a situational analysis, a gender analysis and the indigenous knowledge of the cultivation and use of indigenous vegetables in Gameru parish. The simplicity of the tools might lead us to believe that this is a simple process. On the contrary, the recording of indigenous knowledge and its interaction with scientific knowledge is not a simple process; it is inherent with difficulties. Presently, indigenous knowledge seems to be understood in three different and conflicting ways (Scoones and Thompson, 1994c: 17):

1. Most conventional scientists see it as primitive, incorrect and unscientific, requiring conventional research and extension to educate and transform local strategies for survival in order to modernise them. From this perspective development is seen as modernisation in the form of linear progression from the primitive to the Western or modern ideal (see Verhelst, 1992 for an opposite perspective that is generally held by many development anthropologists).
2. A small group within conventional science, primarily involved in applied research, see it as a highly valued and under-utilised resource that requires careful and complete investigation in order to be incorporated into conventional agricultural practices, thereby making rural and agricultural development sustainable (we will see later that 'incorporate' is the operative word used by proponents of this view, as indigenous knowledge seems to be subsumed within scientific knowledge rather than equitably integrated – see also Grenier, 1998). Modern scholarship challenges the long held views of conventional science towards indigenous knowledge in which the latter is considered a tradition that has been improved by a long process of trial and error, subsequently being passed on from generation to

generation. In contrast to such a view it is considered by many modern scholars as a process of active invention and innovation by local people that has been carried out in the recent past (see Richards, 1985:26 in Mettrick 1993:25). There is a conviction among current proponents of the use of indigenous knowledge that farmers are rational, knowledgeable and innovative (Reintjies *et al.,* 1993; van Veldhuizen *et al.,* 1997; Matata *et al*., 2001:20). Howes and Chambers (1979) argue that like conventional or western scientific knowledge, indigenous knowledge must have come about as a result of creating order out of disorder and not simply as a response to practical human requirements. The proponents of indigenous knowledge argue that it is in effect no less valuable, is as rational as scientific knowledge and is generally only constrained by the availability of local resources; not the creativity of local people. They are also concerned that the capacity to produce indigenous knowledge will disappear because its value is increasingly downplayed and discouraged by conventional science (Mettrick, 1993:25; Grenier, 1998). We can recall from Chapter Three that one of the reasons for including indigenous knowledge in the research on the genetic diversity of indigenous vegetables was in fact due to the awareness that these vegetables and their associated practices were being neglected by conventional research and extension as a consequence of local attitudes and government policies in some African countries (Chweya and Eyzaguirre, 1999).

3. A third group, emerging from the second, argue that it is incorrect to regard scientific and indigenous knowledge as complete stocks of knowledge for they actually represent contrasting multiple epistemologies created within specific socio-cultural, agro-ecological and politico-economic environments (Mettrick, 1993; Grenier, 1998). They stress that analysis of indigenous knowledge is incomplete if it does not address issues of need and power in development, the effect these have on the generation of knowledge, and also the access to and control of such knowledge. In line with the critique of positivist science, indigenous knowledge is not considered to be a stock of knowledge but is evidence of a dynamic process of farmer observation, investigation and experimentation (van Veldhuizen *et al.,* 1997; Matata *et al*., 2001: 20). The availability of indigenous knowledge at any given time is dependent on the processes that generate it, including those responsible for internal generation and the assimilation of external

knowledge. If indigenous knowledge is dependent on who generates it then it has the capacity to include and adapt external innovations.

This chapter examines these three ways in which indigenous knowledge is currently understood. The first view has been discussed in detail in Chapter One but is now briefly re-examined in terms of the problems and merits inherent in indigenous knowledge. The second view is discussed in light of the current practices of integrating indigenous and scientific knowledge and the effects these have on indigenous knowledge. The third view is discussed in terms of the current debate on knowledge generation and argues that we need to refine and improve our methods of generating and recording indigenous knowledge, and in fact all knowledge, as a result of various influences that come into play during the knowledge generation process. The implications that this third view has for the current study on the method and methodology used to record indigenous knowledge about indigenous vegetables in Uganda are examined.

Constraints regarding indigenous knowledge

The argument levelled at conventional agricultural research, outlined in Chapter One, is that it has a tendency to distance itself from many areas of life by ignoring or overlooking many things that do not fit its neat categories of classification, despite the fact that much of human experience does not fit these categories, although it has meaning in other facets of human existence. Having said this, one should be equally cautious in believing that every item of local knowledge contains grains of scientific truth and should avoid romanticising indigenous belief systems as this could lead to irrational behaviour (Chambers *et al*., 1989:36, Grenier, 1998). Neither of the two knowledge systems under discussion are without their constraints. What is required is that just as we are aware of the limitations of scientific knowledge so we should be aware of the limitations of indigenous knowledge. This will ensure that credible and balanced decisions can be made with regard to using and integrating both types of knowledge for optimal benefit and effect.

Some constraints to the generation and use of indigenous knowledge are the following (derived from Chambers *et al*., 1989:37; Mettrick, 1993:26; Grenier, 1998; Torkelsson and Anandajayasekeram, 2000:9-10):

- Indigenous knowledge tends to be locally applicable, empirical, concrete and predominantly intuitive, therefore care should be taken when the intent is to transfer it to other locations;
- It is highly dependent on what the farmer can observe directly and unaided by microscopes and highly technical equipment. Consequently, many possibilities are unexplored within the systems in which indigenous knowledge is generated because the creators lack the specific techniques and resources required;
- Indigenous knowledge and the capacity to innovate on a particular subject are disparately available within and across communities, resulting in various levels of access to different types and levels of knowledge;
- Likewise economic stratification and social groupings affect the type and extent of indigenous knowledge found in communities;
- Individuals exhibit great variance not only in their ability to generate indigenous knowledge but also to implement and disseminate it;
- People's willingness to share indigenous knowledge is often constrained by personal and cultural factors. This can be due to perceptions that knowledge is power in the local domain or that it is backward when compared to external knowledge. To assume that local people are over eager to share knowledge is naive;
- Much indigenous knowledge is recorded by memory alone and is transferred orally increasing the risk of error in content and reducing its ability for replication. This also means that indigenous knowledge is both explicit and implicit, making it difficult to identify;
- Often the scope for improvement of 'pure' indigenous knowledge (supposedly devoid of outside influence) is restricted by what can be done using only locally available techniques, resources and materials, and what external knowledge can be introduced discreetly. Constraints to improvement can be the result of rigid cultural beliefs and practices;
- Indigenous knowledge has been known to break down in situations where people are faced with severe environmental crises (droughts, desertification and floods) or external intervention such as war or displacement. Lévi-Strauss (2001) has pointed out that conventional science is capable of manipulating and, to a large degree, controlling the environment while indigenous knowledge cannot.

Swift (1979), in Mettrick (1993:26), says that all knowledge is generally put to three uses:

1. Classification;
2. Explanation and prediction; and
3. As a catalyst for rapid and increasing change.

He argues that the activity of classification is practised in most resource-poor communities and is well developed to the extent that it can be functionally superior to western science. The classification methods used in the Gameru parish are an example of this for they go beyond the criteria involved in conventional classification. He considers that the use of knowledge as a means of explanation and prediction in these communities is not as well developed, but is present. He argues that while the third category is fundamental to conventional science it is not apparent in resource-poor communities. Mettrick (1993:26,27) cites two examples of the potential and value of indigenous knowledge from his discussion of the subject which seem to support Swift's view as they only exemplify uses one and two respectively:

1. The Hanunoo people in the Philippines identified 400 more plant species than were previously identified by means of a systematic botanical survey. Grenier (1998) provides a similar example among the Inuit people in Canada, whose local ecological knowledge and broad taxonomies were used to establish an environmental baseline for the eastern Arctic ecosystem.
2. Bangladeshi farmers were able to make very fine adjustments to their crops and cropping patterns in relation to changes, and perceived changes, to the microenvironment of their fields. This was in spite of the fact that they were aware of over 4500 rice varieties and had to make different adjustments to each type that they grew.

I would argue that the third use of knowledge, as a catalyst for rapid and increasing change, is also found in resource poor communities. However, this is on a smaller or more localised scale, and rather than complete uniformity there is some variety in terms of application, which is based on each specific location. In such communities knowledge is not developed to provide uniform or generalised solutions and practices, and unlike many facets of

conventional scientific knowledge, the idea of necessary constants and assuming that things can be held constant is unheard of and improbable. Rather knowledge is developed for specific needs and is consequently specific in its nature. In Chapter One we noted that western scientific knowledge is developed for more generally applicable purposes. It is probably a result of rural peoples' marginalisation in remote areas and their need for specific solutions for specific issues that prevent the rapid and cumulative spread of indigenous knowledge to the same extent that this occurs with western scientific knowledge. We will see in Chapter Seven that some uses in indigenous knowledge carried out in Gameru parish were similar to those carried out in Kenya and other parts of Africa. Differences seem to be a result of the different contexts in which the knowledge developed, sometimes giving the appearance of different types of knowledge.

De Bruin and Guritno (1988) provide an example of how the system of budding and grafting two varieties of cassava, developed by a farmer in East Java, spread extensively to surrounding areas and consequently, numerous variations of the original idea developed for specific areas using numerous varieties. This example suggests, that contrary to Swift's (1979) view, fairly rapid and cumulative change can occur, albeit not universally or uniformly. It also suggests that possibly farmers realise what we often tend to forget, that uniform solutions or ideas do not always work perfectly in different situations and require adaptation to suit local circumstances. In Chapter One it was reported that conventional agricultural research tended to be successful in areas where the conditions were similar to those encountered on the research stations where the technology was developed. Nakashima and de Guchteneire (1999) suggest that in a changing worldview of knowledge and knowledge systems, scientists will need to reflect on the relativity of their knowledge, specifically their understandings of reality.

The value of indigenous knowledge

The constraints inherent in indigenous knowledge do not detract from its value. Rather they remind us that we need to analyse it as stringently as we would any other type of knowledge. In view of the shortcomings of scientific knowledge discussed in Chapter One, a brief review of the literature reminds us of just how important indigenous knowledge is to ensuring appropriate agricultural research, despite its inherent constraints.

- Coetzee (1986) stresses that urban and rural development is for people and along with contributors to his work presents a strong case for the involvement of local people in development programmes that are initiated for their benefit. If we accept that human beings are fundamental to the development process then Chambers *et al*. (1989:50) advise that the technical components of an intervention need to result from the interaction of people – agriculture is a social process and not simply a technical one, as many would have us believe. Without considering people there can be no suitable development of technology. We must not forget that all technology has to be used by people and needs to comply with their needs, resources, social, cultural, economic and political context. Similarly people always carry out technology development and so it is likely to be influenced by their social, economic and political context, rather than truly free from bias. Consequently, it will change in response to changes in these issues. While the practice of conventional agricultural science has increasingly ignored the social dimension (Mettrick, 1993), the strength of indigenous knowledge lies in its ability to situate local technologies in their social, ecological and other contexts (IIRR, 1996; Langill,1999). Grenier (1998) argues that science is reductionist and atomistic in that we attempt to understand systems in terms of their simplest and isolated parts. By doing this we are able to separate the natural and the physical world from the social world. We should remember how academic institutions and state departments continue to separate branches of the natural and physical sciences not only from the social sciences but also from one another. Despite this trend, the developed technology is often dependent on these different disciplines and at some stage it has to be used by people, making what they know – their indigenous knowledge – important.
- History has shown us that over the millennia many major developments in agriculture occurred without the help of formal science, as we know it today (Mettrick, 1993:25). These developments include the domestication of livestock and crops, dissemination of various species to other parts of the world, the development of sophisticated irrigation systems, animal traction, etc. Howes and Chambers (1979) argue that such developments were the result of indigenous knowledge creating order out of disorder. There was a need to do this to ensure the survival of humankind. They suggest so called indigenous people have a thirst

for objective knowledge and that while the indigenous knowledge they develop is not pitched at the same level as scientific knowledge it implies similar intellectual approaches and observation methods (*ibid.*).

- Given structural adjustment programmes and the virtual universal downsizing of national agricultural research and extension services, including the funding thereof, indigenous knowledge can have an important role to play. It has the capacity to interpret biological processes in the local environment relatively quickly and at low cost, while the formal system does this over longer periods and at much higher costs (Farrington and Martin, 1998 in Matata *et al*., 2001: 20). Farmer innovation and experimentation can provide locally applicable answers to questions cost effectively and in many instances the subsequent knowledge can be disseminated to other farmers and agricultural areas where replication is appropriate. When part of a participatory technology development (PTD) process the benefit of this is phenomenal and far reaching as it brings about the best of both worlds (Lizares-Bodegon *et al*., 2002). Where indigenous practices, those based on indigenous knowledge, might be harmful or require further assistance this can be easily identified and assistance provided as part of the PTD process.

In spite of being subject to a number of its own specific constraints, separate to those of western science, indigenous knowledge is believed to possess a number of traits that make its amalgamation with scientific knowledge desirable. We now turn to the second understanding and the idea that indigenous knowledge is a stock of knowledge that can be combined with conventional scientific knowledge.

The amalgamation of scientific knowledge with indigenous knowledge?

The proposed complementary or alternative approaches to agricultural research and extension (also known as populist approaches – see Scoones and Thompson, 1994a) require that farmers and researchers participate on a common platform to diagnose farmers problems, plan and develop suitable technologies or interventions, and implement and evaluate these (Torkelsson and Anandajayasekeram, 2000). We have seen in Chapter Two that RRA tools were designed with the purpose of being such a platform. The amalgamation of farmers and researchers knowledge is desirable for it has subsequently provided evidence

that it permits the development of opportunities and solutions that are relevant and appropriate to the farmers and the researchers (Scoones and Thompson, 1994a; Matata *et* al., 2001:20). However, the benefit to the farmers is most often emphasised in the agricultural literature on the subject while that to science is underplayed. Ravjee (2002) provides examples where multinationals and other organisations have benefited as a result of the exploitation of indigenous knowledge. The process of combining the two knowledges should be one of integration i.e. it should be a process of sharing and mutual learning to which farmers and researchers each bring their specific knowledge. The knowledge that researchers bring is *western* or *conventional scientific* knowledge. That of the farmers is known as *indigenous* knowledge (not just technical knowledge but in the broadest sense which includes social, political, cultural and other dimensions).

The idea of a western scientific knowledge and an indigenous knowledge results in a dichotomy (Ravjee, 2002) that is brought about by the emphasis of some significant differences in these two types of knowledge (Grenier, 1998):

- Indigenous knowledge is dynamic and evolves in response to changes in local conditions, making it more dynamic and current. It is usually based on intuition, empiricism and the synthesis of facts or observations;
- Western scientists often rely on averages (means), and theories and beliefs take longer to change because of their tendency to strive for universal applications, This often requires volumes of evidence to the contrary before changes are even considered. Scientific knowledge usually aims toward long-term goals, is more generic in application in uniform environments, and has a long-standing tradition of methodological rigour.

It is unfortunate that the differences are emphasised rather than the similarities and commonalities as this current practice reinforces the dichotomy rather than promoting integration.

Despite these and other differences in these two types of knowledge, and the fact that indigenous knowledge has actually challenged the findings of scientific knowledge (Darling, 1993; Mettrick, 1993; Grenier, 1998) they can work together. In fact, it is the differences that often make it desirable that the two types work together. By combining the two knowledges,

indigenous knowledge helps to fill the gaps in conventional research, while scientific knowledge aids the empowerment of the farmers. This is achieved by the subsequent provision of results to site-specific conditions, and by equipping farmers with improved tools to sustain their ability to adapt to changing circumstances (Van Veldhuizen *et al*., 1997:19). While indigenous knowledge adds meaning, understanding and value to scientific knowledge, the latter is able to build upon existing local knowledge increasing its dynamism. Amalgamation thus seems to provide tangible benefits to both types of knowledge. These two types of knowledge complement one another and in fact there is a suggestion that synergy can occur, whereby the whole becomes greater than the sum of the parts.

However, actual amalgamation, as desirous as it might be, is not without severe complications that threaten the actual usefulness of indigenous knowledge. Far from being truly integrative, current practices of combining indigenous and conventional scientific knowledge can best be described as the reification of indigenous knowledge for the purposes of incorporation into the dominant framework of scientific knowledge to suit the ends of science. The following list adapted from Howes (1979) and supported by Grenier (1998), suggests the many ways in which we can use indigenous knowledge (Mettrick, 1993:29):

- The use of indigenous systems of classification can be a shortcut to establishing inventories of local resources;
- Farmers' ears and eyes on the ground, coupled with their knowledge can form the basis for monitoring the local environment and provide an early warning system for negative environmental changes, such as degradation;
- During on farm trials it can provide scientists with a form of feedback while giving farmers the freedom to structure their observations;
- Its incorporation in identification, planning, implementation and evaluation of projects ensures that researchers take a significantly holistic view;
- It can be a source of initial hypotheses that can be tested in more formal and rigorous (scientific) ways.

On closer examination, these uses all seem to reify indigenous knowledge making it appear to be a stock of knowledge, and suggesting that it is merely an inventory of elements from which certain desirable elements can be withdrawn and put to the uses of conventional agricultural science. This assumption of knowledge as a stock is considered both

undesirable and impractical (Scoones and Thompson, 1994a; Grenier, 1998). In fact it assumes that indigenous knowledge is context and value free and that its elements can be removed from the context in which they are developed and subsequently function without such a process detracting from their value.

In line with these assumptions and practises of incorporation, researchers often talk of 'legitimising' indigenous knowledge and encouraging farmers to use it. However, they need to be clear as to whether they are only going to legitimise it in the eyes of the scientific community or if they intend to legitimise it in the eyes of the local people by maintaining and strengthening its cultural integrity along with all the associated myths and rituals that often enshroud it. These are two different issues. Juma (1987) has charged that if indigenous knowledge is removed from its cultural context and trappings, and moulded into western epistemology then it will be de-legitimised and its value diminished. We already have debates about indigenous knowledge (which is largely oral and non-physical) and the application of intellectual property rights (IPR) to such knowledge (Ravjee, 2002). This is despite the fact that the costs of adopting IPR systems are enormous and if the resource-poor farmer ever wants to use any aspect of such knowledge he or she will need to retain absolute right to do this (Kuyek, 2002). The dominant ideology stresses IPR, although, or is it especially because, resource poor farmers are usually unable to afford to assert such rights? Thrupp (1987) and Grenier (1998) echo these concerns and talk about the devaluing of indigenous knowledge.

A common example of legitimisation in the eyes of the scientific community is when only those aspects of indigenous knowledge desired by conventional agricultural science are included along with scientific knowledge into packages that are disseminated to farmers (integration becomes a process of selection and incorporation). Sikana (1994b) argues that it is possible to ensure legitimisation in the eyes of both scientists and local farmers. He reports that Village Research Groups (VRG) in Northern Zambia, which are modelled on existing local institutions, carry out all the necessary research. These VRGs consist only of local volunteers and they only channel problems that they cannot solve to scientists at the national research institutions. Here farmer research and innovation is demand driven and is institutionalised within the local extension and research system on the terms of the local farmers.

Given the current attitudes to indigenous knowledge by most conventional researchers there might well be a need for *legitimisation* but as Chambers *et al.* (1989) and Thrupp (1989) stress, this should not be done at the cost of discarding symbolic aspects of knowledge that refer to social values. In fact I would argue that this is contradictory to our understanding of indigenous knowledge and the importance we are placing on it, i.e. its holism and inclusion of the social, cultural, political and other dimensions (see Chapter One). In essence the argument is that to remove the cultural symbolism, the social and the psychological dimensions from indigenous knowledge is to make it less effective for these are essentially integral parts of the system that enable it to function. Associated ritual and taboo are as important as the technical aspects. Initially, their absence will appear to only affect the social dimension, but not the technical dimension. In any event, this would probably be unlikely to worry technically oriented conventional agricultural scientists although it might seriously affect local practices. The technical and the social are so deeply entwined at the local level that the removal of the social will ultimately affect the technical domain (Salas, 1994). As these different dimensions change, so they affect the knowledge in its entirety. A change in the social can bring about a change in the technical and vice versa. This suggests that outsiders must take care when introducing externally derived technical changes to local farming communities for these "improvements" might have unforeseen social effects – negative and positive effects. If this occurs it strengthens the argument for the need of a greater understanding of indigenous knowledge prior to the implementation of technology transfer activities.

In our discussion of indigenous vegetables in Chapter Five we noted that the farmers included rituals into their cultivation practices for some of the indigenous vegetable crops. At other times indigenous vegetables played an important role during various rites. These examples underlie the importance of the socio-cultural aspects or influences that are intertwined with the technical activities and are not separate from them. We should remember that it was precisely the lack of a social perspective in conventional agricultural science that was one of the reasons people started to focus on indigenous knowledge in the first place. It is also one of the reasons why this focus has increased during the past decade (Grenier, 1998; Ravjee, 2002). By removing the cultural trappings and subtle nuances that are integral to its functioning we face the threat of going full circle and transforming indigenous knowledge into another form of supposedly objective scientific knowledge, subject to the same constraints that are currently identified from the critique of positivist science. Indeed the

literature gives a number of cases in which the reification of indigenous knowledge is taking place (see Scoones and Thompson, 1994a) and is decreasing its value, not only from a local perspective but also from that of conventional science. The current debate on indigenous knowledge and intellectual property rights seems to confirm that this is where we are heading. What used to be more or less a public good is now like most conventional scientific knowledge becoming subject to intellectual property rights, after science has reified it, devalued it and then legitimised those aspects which it sees as being important. This can result in it becoming the absolute property of an exclusive group and can only be utilised at extreme cost to others (see Kuyek, 2002 and Ravjee, 2002 for some African examples).

A further problem with the current ways in which the combination of these two types of knowledge is carried out, is that it is far from an equitable process – selective and subsuming incorporation rather than equitable integration is the order of the day. Indigenous knowledge is often relegated to a subordinate status in contrast to scientific knowledge. Agrawal (1993) notes that the critical difference between the two types of knowledge is their relationship to power. He emphasises that holders of indigenous knowledge do not have the power to marginalise. However, the holders of conventional scientific knowledge have such power. Marginalisation can be done either consciously or unconsciously. It is largely a consequence of the fact that the roles of the actors participating on the platform where interaction occurs are unequal and issues of power and politics inevitably come into play (Grenier, 1998). In the supposedly participatory use of complementary methods to understand indigenous knowledge, such as RRA and FSR, which are essentially extractive in nature and design (can their be much participation in something that is termed rapid?), researchers remain largely in a position of dominance in relation to the farmers (Scoones and Thompson, 1994b:6). Unfortunately, as we saw in Chapter Two, participation means different things to different people so it becomes necessary to understand the roles, expectations and relationships of insiders and outsiders while they are generating and recording indigenous knowledge. Two examples of the misuse of the term participatory indicate the issue of dominance and power in the farmer – researcher interactions:

- Sometimes farmer participatory research (FPR) has only permitted farmers the chance to participate in researcher designed experiments (Mutsaers *et al*., 1997) as opposed to the preferable and more participatory approach of participatory technology development (PTD) whereby researchers complement or supplement

farmer designed and controlled innovations and experiments (van Veldhuizen *et al.*, 1997, Lizares-Bodegon *et al.*, 2002).

- In other cases participatory tools are used to convey externally derived messages with scant attention paid to local issues. My own experience in South Africa has found this activity to be fairly common practice, but see also Thrupp (1989) for similar observations.

The use of such methods is not really any more equitable than using conventional agricultural extension's transfer of technology (ToT) or training and visit (T&V) models, for it would seem that in both cases the outsiders retain their positions of power and dominance, which become active in their interactions with farmers. I would argue that some elements of participation could be included in the use of RRA and also other approaches that are generally considered to be less participatory. Such forms of participation would be more in line with Pretty's (1996) types three, five and six rather than types one, two and four (see Table 2 in Chapter Two). This, more participatory type of RRA, followed with increasing levels of participation and emphasising elements of methods such as PRA and PTD during the implementation of a project (see van Veldhuizen *et al.*, 1997), which is designed with the equal involvement of all stakeholders (insiders and outsiders), will allow for a more complete analysis of indigenous knowledge, and the ensuing interactions. Such an analysis will indicate that neither indigenous knowledge nor scientific knowledge are complete stocks of knowledge, free from the biases of numerous influences both from within and without the domain in which they are generated. To take cognisance of this and ensure that the best possible understanding and use of indigenous knowledge transpires, it is required that more appropriate methods are developed, refined and used.

Chambers *et al.* (1989) describe earlier uses of 'farmer first' or complementary type methods such as FSR, RRA, etc. as populist. Titilola and Marsden (1995) label these methods as instrumental and rather suggest that interpretive (and multidisciplinary) approaches are required (cited in Ravjee, 2002). To this end such approaches must go beyond the practice of viewing indigenous knowledge as an addition to scientific knowledge and should instead take the best of both knowledge systems, realising that both have constraints and value, and use these to move beyond the indigenous knowledge-western knowledge dichotomy. According to Agrawal (1995:2) it is precisely this dichotomy which functions to conceal similarities and value, and results in the presentation that systems of knowledge are static. Is it possible that

by moving beyond the dichotomy to an equitable integration of these two knowledge systems will result in a third type of knowledge?

Problems with complementary approaches to agricultural development

Much of the problem with conventional agricultural research and extension lies in the processes used to develop and transfer technology, while much of the solution seems to lie in the farmers' own capacities and priorities. Therefore, it is argued that where appropriate researchers and extensionists must consider farmers' priorities and build on their existing capacities. Understanding farmers' indigenous knowledge is seen as a key to identifying these capacities and priorities (Chambers *et al.*, 1989; Grenier, 1998). The earlier complementary methods, such as FSR, RRA, etc. have attempted to unlock such capacities and priorities by using a less participatory approach.

The complementary methods advocate that active partnerships in all areas of the research and development process are required. They concentrate on bridging the gaps between stakeholders (or actors), finding new ways to understand local knowledge, to strengthen local capacities and to meet local priorities (Scoones and Thompson, 1994b:2). However, there are concerns that this populist perspective often encounters similar problems to those experienced by conventional research i.e. the transfer of technology approach (see the contributions to Part II of Scoones and Thompson, 1994a for detailed examples). The use of RRA in the current study and the use of FSR and similar extractive and researcher dominated methods in other studies actually place insiders and outsiders in a dichotomous contrast, thereby oversimplifying the roles of the broad range of actors involved in knowledge sharing activities; thereby excluding or obscuring vital dimensions of these interactions (Scoones and Thompson, 1994b:6; Grenier, 1998). How the various dimensions and roles of different actors influence the effectiveness of these early complementary methods needs to be understood if we are to understand how they influence the generation of indigenous knowledge.

On farm research (OFR) and the more recently evolved PTD both provide ideal opportunities for interaction and possible integration between scientific and indigenous knowledge. Unfortunately, in many cases of applying OFR, researchers still tend to dominate the design, implementation and evaluation of these on-farm experiments, reducing their value (Matata *et*

al., 2001:20). Similarly, factors such as government policy and funding also dictate the nature of these processes and especially the identification of the research activities (Scoones and Thompson, 1994c).

The argument is that the complementary methods must go beyond viewing indigenous knowledge as merely a stock of knowledge that can be added to conventional scientific knowledge. To achieve this, the selected methods and their users should integrate, rather than incorporate, the best of both knowledge systems, realising that both have constraints and value, and thereby move beyond the indigenous knowledge – scientific knowledge dichotomy. One of the main constraints that affect both indigenous and scientific knowledge is the failure of researchers and others to take cognisance of the internal and external factors that influence their creation and function. The strength of the argument is that the earlier complementary approaches failed to adequately confront the effect that the various power relations between the different groups within a community, between different communities, and between local people and outsiders, such as researchers and various officials, have on generating and analysing indigenous knowledge. People engaged in power-laden interactions usually only reveal selected parts of their social transcripts – opinions, beliefs, ideas and values. Those who feel subordinate usually reveal significantly less and the amount revealed is proportional to the disparity in power between the actors. This is what Scott (1985, 1990) has called 'hidden transcripts' (cited in Scoones and Thompson, 1994c:27).

Let us consider, for a moment, the interaction between a university professor and a student. It is seldom that the latter openly challenges the former, as it is seldom that the student would divulge all his / her knowledge of and perceptions about a subject in response to a question by the professor, for fear of ridicule or some similar reason due to the unequal relationship that generally exists between the two parties. Similarly, the professor selects what he / she intends to tell the students, sometimes avoiding the inclusion of beliefs contrary to his or her own beliefs. Knowledge generated in this context cannot be considered as a complete whole for it is selectively created in terms of the power relationships that exist. Similarly, issues such as duration and timing of the knowledge generating activity would also influence the value and content of the knowledge. The knowledge that is generated in such contexts is a partial truth rather than a complete truth. This is what happens in various degrees during the power-laden interactions between researchers, farmers and rural inhabitants.

Long and Villareal (1994) draw our attention to the fact that participatory approaches to development, making claims of empowerment, also pose a number of dilemmas and should be viewed with caution. Often these approaches are used with the underlying assumption that 'enlightened' outsiders come to help 'backward' locals become empowered. This again emphasises a dichotomy and temporal distance between the two groups before the process has begun. It can result in conscious or unconscious autocratic behaviour on the part of the outsiders. More recent participatory methods, like the use of earlier complementary methods, also obscure issues such as timing of interaction, place or locality of interaction and local power struggles, implying that these have no effect on the creation and the recording of indigenous knowledge. The RRA carried out in Gameru parish also obscured these issues, as they were not considered during the fieldwork and subsequent analysis of the data.

Another concern is that the complementary methods fail to truly capture the complex socio-cultural and political-economic dimensions of knowledge creation, innovation, dissemination and application within scientific organisations and resource-poor communities (Scoones and Thompson, 1994b:2). In what are termed more participatory methods, such as PRA, emphasising activism, local learning, analysis and action, the outsiders are still present but because the research process is so involved with action their influence is considered to be part of the participatory and empowering process, having no or minimal effect on the process of knowledge creation. However, this is not always possible as the researchers tend to interpret their observations and interactions, based on their assumptions and priorities, rather than merely describe them (Uphoff, 1992). As Chambers (1994b) and Richards (1994) acknowledge, the key issue for many development workers is that what local people do not know makes them the problem while what development professionals know is the solution. These unfounded beliefs can be borne out in the facilitation process. The idea that the outside facilitator has no or minimal effect, obscures the reality in which they can have a profound effect on the knowledge generated (Cornwall, *et al.*, 1994). We have seen in the previous section that in practice the integration of indigenous and scientific knowledge tends more towards incorporation of the former into the latter and that it is a selective process determined by the more powerful of the participants.

The issue of agency is evident and the agents' interpretation has an enormous effect on the knowledge that is generated and disseminated. Social anthropologists and other social scientists have for years argued that the interaction of the researcher and the informant

influences the data generation process and the type or content of the data collected (Hammersley and Atkinson, 1996; Mouton, 1996). This threat to validity seems to hold true even in the participatory complementary methods. Grenier (1998) reminds us that the role of the researcher in the research process is never value free (see also Fetterman, 1989 and Bernard, 1995 for similar warnings). She notes that not only can the research process raise expectations but also that the presence of the research team contributes to cultural transformation and consequently knowledge transformation, for knowledge is an integral part of culture. Cornwall *et al*. (1994) take up a similar theme, but from a different angle. They argue that the methodological strategies and subsequent methods adopted by outsiders are never neutral decisions and in fact they are often political choices, influenced by personal and professional circumstances as well as the socio-political context with which the researcher is confronted at any given time. Therefore, the selected methodologies influence the type and manner of knowledge generated and also its ultimate use.

Essentially, what is happening is that the current means of combing scientific and indigenous knowledge, which ignores the dimensions and the roles of the different actors, is actually transforming indigenous knowledge into a neutral stock that can be drawn upon as and when scientific knowledge requires. The effect that conventional science has on the creation of indigenous knowledge is ignored. The selected elements of indigenous knowledge are then packaged within a conventional scientific framework, legitimising it in the eyes of science but not in the eyes of the farmers and rural inhabitants. This form of legitimisation results in indigenous knowledge losing much of its intrinsic value. Furthermore, the fact that indigenous knowledge, as with all types of knowledge, including scientific knowledge, is neither a stock and nor is it created in context and value free situations is overlooked. Consequently, the resulting indigenous knowledge is not really understood by the scientists and what is perceived to be the truth is in fact no more than a partial truth.

To move beyond these constraints, all forms of knowledge must be seen as social processes, and knowledge systems must not be seen as single, cohesive stocks but rather in terms of multiple actors, networks and influences. Just as agricultural research and technology development are social processes that cannot take place in a vacuum so is the generation of knowledge. An awareness and acceptance of this now makes it important to do an analysis of the differences in knowledge (the what) that different people (groups and individuals – the who) possess (not only in multiple areas but also in a single locality – the where) and the

reasons for these differences (the why and how). Apparent differences in knowledge are important because they can actually manifest differences in local power struggles and diversity of knowledge rather than real differences in knowledge (Fairhead and Leach, 1994). The concern with difference has in recent years manifested itself in the increased emphasis placed on gender analysis in agricultural and other development settings (Sims-Feldstein and Jiggins, 1994; FAO, 1996a; IFAD, 2000). However, there are also calls to analyse differences in age, wealth, occupation, ethnicity, religion, etc. (Scoones and Thompson, 1994a). Bebbington (1994) argues that we should also look at difference in terms of what people don't know because what they don't know often seriously affects them without their being aware of this. He identifies markets and government policies as two examples of what people don't know outside of their immediate vicinity.

The emphasis on the analysis of difference approach suggests that knowledge is multifarious, lacks continuity, and is dissipated, rather than being singular, systematic and consolidated (Scoones and Thompson, 1994b:3). Following from this we can now understand knowledge to be the outcome of the dialogue and interaction between different groups of people (both similar and dissimilar) and networks of people, who often have incomplete knowledge, conflicting loyalties and competing interests. A cursory reflection of all the activities (tertiary education, reading), networks (disciplines, formal and informal associations, computer networks), constraints (access, other commitments, distance, communication), etc., involved in our own practices of generating knowledge empirically supports such an understanding. This thesis is a creation of knowledge subject to all of the above. The final product is subject to the following: student's interest in the topic; student's discipline and career choices; access to supervisor including his or her discipline and interest; access to a well equipped library; availability of literature; existence and access to various human and computer networks; available time; timing of the study and socio-political context of the university, the place of employment and the country.

If we accept that these various factors can influence the generation of all knowledge, then it is not difficult to consider agricultural research and extension (in both its conventional and complementary forms) to be a socio-politically charged process of accepting conflicting interests. A process in which choices and exclusions are made, alliances formed and worldviews inevitably imposed. However, such a view is contrary to the strongly held belief that agricultural research and extension, and to this I would add perceptions of development

in general, are a sequence of carefully planned and rational acts (Scoones and Thompson 1994b:4). In the words of Scoones and Thompson (1994b:5) agriculture should be considered "… a complex social process, not simply a complex, diverse and risky technical activity." The significance of just how social difference (age, gender, power, wealth, status, etc.) affects people's perceptions, their thoughts and actions, and their access to and control of resources cannot be overlooked. Ultimately it affects their creation of knowledge.

If Swift's (1995) opinion that the use of knowledge as a means of setting in motion rapid and increasing change is not found in resource poor communities is correct this might be because such communities are in fact resource-poor and do not have access to the same resources available to conventional scientists, preventing them from doing what scientists do. Their current resource poor circumstances are most likely the result of relationships of power, politics, economics and other aspects of social difference brought about by colonialism, imperialism and caste systems, to mention a few.

An alternative interpretation?

Realising that there is still a problem with agricultural research and extension, even when complementary methods are adopted in place of, or in conjunction with conventional approaches, we need to look at the practical aspects of how we can address the issues that have been raised. As Scoones and Thompson (1994c:17) put it, can there really be "… an effective and equitable partnership between indigenous knowledge and formal knowledge systems by means of adaptive, people centred agricultural research and extension practice?" This necessitates a brief look at whether or not there are tools and strategies available and if current methods can be refined to encourage integration (as opposed to incorporation) of the knowledge systems.

Cornwall, *et al*. (1994) considers complementary methods such as most applications of farming systems research (FSR), rapid rural appraisal (RRA) and agro-ecological analysis (AEA) to fall into the populist framework. On the other hand they argue that while approaches such as participatory action research (PAR) and more recent applications of participatory rural appraisal (PRA), farmer participatory research (FPR) and participatory technology development (PTD) also fall within this framework they are distinguished from the previous

methods in that while the latter methods share elements of the soft systems approach, which focuses on issues such as networks, power relationships and dynamic performances, the former methods do not. These more recent methods have been developed in order to address issues such as needs and power, authority, etc., in development, or at least if they do not address them directly they attempt to take cognisance of these. It can be argued that one of the strong differences between the earlier methods and the more recent ones lies in their styles of investigation. The latter stress participation in terms of bringing about empowerment and social transformation while the former do not attempt this and are more interested in social reform. Cornwall, *et al*. (1994) warn us that despite this, the more recently developed complementary methods are often subject to similar constraints that affect the earlier methods. Such constraints can include the manner in which the tools are used , the purposes to which they are put and the context in which they are used.

I would suggest that one of the primary constraints that all complementary methods are subject to is the manner in which they are employed, as this is not typically value free. None of the methods are all encompassing and rely largely on the reasons why they are selected, and the manner and care in which they are employed by fieldstaff for particular purposes. Narayan (1996) and Grenier (1998) both emphasise the need for careful training of fieldworkers and the value of continual reflection on the application of the methods. There is a need for reflection to follow action and then to act again in accordance with this reflection – an opportunity that we did not have at the time of our study in Gameru parish because of the time constraints and because some team members were unaware of the need to do so. Consequently, in-depth reflection only occurred after the fieldwork.

According to the work done by Scoones and Thompson (1994c:22, 23) most practitioners who use complementary methods have largely remained information gatherers (extractors) and recorders of indigenous knowledge, and designers, planners, managers and evaluators of agricultural development interventions. Personal observations suggest that they often remain the main implementers of these projects, based on selected elements of indigenous knowledge that they have generated by extractive means. Many practitioners have also predominantly followed a ‘positivist’ agenda and hard systems approach, attempting as we have seen above, to fit information into the neat boxes of conventional science.

Given this evidence (see Scoones and Thompson, 1994a and van Veldhuizen *et al*., 1997 for examples) Cornwall, *et al*. (1994) claim that it is the more participatory and empowering processes of the more recently developed methods that take better cognisance of the problems that we have identified as being inherent in knowledge generation. Despite this they acknowledge that there is still the need for the further refinement of these methods. As noted previously Grenier (1998) has advocated that RRA can be used to quickly obtain an intimate knowledge of a local area. PRA can then be subsequently used to further increase the outsiders' understanding of the area and the indigenous knowledge while embarking on a long-term process aimed at empowerment and social transformation. As a consequence of the rapid rate at which the numerous complementary methods have developed over the past twenty years there is a need to spend more time on examining how we use them to learn about indigenous knowledge as this will identify the various constraints involved in the process, thereby allowing us to be aware of them. Chambers (1994a) emphasises that we need to reflect on our methods and techniques to ensure their quality, validity and reliability.

Sheperd (1998) supports the use of the more participatory methods, emphasising soft skills, but upon reflection he also identifies a number of difficulties in doing this, in particular with the PRA techniques. He points out that if due attention is not paid to the use of such methods they can suffer similar constraints that affect the earlier complementary methods:

- The techniques might be used superficially and insensitively for reasons such as obtaining funding, thereby removing the action research element that enables reflection and learning. This will reduce the quality of the process for all involved. To some extent this is what happened during the study in Uganda. There was a desire to label the research PRA, although the financial and time constraints effectively prevented such an undertaking from ever becoming a reality. The use of PRA is currently vogue and if the process we undertook was labelled as as such it might have given it greater credibility than it in fact merited. An RRA was actually carried out and as we have seen this indeed had the consequence of removing the action research element. My own observations in South Africa suggest that one of the fears scientists have of adopting a more participatory approach is that they might find that there is not enough funding to do their research in a participatory fashion. This is problematic for the researcher, whose performance is increasingly reliant upon and measured in terms of publications of

topical issues and sustainable funding, in a period in which desirable research projects and associated funding is becoming a highly competitive and politically charged business.

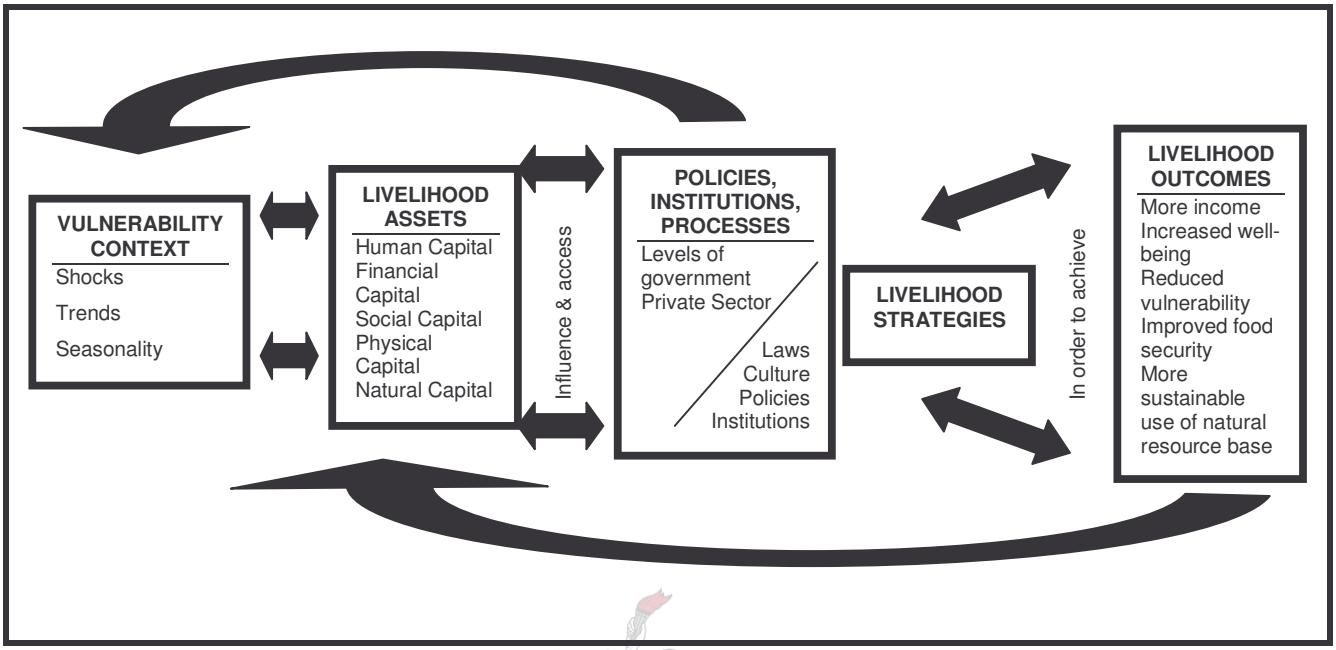
- Briefly trained fieldstaff may use the techniques mechanically without having the necessary flexibility to do an in-depth analysis of the information generated. Here I have encountered a perception among many agricultural development workers, managers and researchers that PRA is something that is done quickly at the beginning of a study, usually by a social scientist, to identify the local needs and is never again to be repeated. It is seen as a once-off extractive activity and not in terms of a continual process in which the method and the tools are continuously used and developed appropriately to ensure continuous learning. Only by continually following approaches like PRA or PTD, as they are intended with the farmers and other development partners can we talk of a truly participatory and empowering approach that can result in social transformation.
- Training in the use of these methods and tools needs to be continuous because the knowledge about these approaches is continually being generated and refined.
- To demonstrate sustainability and equity there must be a link between the uses of the techniques and local institutional development (and I would recommend research institution development, whose internal relationships far from encourage equitable, interdisciplinary and truly participatory interactions amongst personnel and with farmers).
- Previously the emphasis was to concentrate on the techniques, which have evolved rapidly, rather than on the process undertaken (see also Chambers, 1994a and Grenier, 1998). However, there is a strong need to focus on how the local people analyse and think about issues. They are the people who need to influence the development agenda so their understanding and thoughts become vitally important to any development process.

To move beyond these and other current constraints Sheperd (1998) argues for continued local capacity development. He understands this as developing local skills in necessary techniques such as participatory planning, developing and strengthening networks, and the development of local institutions (both formal and informal). He believes that this should be done by building upon that which already exists locally. He stresses the importance of local

institutions because it is likely that without the empowerment of people who are unaccustomed to participation in public affairs they will remain excluded from the process. Shepherd also argues for social transformation and stresses that for there to be success and sustainable development the outsiders need to pick up on local capacities and concerns (including powerplays and conflict), exposing these to the insiders who are then able to act upon them.

Bebbington (1994a) argues that knowledge is embedded in a broad and extensive socio-cultural and political economic context that goes beyond its apparent immediate vicinity. He argues that the issue of what people don't know in other important areas that affect their livelihoods needs to be analysed if we are going to grasp the powerful nature of rural livelihoods and subsequently develop more appropriate methodologies and policies. This view is shared by Scoones and Thompson (1994b:16): "In order to comprehend issues of knowledge, power and agricultural practice, we must understand these wider structural conditions and their role in shaping local livelihood strategies." Given these calls, to understand the extent of local peoples' knowledge and to combine wider structural conditions with local circumstances it is possible that the sustainable livelihoods approach (SLA) to development, with its inclusion of the analysis of the macro, meso and micro policies and influences that affect local development and potential interventions is a step in the right direction (DFID, 2000). SLA includes a framework for analysis that is considered to be extremely powerful when used in a participatory manner with participatory tools, such as those found in the continually developing PRA toolkit. However, I would argue that the framework only encourages the analysis of obvious or more visible macro and meso issues, such as policies, and not how the more subtle ones, such as the researchers' own context, discipline, timing and duration of visit, etc., affect local issues and particularly the interpretation of indigenous knowledge. SLA also includes the analysis of what are termed the five capitals or assets: Social, Human, Physical, Natural and Financial. This allows for the determination of what needs to be done at the micro, meso and macro levels to develop the capacities of these local assets to ensure optimal and sustainable functioning (DFID, 2000). The capitals are the existing local resources that are available for local development initiatives. Figure 20 illustrates the Sustainable Livelihoods Framework (more information can be found in the Sustainable Livelihoods Guidance Sheets 1 – 8, DFID, 2000).

Figure 20: Sustainable Livelihoods Framework



Source: Sustainable Livelihoods Guidance Sheets 1.1 (DFID, 2000)

IIED (2002) explains that the participatory methods that we are discussing have moved beyond their initial, exclusive focus on rural, community-level initiatives and circumstances in order to be more in focus with addressing the criticisms we have levelled at the earlier complementary methods such as RRA and FSR. Such recent shifts include:

- In addition to local decision-making attention is now being given to areas of sub-national, national and international decision-making and the effects that these have locally;
- A shift in emphasis away from local projects to policy processes and scaling-up or institutionalisation of approaches;
- An increased awareness and attention to issues of power and difference;
- Instead of simply promoting participation, significant attention is being paid towards assessing the quality of participation and understanding its impact.

These changes have been borne out of the continual reflection by practitioners and their peers of the work, results and uses to which they apply the complementary methods in terms of the principles of participatory methodology.

Scoones and Thompson (1994c) observe that the use of more recent participatory methods increase our understanding of the similarities and dissimilarities of indigenous and scientific knowledge. This has an implication for the integration of indigenous and scientific knowledge. Following Hacking (1983), they argue that contrasts or the dichotomy between indigenous and scientific knowledge have been oversimplified and that both "… proceed with context-determined, experiential and theoretical knowledges, reinforced by continuous interactions between theory and practice." (*ibid*. 29). This becomes evident when studies are undertaken that do not dissect indigenous knowledge into neat scientific categories (Fairhead and Leach, 1994; Salas, 1994; Millar; 1994). Recent work using participatory technology development (Richards, 1994; Van Veldhuizen *et al*., 1997) indicates that some innovations and experiments by farmers can fit neatly with conventional research practises but that others will require creativity and the development of new methods to understand them if they are to be used effectively and retain their value. The similarities and differences between the two types of knowledge are exactly what afford their optimal integration, avoiding the reification and devaluation of indigenous knowledge. Sikana (1994a) suggests that the differences between local classifications and those of researchers exist because farmers' constructions of their reality reflect the dynamic and strategic nature of indigenous knowledge. He emphasises that conventional science must come to terms with this if it really seeks true collaboration with farmers and integration of knowledge.

The transfer of technology approach is firmly entrenched in the cultures of agricultural institutions, in management and financial procedures, and is increasingly reinforced by training in mainstream tertiary institutions, where scant attention is paid to complementary methods. What is required is a change in the mindset of conventional research institutions, tertiary educational institutions, and research and extension organisations to ensure that the more participatory complementary methods are promoted, refined and developed. This will prevent the reification and devaluation of indigenous knowledge. Flexible funding and consistent support will play an important role in the successful application of the more participatory methods, both within institutions and in the field, as these methods need to be flexible (Scoones and Thompson, 1994b:10). This implies that they will need to adjust to local circumstances and pace.

The current debate on the generation and use of indigenous knowledge indicates that there are methods available that when used correctly, they take cognisance of the constraints and complexities involved, enhancing our ability to generate and record indigenous knowledge more accurately. This will improve our understanding of indigenous knowledge and make us aware of the dynamics at play in all knowledge generating activities. It also permits a more suitable integration of indigenous knowledge with scientific knowledge in which they are both seen as dynamic systems rather than as static stocks.

With regard to the various methods employed we have heard that RRA is not always considered to be an ideal method for generating and recording indigenous knowledge because its positivistic application avoids creating an awareness of the problems inherent in the generation of indigenous knowledge. In contrast to methods such as PRA and PTD the main criticisms are that it does not encourage as much participation as is desirable, it does not include joint analyses, it is usually used in a rapid manner and it generally does not involve reflection on the process and the issues inherent in the interactions and subsequent generation of knowledge. We now return to the study in Gameru to see what issues were encountered in the use of RRA, their influence on the process and if the concerns we have raised in the preceding discussion are relevant to the practical application of a complementary method. This will then allow us to determine the overall value of using RRA methods in the current study, which will be done in Chapter Seven.

Creating and recording indigenous knowledge in Uganda

The emerging view is that some complementary research methods have similar constraints to conventional practices, although the use of methods which emphasise greater participation seem to incorporate strategies that can go a long way to overcoming these constraints. The more participatory methods do this by, firstly invoking tools which consider local power relationships, local differences and sometimes local and external networks and official policies. These tools attempt to directly identify and address constraints. This is something which the RRA method was not designed to do and only with its evolution into PRA were issues such as gender and wealth or class difference really addressed. Secondly, and this is largely the focus of our discussion on the use of RRA in Uganda, they became aware of the constraints to the methods, which include the manner and context in which the methods are

selected and used, the purposes for which they are used, the timing of their use, the locations in which they are used, the interaction between farmers, extentionists and researchers, etc. There is no such thing as the best method, but Guijt and van Veldhuizen (1998) suggest that some methods are better than others and include PRA and PTD in their group of preferable complementary methods.

The RRA tools used in the generation and recording of indigenous knowledge in Uganda were used largely in the same fashion as that in which they were employed during their heyday in the 1970s. Subsequently, their use did not directly result in identifying, considering or reflecting on the types of constraints discussed in the previous section. Such activities form part of the more recent PRA activities (FAO, 1996a; Narayan, 1996; Grenier, 1998; Langill & Ndathi, 1998). In other words during the study in the parish the research team did not take cognisance of the constraints inherent in using RRA and therefore did not focus on the significant influences of networks, power relations and difference, dynamic interactions and external influences in the generation of knowledge. Consequently, we need to reflect on these and related issues to determine how they might have influenced the process if we are to evaluate the use of RRA tools as a means of generating and recording indigenous knowledge in this parish and possibly in similar future studies.

Grenier (1998) has pointed out that RRA tools can be useful if followed by more participatory (empowering and self-mobilising) processes. Matata *et al.* (2001) put forward a similar belief, while Guijt and van Veldhuizen (1998) suggest that such tools are most effective in bringing about social transformation when included as part of a larger and long-term participatory programme, such as PRA or PTD. This begs the question whether RRA was then useful and appropriately used in the study relating to indigenous knowledge about indigenous vegetables in Uganda? In order to answer this satisfactorily we need to analyse the use of the RRA method in terms of the constraints that have been identified as being generally ignored or overlooked when earlier complementary approaches are used to generate and record indigenous knowledge and on how this affected the activities in the parish. The following six constraints will be discussed in terms of my reflections on the experiences of using the RRA method and my involvement in the Ugandan study: Indigenous knowledge as a stock that can be put into scientific categories; Power laden interactions; Local power struggles; Effects of outsiders' presence in the knowledge generation process; Time, timing and locality where knowledge is generated; and the analysis of difference.

Indigenous knowledge as a stock that can be put into scientific categories

Methodological strategies are not neutral and Cornwall *et al.* (1994) inform us that the selection and application of methodologies is largely political. Far from being neutral researchers make selections based on preferences, pressures and a host of other external influences. Two issues are important here if indigenous knowledge is seen as a stock of knowledge which can be collected and incorporated into another knowledge system. The first issue is the types of tools selected and the way they are applied to generate and record knowledge, and the second is the way the knowledge is subsequently presented.

Initially the researchers developed a questionnaire containing approximately seventy closed questions which they had wanted to use to generate the indigenous knowledge in conjunction with a random sample of the parish farmers and residents. They had initially called this a PRA although no participatory tools or complementary methods were to be used. Ultimately, the decision was taken that if the study was to include an element of participation greater than responses to predetermined questions the use of RRA tools was more desirable. These tend to be open-ended and also allow for the collection of more qualitative and contextual data. They encourage a level of local decision-making on the type, pertinence and relevance of the information recorded. With the use of a questionnaire the data recorded is largely quantitative and the process is completely controlled by the researcher.

Given the short period of time allocated to fieldwork in the parish some subject areas were identified beforehand to guide the process and ensure that knowledge was generated about certain topics that the researchers deemed important. This undoubtedly influenced the topics covered and the type of data collected. Much of it evolved around areas that the researchers deemed important and neglected other areas. Despite the desire by the research team to collect more technical information the tools actually enabled the collection of some knowledge on rituals, taboos, beliefs and cultural uses of indigenous vegetables. It also identified some of the relationships between these topics and the technical elements. The scribe attempted to collect and present this data separately despite it being intertwined with the discussions of the technical information. This actually resulted in less information being recorded on these topics than was discussed and also alienated the social and cultural practices from the technical.

The farmers and residents were not involved in many of the analyses of the generated information and were therefore unable to optimise their experience of the tools.

According to IIRR (1996), Grenier (1998) and Langill (1999) the practise of compiling broad questions beforehand is common and acceptable in order to define the relevant areas of the study. This begs the question, “Relevant to whom?” They suggest that the focus of the research must be flexible and that sufficient time must be available so that other important topics (important to local people) do not become neglected to the detriment of the knowledge that is generated in terms of predefined topics. I would argue that the success of this process in reducing the influences of the researchers is highly dependent on the skill and experience of the facilitator. Even when a highly skilled facilitator is available he / she is inevitably constrained by contextual factors such as time and decisions taken within the research team.

If we look at Chapters Four and Five we can see that the process of recording the knowledge has enabled it to be put into neat categories, including headings and sub-headings that are easily understood by conventional agricultural scientists and extension officials. Each researcher can quickly ignore the headings or sub-headings which they do not believe to be of interest to them. Except for parts of Chapter Four the social and other important areas relating to indigenous vegetables in the parish are generally separated from the technical. At times during the discussion on the local circumstances we can see how historical and current activities are intertwined and have resulted in the status quo. However, in Chapter Five this is not really explicit and the different topics are generally discussed in isolation from one another. Consequently, the researchers can select what they deem important, ignoring the rest, and include only this into their work. The more complex nature of the real situation becomes lost. Indigenous knowledge is presented as a stock from which certain aspects are drawn. I would argue that this style of recording indigenous knowledge is typical of the older RRA type reports (see Adebo, 1993) and also some more recent indigenous knowledge reports (Langill and Ndathi, 1998). The result is that much of the interrelationship between the different dimensions and elements are ignored or underplayed.

Power-laden interactions

In all studies involving the presence of outsiders conducting research in communities, villages, groups, congregations, sects, etc. there is an element of gatekeeping practised by

members of these groups, communities, etc. Often this can be done either for the protection of the group or for malevolent reasons. Ultimately the role of the gatekeepers is to control the in- and / or outflow of information. The research needs to be “approved” by those responsible for the security of the group and their permission must be sought. In such a situation access to various respondents is controlled and consequently the type of information that is generated is based on whom one has and does not have access to and whether they are willing and able to discuss this information. Consequently, gatekeepers influence the type, quality and quantity of information obtained in such research settings.

In Chapter Three we saw that permission to conduct the study was obtained from officials of the Ministry of Agriculture, local leadership representatives and parish elders. During the interviews the local leadership representatives and the extension officer always accompanied us. However, the degree to which they actually controlled the information we obtained is uncertain. They were always present during the workshops and they organised the individual interviews with the farmers. When we were doing the transect walks or interviewing farmers at their homes or in their fields they did not always accompany us throughout the entire process, but they did identify the route that we would follow. However, they did not appear to directly influence the content of what people said to us during interviews and workshops. After the workshops nobody prevented us from chatting to residents and from asking further questions.

What we did gather in this parish was that a man would always accompany us when we spoke to women and if a woman wanted to talk to us she would bring a man with her. The impression was that this was the correct protocol to be followed when dealing with strangers from outside the parish. The extension officer was well known to the residents and he did not seem subject to this protocol. In fact he would often accompany women when they wished to speak to members of the research team and he would walk around the parish unaccompanied by residents. While he was not a parish resident he seemed to enjoy semi-resident status. More time in the parish would probably have allowed us the same freedom and would definitely have reduced some of the influence that gatekeeping activities might have had on the knowledge generating process. During the workshops women freely communicated directly with the research team as men were also present in the workshops. It is also possible that what I describe as gatekeeping was in fact nothing more than the respect that the local residents conveyed to us as a result of our presence in their parish.

Besides gatekeeping there were a number of other power-laden interactions that influenced the research process. These were the interplay of various issues within the research team and the external socio-political influences. It is possible that the research team was largely responsible for the scope of information we generated with the local residents. Initially a colleague of mine (a natural scientist) had been identified as the researcher to facilitate the process in which the indigenous knowledge was to be generated and recorded. However, her time was booked on another project and she recommended me, based on my experience in the use of participatory methods to gather and record indigenous knowledge. This caused some concerns, as the project leader only wanted her involvement in the process and my proposed presence on the team was initially opposed. Eventually it was agreed that I would facilitate the process with the Ugandan researchers. When it was realised that I had a fair amount of experience in participatory methodologies but was not as academically qualified as some of the team members, those with higher qualifications tried to overrule suggestions that I made, despite their having no experience or knowledge of the method and process.

There was also some dissatisfaction when I referred to the process as a RRA and not a PRA. Some of the team members had attended a one-week course in PRA tools. They were adamant that we had to and could do a PRA in one week, after all they had been trained in one week! Eventually the change to RRA was accepted when it was realised that we did not have enough time and could explain our decision in the final report of the first phase, while simultaneously recommending greater participation during subsequent phases. The donors had set the financial and time limits which essentially prevented us from doing a PRA.

At a certain level there existed occasional currents of conflict within the team, however this was probably not evident to the local residents as it generally arose during report-back and planning sessions. Despite this it did affect the ways in which we generated information and the topics that were covered.

Local power struggles

The research team did not observe any local power struggles within the parish during the study. The main reason for this was the short time that we spent in the parish and that the process we followed generally prevented such issues coming to the surface. The only way to

have noticed local power struggles and relationships would have been to spend more time in the parish, which at the time of the study was impossible. If later phases are carried out using a more participatory approach, such as PTD, then it is likely that these local power struggles will be identified where they exist. This awareness can then be used to reflect on the knowledge that was generated during the course of the first phase. I suggest that obtaining and verifying such information takes time and is based on the level of trust that develops between the researchers and the local residents. Consequently, it is highly dependent on issues of timing, time, relationships and other contextual factors.

During the workshops we also failed to get an inkling of any power-laden struggles inherent in the interactions between different groups within the parish. We were seeking insights on cultivating and processing indigenous vegetables and needs from different groups and individuals all within the same locality and this can give rise to conflict. Regretfully, it is difficult to say whether this did or did not occur. Generally, during a PRA exercise it is recommended that there is a scribe to record the process and one to record the data generated. Due to resource constraints the two researchers who were allocated the task of observing and recording the process were unable to do it effectively as it was necessary for them to also perform other tasks during the workshops. Consequently, any potential conflict largely went unnoticed. Some differences in access to knowledge were identified and are reported in Chapter Seven.

Guijt and van Veldhuizen (1998) caution that in large groups (recall we sometimes had up to seventy people in a workshop) it is often that the “most powerful” (usually older men and especially those with authority) who will actively ‘participate’ while the “marginalised groups” (females and young children) largely remain silent and watch. I would venture that this was probably not the case in Gameru for generally women also participated and some were as equally vociferous as their male counterparts on certain topics. However, given the gender differentiation of roles relating to indigenous vegetable cultivation and use in the parish it is likely that each gender only had detailed knowledge on the issues in which they were directly involved. For example females had more knowledge on processing vegetables and storing seeds while some males had more knowledge about the practices associated with the commercial production of specific varieties of indigenous vegetables. It would have been preferable to split the participants into two separate groups, based on gender, at various times during the process and to see what transpired with regard to the knowledge

subsequently generated. This strategy and a greater analysis of the relationships of difference would have provided greater clarity of the nature of the relationships between the powerful and the marginalised.

The effect of outsiders' presence in the knowledge generation process

Organisations and individuals have their own interests and these influence the methodologies and methods that are selected to generate knowledge; researchers can use methods to illuminate and reinforce their own priorities. The decision as to which methodologies and methods to use in a particular study involves personal, professional and institutional interests and preferences. My own desire to be correct and term the study an RRA rather than a PRA activity was based on both personal and professional choices. I knew that the study we were undertaking was not a PRA activity and rather than go against my personal integrity and my professional experience I was adamant that the more appropriate term be used and the differences between the two be understood. The team was adamant that they were not including empowerment and social transformation in the agenda so there was no need to use the term PRA. However, having recently completed a course in using the PRA tools they wanted to show the sponsor that they had used these as soon as they could. Given that the tools that they received training in were the same as the ones I selected for the study it was possible to convince them that although we were not using the PRA method we were in fact using similar tools.

The research team included five males and one female. The latter was the project leader and delegated the bulk of the fieldwork tasks to the three junior team members, all males. The facilitation was done exclusively by a male team member. The female researcher participated more during the individual interviews with the local officials and the farmers. To some degree then there was a possible male gender bias coupled to the bias inherent in our being outsiders.

The fact that the research team had identified some topics beforehand in order to guide the process and ensure that knowledge was generated about certain topics that they deemed important undoubtedly influenced the type of data collected. Most of the identified topics evolved around areas that the researchers considered important and might have neglected other areas. Initially the researchers had wanted to carry out a survey using a questionnaire

with approximately seventy questions. At that stage the RRA / PRA idea was unfamiliar to them and when it was accepted that they were rather going to use a complementary method, as opposed to a questionnaire there was still the desire to prepare a set of all the questions beforehand and then to change these into RRA tools. The result was that the while the use of the RRA tools allowed for more flexibility and for greater participation than a questionnaire, these were used in a more extractive fashion than is usually associated with more recent applications of these tools in PRA.

My colleagues were all natural scientists whose emphasis was on agricultural technology development and this led to a greater emphasis being placed on the technical aspects of the knowledge generated. Very little information was collected on symbolism, ritual and belief, gender and social differences, etc., and consequently these topics covered a very small part of the report. When such areas were probed, only cursory information was obtained. We can see that in Chapter Five no descriptions are presented of the rituals involved in cultivating Empande or the rituals associated with preparing different indigenous vegetables when these were used in other rituals. For example we are still unaware if Egobe was prepared differently when it was prepared for the in-laws than when it was generally consumed by the family. It is also possible that certain associated taboos or rituals resulted in some plants being cultivated in slightly different ways. However, we were only given the more general cultivation practices. Likewise, only cursory information was obtained on the medicinal properties of indigenous vegetables and the associated practices. A longer and more participatory process would have resulted in a more equal coverage of the knowledge generated. Also, given that both Islamic and Christian worshippers lived in the parish and were both involved in agricultural activities, more time would have enabled us to determine if they practised different rituals and held different beliefs and taboos. Similarly, we would have been able to explore the origin of the beliefs and practices.

The fact that the entire research team consisted of outsiders to the parish also had an effect on the knowledge generation process. At the beginning of the fieldwork the farmers were often overawed with our presence because we were the first team of agricultural researchers to enter the area. They occasionally tried to impress us with their knowledge and desire to practise conventional farming practices such as the increased use of synthetic agro-chemicals. This was despite their conflicting beliefs that these practices were expensive, ineffective and had increased some of the problems they now experienced. Limited

preliminary observations suggested that they did not practise these conventional methods as stringently and as extensively as suggested.

Our movement in the parish was often 'guided' by key officials and male residents. Being outsiders sometimes made the language barrier a problem and this, coupled with our limited time in the parish, prevented us from splitting into smaller groups at times when such a strategy was desirable. My inability to understand the local language also proved to be a handicap in this short period of time. While farmers understood my questions they were hesitant to reply in English in case they did not express themselves clearly. Those research team members who could speak the local language would then summarise the response rather than translate the conversation. I believe that this occurred because of our restricted timeframe and that often the issues discussed were not always of interest to the different team members, who were from different disciplines. They were more interested in the issues that affected them and tended to focus more on the technical issues relating to indigenous vegetables. This act of summarising might well have included interpretation that was not actually present. A longer period of time might have enabled me to understand the local language or it might have allowed for the development of trust that ensured that the locals were more comfortable in communicating with me in English.

Three of the Ugandan team members of this particular research team underwent a one-week PRA training course in Kenya about seven months before the fieldwork started. This was their first introduction to PRA tools and subsequent to this training no support mechanisms were put in place to assist them in the field. None of the researchers had any practical experience in the approach. My practical experience was slightly greater, but while I was adept with the tools, I was still largely inexperienced in encouraging optimal participation, empowerment and social transformation. During the study my role was mainly to ensure that the tools were ready for each exercise and to answer questions when the researchers encountered problems, in between this I was supposed to observe and record the process as it unfolded. As mentioned above this latter activity was carried out insufficiently because most of my time was spent on the other activities resulting in my neglecting of this important and insightful task.

Time, timing and locality where knowledge was generated

To a large degree the time available for research, especially if it is to be participatory, determines the quality of the encounter and the quality and quantity of the information generated. I pointed out in Chapter Three that not enough time was allocated for the visits to the parish. This was largely due to the costs, distances involved and the limited budget. The exercise might have been more valuable if we had visited the parish at different times during the production cycles of the indigenous vegetables. Such a strategy would have allowed us to observe the actual social and technical practices firsthand. It might also have provided more accurate information because people would actually be busy with the different facets of indigenous vegetable cultivation, harvesting and processing.

Consequently, we recommended in the final report that participatory technology development (PTD) be adopted as the method during the implementation of the subsequent phases of the project. It is believed that if PTD is followed it will allow the researchers to directly observe the practices, allow the researchers and the farmers to make changes during the implementation, as they integrate existing knowledge and generate new knowledge together, and allow for more holistic agricultural development leading to local self-mobilisation and action. However, I was the only member of the team who was aware of PTD at the outset of this first phase and given that it was not initiated from the beginning it might not materialise in any form during the subsequent phases.

We must remember that the objectives of this phase of the project were very specific and at no time was it stressed that any of the objectives were to empower and ensure the self-mobilisation of the local population, leading to social transformation. A purist could argue that by initially indicating that we were using the PRA method this was implied. Be that as it may, it was never the intention of the team to promote social transformation and a strategy required to do so was never discussed. This again emphasises the common confusion surrounding the use of RRA and PRA methods. We called our method RRA because in spite of incorporating some newer PRA tools it was largely extractive and this would help us to avoid falling into the trap of calling something a PRA when in fact it was nothing of the sort. I wanted to be certain that we could not be accused of misusing the term. Given the time frame, PRA outcomes such as empowerment and social transformation were impossible as

there was barely enough time to get a general overview of the indigenous knowledge relating to the cultivation and utilisation of indigenous vegetables.

In 1999 research on traditional leafy vegetables that had been carried out in other African countries, including neighbouring Kenya (Chweya and Eyzaguirre, 1999) was published and was a key factor in prompting the conceptualisation of this study. The Ugandan project on the genetic diversity of indigenous vegetables was conceptualised in 2000, about two years before the RRA was carried out in the parish. The delay resulted from the fact that the Ugandan research team was experiencing problems in linking with partners who had the relevant technology to assist them with the research and analyses required in some of the other phases. When the South African team became involved it was about ten months before the fieldwork started and the proposal still had to be compiled. Once this was conceptualised the donor decided that the study of indigenous knowledge must be carried out before any of the other phases would be approved and allocated funding. A limit was also placed on the amount of money that could be used for this phase. The first phase, involving indigenous knowledge generation was subject to a severe time constraint in terms of our being able to use a more participatory approach, although the donor was keen on a PRA process. The money allocated also meant that not more than five days could be spent at each of the eight parishes identified for the larger study. A lot of time had passed since the project had been conceptualised, but very little was spent on the planning of the first phase and my involvement was only finalised about three months before the fieldwork started. Consequently, I was still negotiating changes in the methods two days before the fieldwork commenced.

The extension officials had organised the dates of the field visits with the local leaders and had informed the research team of the satisfactory times. During our actual visits we asked the farmers and the local leaders to select the venues and the times. The two main workshops were held at the church, as this was chosen by the local people as a suitable venue that would provide protection from the elements if needed. Fieldwork was conducted in this parish as the first rainy season was coming to a close and occasional heavy downpours still occurred. The fieldwork in the parish took place at the end of the first rainy season because some of the roads were impassable during the rainy season and the officials from the main town in the district would have been unable to attend some of the workshops.

Despite the fact that the local leadership organised our schedule, during some of our visits to do the individual interviews and during the transect walks we arrived at some households unannounced. Generally the days, times and activities were more controlled by the officials and residents than by the research team. The project leader identified the period of the visit in consultation with the elders, extension officials and local leadership. Ultimately the dates had to coincide with my availability which had been negotiated beforehand. A more participatory approach would have included at least one preliminary visit to the parish in which the time frame for activities would have been identified along with the local farmers and officials.

We should have used smaller groups during the workshops and had more discussions on issues relating to indigenous knowledge in the fields and kitchens where the activities were typically carried out. Discussions in these locations might have provided cues, helping local people to refresh their memory of practices and processes that they felt were important. Some practices might not have been mentioned during the workshops because of their timing and location. We have no means of knowing this from the way in which the current study was conducted. If we had moved around the parish to nearby villages we might have also become aware if different or similar local practices were used in different villages in the parish. Based on the information provided and the relatively small geographical size of the parish we assumed the use of similar practices to the extent that they were probably identical.

By having the discussions in a central place people might have forgotten certain important bits of information or they might have felt it was easier to agree with the others because the practices mentioned were those carried out in the area where the meetings took place and not those carried out elsewhere. This might be the reason for our result of only obtaining two basic types of cultivation and post-harvest practices – one for leafy vegetables and one for fruit vegetables. I would interject here that there was a limit to how much detail we required at this stage. While these practices might be used in other parts of the parish in slightly different forms it is unrealistic to get every different practice from every individual involved. Such differences and their significance should become clear during subsequent phases of the project if greater participation is followed and the researchers pay attention to the differences. In any event differences in local practices will probably only become important if the subsequent phases are implemented. During the field visits to the individual farms we interviewed individuals in some cases and household groups in other cases. It seemed that household members all farmed on the same land and this generally meant that we tended to

get the same explanations and information from these groups, suggesting that they followed the same practices.

The fact that I am an African of European extraction also seemed to influence at least two of the selected parishes and the timing when we visited them. The team leader was concerned that I would not be able to accept the conditions of the local accommodation in some of the areas where we planned to do fieldwork. Rather than consult me on this issue, fieldwork sites requiring my involvement were selected because they provided above average accommodation. This was appreciated, especially after we almost booked into the wrong accommodation during the second field trip. However, the influence that this decision had on the selection of the fieldwork sites might have affected the type of information we obtained because the two parishes were close to major towns. Given that one of our interests was on the effects that urbanisation has on indigenous vegetable cultivation by virtue of market demand this is probably not a major concern.

Analysis of differences

Due to different roles and practices based on gender and age groupings, neither gender nor the different age groupings can completely represent the knowledge of the other, thus there is a need to include both genders and the different age groupings in the research and to note the differences in their knowledge and the reasons for this. In any particular situation the environment, technological inputs and the opportunities that are made available to different gender, age and social groups can differ significantly. The differences in knowledge amongst different groups do not necessarily represent less knowledge but are likely to suggest differences in experiences and needs or even access to resources which inevitably affect knowledge.

During the study only gender and age grouping differences were considered. Time and language constraints prevented us from splitting the groups into various categories of difference and subsequently doing a more in-depth investigation of these differences. An effort was made to specifically invite both male and female members of the parish of all ages to attend the workshops. The gender proportions of the adults at the workshops were approximately equal although it seemed that when large numbers were present the majority

were older males. The age group tended to be adults (young and old) with a few pre-school children. School-going children were not present as they attended classes.

During discussions on gender specific roles and practices, the researchers requested males and females not to provide information on behalf of the opposite gender. They were requested to voice objection or criticism when they believed that what was being discussed was inaccurate. This allowed for externally facilitated debate on gender issues. No serious disagreements were noted although occasionally the women would say that the men did not have the exact detail correct. This was especially so when it came to some of the discussions on farming practices rather than during the specific gender analysis discussions. This might indicate that women knew more about certain cultivation practices but did not want to explicitly disagree with the men or cause them to lose face. It would have been preferable if we had separated males and females during the gender analysis stage as well as during other stages of the study, such as when we considered rituals and beliefs. This would have removed any possible influence of the one group (dominant group) on the other, possibly allowing for a more accurate understanding of gender differences. Similarly, we did not really explore the various networks involved in information generation and dissemination. There was talk that farmers were the key players in these networks but it is possible, given their involvement in the various processes, that the women initiated some of the innovations which farmers then shared among themselves. Networks of information exchange probably existed at the markets where farmers from far a-field would meet, but due to the time constraints these were never explored. In any event the impression was that networks existed in the parish but that these were informal and did not focus exclusively on agriculture. In fact mention was made that there was no formal farmers' association in the parish at the time of out visit. We noted in Chapter Four that the women's group existed for purposes other than discussing agricultural topics and growing indigenous vegetables, although these issues were sometimes discussed.

There were a number of Islamic worshippers living in the parish but they were in the minority. It is possible that because the workshops were held in the church some of them might have excused themselves from attending the workshops. We did not have the time to explore this and other issues such as whether there was a difference in the involvement of Christians and Muslims in the cultivation and use of indigenous vegetables and associated beliefs. This is

considered a significant oversight, as it is possible that some of the farming practices might be different given the different religious beliefs and practices.

There were a number of differences within the research team. Primarily it was a multidisciplinary team, the members of which had never previously worked together, and most of whom were strangers to one another. Two of the team members were brother and sister and this definitely influenced the process and in fact one of the areas we visited as part of the second study was actually their hometown. Language and cultural differences also affected the team members and sometimes misunderstandings arose. While these could have influenced the knowledge generation process every attempt was made by those involved to resolve any misunderstandings. While the team was multidisciplinary it did not really function in an interdisciplinary manner when interacting with the farmers and rural inhabitants. Very few members attempted to cross interdisciplinary boundaries and besides the application of RRA tools no common framework of interaction existed. When the team members were first introduced to one another and to the farmers no exercises were performed in an attempt to "break the ice" or to increase the cooperation amongst them.

Differences in levels of qualification possessed by the research team members tended to relate to the level of involvement in the actual fieldwork and workshop activities. The more senior team members, based on their possession of doctoral qualifications, tended to be more involved in logistical aspects than the actual generating and recording of indigenous knowledge with the farmers.

Conclusion

From our discussion in Chapter Two we can recall that conventional agricultural research is oriented towards technical and economic problem solving – this denies the complexities of rural life. Proponents of complementary methods argue that participation is required to make us aware of these complexities. Ideally participation involves more than consultation and should encourage local people to become actors in the development process rather than the instruments of somebody else's actions. The more participatory methods, such as PRA and PTD, strive for farmers and others to be actors. In such methods it is a prerequisite that the

roles of extension and research agents also change. There are a number of constraints that are evident when we attempt to utilise these ideal approaches.

Communication between extension, research and the farmers is far from simple. Local people are not exclusively responsible for creating indigenous knowledge. The nature of their interactions with outsiders also influences the indigenous knowledge that is generated and recorded. None of these groups can step outside of their own ways of reasoning and the confines of their language. To communicate what is known and showing how this is done involves interpreting the intentions of others in terms of one's own understanding. Newer tools, such as those involving greater visualisation and performances, unfortunately provide greater opportunities for interpretation rather than laying bare what people know (Cornwall *et al.*, 1994: 112). Therefore, these complementary methods are not completely free of the constraints attributed to earlier methods. This again emphasises the need to listen, observe and reflect on what we are doing, and why and how it is being done.

The purpose of research is to seek the truth. In knowledge generating processes different versions of knowledge are generated and no single version is able to provide one truth – there are rather multiple truths. However, a choice is always made and this selection becomes one of appropriateness or applicability, and is contextually influenced rather than an objective and neutral choice. Personal, professional and political beliefs override the choices researchers make, just as they override the selection of knowledge presented by the rural inhabitants. We need to be explicit about why choices are made, as this would give us a greater understanding of agricultural research and extension. Multiple truths will abound and rather than ignore them and construct our own truth the more recent complementary methods enable us to get better information and encourage us to be aware of what is inevitably happening as a result of the interactive process.

The study carried out in Gameru parish was done in an extractive manner using a populist and complementary research method. By using such a method we attempted to put the farmers first, or at least that was the theory, and we can recall from previous discussion that such methods seldom do this as completely as desired. However, by reflecting on the factors that influenced the process we are able to become aware of the constraints of generating knowledge in this manner. On the other hand the more recently developed complementary methods, such as PRA and PTD, do not offer the perfect means of generating and recording

indigenous knowledge. What they do offer us are tools which consider power relationships, differences and some external policies and influences, while making us aware that knowledge is not generated, recorded and presented in a value free manner. By using these methods we should obtain a better understanding of knowledge and the awareness of the plurality of truths. This might enable us to truly integrate indigenous and scientific knowledge.

The RRA process that was used in the study emphasises consensus seeking and general agreement with the issues discussed during the workshops. In PRA negotiation and trade-offs are emphasised to the extent that difference is actually embraced, with the understanding that variation gives us a much more accurate picture of what is transpiring than merely the general picture provided by RRA. Many RRA tools are included in PRA. Of course we must remember that many of the newer tools that are included in the PRA method, such as puppet shows and role playing are those which encourage a greater deal of participation. However, the real difference in the two methods seems to be the approach (emphasis on participation and analysis of difference) and the manner in which they are applied. The approach rather than the tools is important if one is attempting to get a greater degree of accuracy and bring about social transformation. However, this was not the purpose of this study.

If we accept that all knowledge and especially indigenous knowledge, given the information presented in Chapters Four and Five, is socially and politically constructed (Scoones and Thompson, 1994c: 26) it undoubtedly requires a socially differentiated and politically perceptive analysis to comprehend it. At present the most suitable methodology to do this would seem to be participatory and the most suitable existing methods and tools would seem to be PRA and PTD, or one of the other more recently developed complementary methods (see Cornwall *et al.,* 1994 and Guijt and van Veldhuizen, 1998). I would suggest that in future an inclusion of the Sustainable Livelihoods Framework as one of the diagnostic frameworks for analysis would be beneficial so that the local (micro) situation is understood in terms of the broader meso and macro contexts. This is akin to the maxim: Think globally while acting locally.

RRA has enabled us to realise the linkages between agricultural practices and other elements of indigenous knowledge. If we look carefully at the history of Uganda that we obtained during the fieldwork it is clear that the current circumstances in the parish, including agricultural activities and technology are a consequence of social, political and economic

processes rather than simply technological issues, although these might have a future role to play. In future we should strongly consider focussing equally on the social, political, ecological and economic dimensions of agricultural development when we focus on the technical. Cornwall *et al.* (1994: 100) inform us that we in fact make a grievous mistake if we do not do this because "[c]onceptualising agriculture as a largely technical activity obscures the social, cultural, personal and political dimensions both of rural farming practice and western agricultural science."

It is important to reflect on and understand issues of difference, power and control within rural and urban communities. This helps to understand the farmer as a social actor involved in many spheres as opposed to being solely involved in agricultural production. These other spheres of involvement might influence his / her agricultural and technical decisions more than those of his / her agricultural needs, expectations and experiences. These spheres of involvement might also influence these latter issues. It is important for us to realise and to understand why his / her life and focus does not evolve exclusively around agricultural production when interacting with research and extension officials. It is equally important for us to understand that the actions of the researchers and the extensionists are also value-laden and are subject to similar issues faced by the farmers.

The reflections on the fieldwork process emphasise that when we are attempting to generate and record indigenous knowledge we need to spend more time in an area, and be more participatory in our approaches and interactions with local residents. We also need to continually reflect on the knowledge that is generated, the methods or tools that are used and the processes whereby knowledge is generated and recorded. Given the awareness of these constraints involved in the process of generating and recording indigenous knowledge it is now important for us to consider the value of the RRA tools in terms of the objectives of the study.

CHAPTER SEVEN

THE VALUE OF THE RAPID RURAL APPRAISAL AND SOME PRELIMINARY REFLECTIONS ON INDIGENOUS KNOWLEDGE

Introduction

The previous chapter has suggested that while there has been a remarkable development in participatory methods and tools that enable us to examine the local context in which development and agricultural research take place, most of the tools do not actually consider the context in which they are developed and applied. The current criticism is that we need to reflect on this context as much as we do on the local context we are studying. To do this we need to consider developing and employing tools that incorporate greater participation. We are cautioned that even some of the more recent participatory methods such as PRA and PTD are susceptible to these criticisms if not applied carefully (Sheperd, 1998). The tools and methods, study sites, time and duration of study, etc., that we select are not value free and we must be aware of the values attached and the context in which we make our decisions in order to understand the data that is generated and recorded.

We also discussed some of these contextual issues that were ignored, but which affected the current study in Uganda. On reflection it was noted that the RRA method used in this study was susceptible to the criticisms levelled against it and other methods used in other studies. While this is acknowledged it is necessary to consider the actual value of using the RRA method and tools to generate and record indigenous knowledge as they were used in the context of the current study. It is to this issue that we now turn, as it is the core purpose of this thesis. This discussion is followed by some preliminary reflections on the concept of indigenous knowledge as a system of knowledge and the apparent defining characteristics of indigenous knowledge, based on the information generated when using the RRA method in this study.

The value of the RRA method

The tools tend toward contextualisation of knowledge

RRA has attempted to move away from the exclusive emphasis on agricultural concerns which was common to methods such as FPR and early practises of FSR. Instead it has emphasised that agriculture is only one of many dimensions of peoples' lives and livelihoods, although recognising that in an agrarian society it may well be the most important one. Despite the desire by the research team to collect more technical information on agricultural practices the tools actually enabled the collection of some knowledge on rituals, taboos, beliefs and uses of indigenous vegetables. They also afforded the collection of knowledge about local circumstances and the context in which knowledge develops. This knowledge identified links between gender roles and technical activities and indicated how socio-political changes resulted in technical agricultural changes.

The use of the RRA tools enabled the research team to obtain the technical data that was required in terms of the objectives for the first phase as well as some information relating to social and cultural issues. They allowed us to do a gender analysis that permitted the understanding of the responsibilities and rewards related to the gender group to which a resident belonged. We were able to see how income was distributed and used for various purposes by males and females. Importantly, we noted that men took responsibility for overseeing the commercial activities involved in the selling of commercial crops and livestock and that they received the income from the sales of these products while women were involved in the care of these crops and livestock.

The tools enabled us to carry out a situation analysis which provided us with the context in which the indigenous vegetables were used and cultivated. We subsequently became aware of why and how this had occurred. The value of this activity is that it pointed out that the development and use of technical practices and related decisions made by the farmers did not occur in a vacuum or on a whim but were in fact strongly influenced by a number of contextual and extraneous factors. The data captured by means of the tools is contextually relevant if we consider how certain issues presented in Chapter Four are linked to other issues in Chapter Five. We saw how the changes in one area of life affected and brought

about changes in another area which was often seemingly unrelated. For example changes in the national political arena influenced changes in the local agricultural activities. President Amin's rise to power and also the political changes in the 1990s brought about increased local production for commercial purposes. The increase in urbanisation from the 1960s onwards and the rising cost of exotic vegetables brought about a demand for indigenous vegetables in the urban areas which eventually led to their commercialisation. This increased farmers' production of these vegetables. Local livestock were decimated during the conflict of the 1980s and resulted in the farmers having very few livestock at the time of the study. This also suggested why livestock were well tended.

Throughout the discussions in Chapters Four and Five I occasionally attempt to show how various issues are related to one another. An analysis of the tools in combination with each other and the information obtained from the semi-structured interviews permit this activity. The RRA tools record the information and enable participants to make analyses and perform linkages. Unfortunately, the way in which this information is presented in the technical report and duplicated in Chapters Four and Five does not emphasise this important characteristic, rather it keeps the data in neat blocks suggesting that this is how the information is generated. At times I have attempted to overcome this conventional practice by showing the linkages and providing cross-references to some of the tools used. In order to emphasise some of the consequences of using the RRA method I have attempted to keep the information reported in Chapters Four and Five more or less in the format in which it was collected and subsequently reported in the technical project report. This is done to emphasise the criticisms levelled at the approach which collects indigenous knowledge in a fashion that allows it to be subsumed into conventional science.

While some contextualisation of knowledge was obtained by means of the RRA method a greater understanding would be possible if greater participation had been encouraged. During the workshops the tools were usually displayed on a wall or on the ground as they were developed and the data recorded. The facilitator should then have got participants to look at patterns, similarities, discrepancies and to discuss these. This discussion brings out the linkages between the information recorded in the tools and is the process of participatory analysis found in the PRA method using similar tools. This process affords a greater understanding of the context in which local practises emerge. This activity was not done optimally and in most cases the participants were not asked to comment and discuss the

recorded information. This activity is the systemic learning process that is often emphasised in PRA and similar methods stressing maximum participation. The fact that the tools were displayed during our study allowed the participants to correct the data and was an important part of the triangulation process. Again the constraints of time, experience and the size of the groups restricted our optimal use of the tools in terms of conducting a participatory analysis. The analyses were virtually all carried out later when the research team returned to Kampala each evening.

Some participation was encouraged

A single tool, such as a time line or map generated and recorded information relating to a number of diverse topics, each of which were then probed using other tools (trend lines, proportionality diagrams, transect walks, semi-structured interviews, etc.). The results from the use of one tool often suggest the following step (or tool) in the generating and recording process. This implies a systematic process, but one that is flexible to the extent it allows the participants and the facilitator to decide what step or tool should be used next and how this should be done. A rigid structure such as that evident in a questionnaire is not followed. Tools can also be used in accordance to the mood of and feedback from the participants giving them some control over, or at least influence on the process.

Certain tools encourage the participation of local people and the research team noticed that a large number of people participated in the time lines and the map exercises. In general most participation seemed to occur during the generation of information during the situation analysis. This was probably because the information discussed was relevant to almost all of those farmers and residents who were present. Consequently, they actively took part in drawing maps and recording timelines. During the large groups many people who were not doing the drawing and recording would make suggestions and corrections. During many of the discussions on indigenous vegetables we noticed that different social groups provided knowledge about different issues. This indicates that various social groups could participate. It also suggested that indigenous knowledge is more or less unevenly distributed in the parish with various people knowing about certain issues but not about others.

Like the PRA method, RRA allows for an element of participation which is increased by experienced and unbiased facilitation. While attempts were made to conduct the process in

such a manner our previous discussion on the use of complementary methods shows just how difficult this can be. Consequently, the level of participation attained did not encourage empowerment, mobilisation and social transformation. The participation achieved during the course of the study was an adaptation of Pretty's (1996) levels 3 and 5. Consultation took place during a large proportion of the time but locals did much of the organising of the information, some of the compiling of the tools and the recording of data. They also organised our meetings and daily activities. While we had certain topics and issues that we wanted to cover during the study we let them decide how and what they were going to cover during each day and each workshop session. This allowed and emphasised a more bottom-up approach to the research and development activities. The lack of any true participation was largely because of the constraints previously mentioned such as group size, experience, time and purpose of the study. A collegiate type of participation was not even considered let alone adopted during the process.

A more participatory approach might have permitted the farmers to expand on and concretise their belief of the possible relationship between current crop, pest and disease problems and the introduction of high input commercial farming practices in the 1970s and 1990s. These were green revolution type practices that were applied in areas that did not meet the requirements of the green revolution system (see Chapter One). The trend to introduce these practices into the cultivation of commercial indigenous vegetables was startling given the fact that farmers believed that these crops did not need such inputs and that they admitted not being able to afford such inputs.

Extractive by nature

The development of RRA out of the conventional methodologies and methods of the natural and social sciences is largely responsible for its extractive nature. The inclusion of the participatory research methodology and associated methods into the development sector from the 1980s onwards, resulted in the RRA tools developing a more participatory emphasis, eventually culminating in PRA, PTD and similar methods. Despite its ability to promote some level of participation RRA is a predominantly extractive method. From the previous discussion on participation and especially the reference to the analysis of the generated data the emphasis during the current study was more on its extractive characteristics rather than ideal participation with its associated long-term benefits. Its extractive nature (or at least use in this

case) is a weakness that is similar to the other more conventional qualitative and quantitative methods, although the ability of the combination of the tools to encourage a greater level of participation, their inclusion of the local context and their ability to ensure the simultaneous triangulation of data makes the RRA method more acceptable than other more conventional methods in the development environment.

Multidisciplinarity and other desirable characteristics

In Chapter Two we noted that RRA was recommended as an ideal method for rapid and cumulative contextual data collection in agriculture and other development situations, such as sanitation, natural resource management, etc. because it has the following characteristics:

- provides a flexible and systematic platform for generating and recording information;
- multidisciplinarity – in that people from different backgrounds and disciplines can comfortably use the tools;
- semi-structured – allowing flexibility of sequence and content of the information collected;
- the tools can be regularly reviewed and refined while being used;
- has the ability to explore local categories, classifications and perceptions in a way that these can be understood by both the locals and the outsiders.

The tools can be applied structurally, using any framework (such as the SLA framework), and for any topic of inquiry without any significant change in their basic structure and application. None of the tools from the other two social science methodologies (qualitative and quantitative) seem to be able to offer what the RRA method offers. During the study it became clear that while using the tools the farmers and local residents could interact well with researchers. When a tool was used and information generated and recorded then there was virtually no confusion as to what was being discussed. However, confusion occasionally arose when specific questions were asked without the use of the tools – especially during some large group discussions and some semi-structured interviews. Likewise, the researchers were also able to interact well with one another discussing and analysing the information by means of the tools. This was apparent in their interactions with each other and with the local residents and farmers. The visual nature of the tools was extremely valuable

when questions of clarity were asked based on the comparison of information recorded by means of the different tools.

Accuracy and detail

The study in the parish was an introductory study with the purpose of eliciting an overview of indigenous knowledge relating to indigenous vegetables from the parish residents and farmers. It was assumed that this activity would identify future areas for research with the involvement of those groups engaged in indigenous vegetable cultivation and use. It is argued that given the intention to do further long-term research, the research team did not require the same degree of accuracy as might be required in pure or academic research, especially research of shorter duration. The team required less accuracy and detail because they were interested in obtaining an overview of a broad range of issues relating to indigenous vegetables. At the beginning of the study we did not know whether the donor would agree to fund the subsequent phases, so the agreement was that specific detail was not required at that time. This would be collected during subsequent phases if these were funded. We wanted information that would guide us in our future research planning and make us aware of the general context in which future research would be taking place. Therefore we wanted and got relatively accurate information on various issues, including plant varieties, an understanding of local taxonomy, cultivation practises and uses of indigenous vegetables.

The reader will recall that some of the information has been left out in Tables 3 - 7 in Chapter Four. The missing information is indicated by means of question marks. This information was not collected or could not be verified during the study and provides us with some examples of the weaknesses involved in the RRA methods. Specifically, it is a relatively rapid approach and in this instance was carried out in less than five days making it virtually impossible to capture, clarify, crosscheck and verify all the information that was generated. Consequently, some oversights and gaps inadvertently occurred. The missing information would need to be collected and some other information verified at a later date during return visits to the parish. We should bear in mind that the research mandate was very broad in scope and possibly more was attempted than should have been, given the limited time period available for generating and recording this information. However, having said this I would argue that the review of the data indicates that despite the numerous constraints, the RRA tools enabled us to gather a vast amount of information in a short time about a number of topics relating to

indigenous vegetable use and cultivation in the parish. This included local circumstances, agricultural practices, how and why these had transformed in recent decades, and possible differences amongst residents in the parish. The accuracy of this data is considered to be as accurate as that collected by any other quantitative and qualitative method, save the scientific analysis of organic material and perhaps the ethnographic style of continued participant observation of practices (such as ethnography). Remember we were not interested in the exact figures, dates and facts. What we sought during the study were trends, patterns and possibilities.

A review of the data presented in Chapters Four and Five suggests that we did not obtain "thick" descriptions of the generated information as described by Geertz (1975). While the information recorded allows for the contextual integration of indigenous knowledge and the practices developed, the information is relatively thin. This situation arose out of the rapid nature of the research process undertaken in the parish. Despite this it is unlikely that we would have got this level and combination of contextualised, diverse and detailed data using more conventional quantitative and qualitative data in similar circumstances. Questionnaire surveys would have resulted in less contextualisation and diversity. Qualitative methods with their in-depth interviews and participant observation would have achieved greater depth, detail and similar contextualisation but would have required months of fieldwork – something we did not have and could not afford.

Chapter Four presents the context in which parish farmers and residents found themselves at the time of the study, including their gender roles and how they carried out agricultural practices. This shows that the RRA tools were able to obtain a large amount of information relating to these subjects at the time of the study. The information is voluminous but the question might be asked whether it is accurate. We mentioned that some of the information in the tables was missing, but this detracts from the detail rather than from the accuracy. The accuracy of the data reported in this study can be supported in at least four different ways:

1. Issues discussed in individual interviews were confirmed in group settings and other individual interviews. Group settings tend to highlight the most common tendencies and result in validation by group consensus and general agreement. This is the approach we used. Cornwall *et al.* (1994) point out that in the use of the PRA method the emphasis is different, in fact difference is embraced and the

facilitators emphasise the importance of negotiation and trade-offs. The argument is that this variation actually gives us a more accurate picture of the truth; a realisation of the possibility of multiple truths. However, in both cases it is likely that some people will agree and some will disagree and the subsequent trends will provide us with a degree of accuracy and general perception of truth. The difference in the methods becomes important if we ignore the observed and implied variations or differences which they elicit;

2. Where various tools were triangulated with one another it was possible to see where data conflicted or coincided – conflicting results were usually identified and clarity was sought. The continued use of the tools in this fashion in subsequent phases will increase the verification of the data and its accuracy;
3. Observations in the fields confirmed some of the data provided at workshops. However, given the seasonal nature of agriculture and indigenous vegetable production in particular, and the short time allocated to fieldwork it was impossible to verify all the data by means of observation;
4. Secondary resources were also used in some cases, and in particular with regard to the taxonomy and identification of plant varieties. However, samples need to be taken and expert opinion obtained.

In all social science research we are largely dependent on the respondents to inform us about what they perceive to be the truth. This is especially in instances where events have transpired before our arrival to begin the study or where we are unable to directly observe events. To a large degree, in such situations, we have to accept that they have informed us of the events, their ideas and truths both accurately and truthfully. In the current study it is suggested that while the RRA method was weak on depth and richness of the generated data, making it relatively low in terms of validity, it was high in terms of reliability. The fact that the data is considered to be reliable is a consequence of the ability of the tools to triangulate the recorded information. Successful triangulation allows us to claim the reliability of the method.

Given the nature of the RRA method - quick and extractive – the study that was carried out in Gameru parish should not be seen as an all-conclusive form of research, it is rather an introductory piece of research that provides a general context in which the studied activities took place. The information obtained was more general than specific. The process generated

some baseline data, identified certain elements of indigenous knowledge and areas for future research. All of these can be improved upon when the next phase of the research begins. Narayan (1996) explains the issue regarding the need for accuracy and detail in that the degree required of each determines the type of tools and methodologies that are used to generate and record knowledge. The participatory methodology, including the RRA tools, does not lend itself to absolute accuracy. Rather it invokes "… cost-effective trade-offs between quantity, accuracy, relevance and timeliness of information" (Cornwall *et al.,* 1994: 108). In a study where accuracy is the overriding concern then an alternative set of tools and methodology would be more suitable.

What still needs to be done to improve current accuracy and depth of the data

If researchers return to this parish to carry out further research on indigenous vegetables they will need to encourage increased participation by all involved in the future activities (ensuring greater depth of detail) and they will need to ensure the sustainability of such activities by verifying their local relevance. Their return to the area and greater participation in the lives of the parish residents will also allow them to determine the accuracy of the data that was collected and also that which must still be collected. It is suggested that to achieve this they undertake the following three activities:

1. They will need to pair-wise rank and assess the possible options for addressing a number of the identified research requirements and problems which they were unable to do during the current study. Recall that this need analysis was incomplete due to the desire to focus on the technical issues relating to indigenous vegetables. The completion of this will help to verify that identified issues are still important and whether new, and possibly more important, issues have surfaced in the interim and how these affect issues relating to indigenous vegetables. Needs, like knowledge, are dynamic and might change as circumstances change.
2. In the future, researchers will need to pay regular visits to the parish to interact and observe precisely what activities farmers are implementing while cultivating indigenous vegetables and precisely how the different vegetables are being used. This will allow further triangulation of existing and new data. At present the information reported in this study is largely based on what participants reported. A lack of encouragement of greater participation might have resulted in the farmers

reporting partial information because they did not really see the benefit of doing more than this. Given the duration of the study only a few practices were actually observed and limited detail was provided during discussions. This prevented the researchers and the farmers from attempting to assess the indigenous knowledge in terms of scientific knowledge and *vice versa*. Our short stay also prevented us from getting any useful information on the pests and diseases associated with the indigenous vegetables. This was a result of the researchers being unable to understand the actual pests and diseases that were being described. Due to their seasonal nature these pest and diseases could not be observed. Visits will have to occur at appropriate times during the different seasons and throughout the life-cycle of the plants. This will become especially important if the cultivation and utilisation of indigenous vegetables follow the current trends. If these trends persist it is likely that local farmers will become increasingly innovative, for they already carry out experiments, and the demand for their produce will put pressure on them to continue to experiment as they increasingly adapt their systems to meet the demand. This should be encouraged and the information shared. Such practises will reduce the research and extension costs of these already financially over-burdened organs.

3. During the study the researchers attempted to capture all the different names of all the different types of indigenous vegetables that were identified but it was soon realised that more time than was available was required to do this accurately. Consequently, the local classification process was identified during the study to illustrate the basis upon which it is carried out. For taxonomical purposes many of the various indigenous vegetables still need to be clearly identified and the local names recorded. We were aware that more than twenty-five different types of indigenous vegetables exist in the parish. It is also possible that when the research team returns some of the existing indigenous vegetables might be replaced with ones that were not mentioned in this study or the significance and priority of those mentioned might have changed. Actual samples need to be taken of the different plants and analysed to verify that they are in fact the species that were identified. It is possible that some plants are similar and some might be hybrids resulting in taxonomical error on the part of the scientists.

Ability to make population inferences

In Chapter Two we noted that inferences cannot be strictly made when RRA tools are used. To a large extent this inability is considered to be unimportant in this study. At no time did we intend using the data to make inferences. As we mentioned in Chapter Two the RRA methods attempt a move from the etic to the emic. Indigenous knowledge is emic and is expected to differ to some degree from one area to another, although, as we shall see below there are often similarities. Given the assumed peculiarity of its local nature the desire to make population inferences and generalisations about indigenous knowledge beyond its immediate vicinity seems unwarranted at this stage. This was reinforced by the fact that the study was to be replicated in seven other areas thereby providing us with an overview of the indigenous knowledge relating to indigenous vegetables in each of these other parishes. The fact that we sought information on specific parishes whose suitability had been identified in terms of specific criteria by the local agricultural and other officials suggested that we did not require the same degree of statistical accuracy as we might have desired in other circumstances. Similarly, given the limited knowledge we had about indigenous vegetables we would not have been able to compile a questionnaire that would have obtained the information we required at this stage. Possibly, we could have used the questionnaire developed by Maundu *et al.* (1999) but given the differences found in their study, which I discuss in Chapter Seven with regard to indigenous knowledge and indigenous vegetables, I do not believe that this would have been a good idea. We might have obtained exactly the same results as they did or found that the questionnaire was not applicable when we pilot tested it in the parishes in Uganda. The RRA tools, on the other hand, are flexible and provided us with an indication of proportions and trends rather than absolute figures or inferential statistics. This trade-off suited the purposes of the study.

What the RRA tools achieved

Despite being a very rapid and fairly extractive approach I would argue that the use of the RRA method has met the objectives of the first phase of the project. Some baseline data was obtained that can be used during later phases of the project for evaluation purposes. We obtained sufficient contextual information on the situational analysis and insights as to why this was the case. A broad overview of the indigenous knowledge, including indigenous

practices and uses, of indigenous vegetables was generated, recorded and contextualised using the tools. We have now realised that various elements of indigenous knowledge are actually integrated and do not stand-alone. The RRA tools provided us with an overview of what resources were available, which of these were used, for what purposes and how they were used. Farmers tended to use low external input practices and generally attempted not to threaten or pollute the local environment although recent use of conventional practices could prove to be a long-term threat. External inputs were sometimes used for the cultivation of commercially focused vegetables, while all other production depended on the development of inputs from locally available resources. This information is vital for any future sustainable agricultural development initiatives in the parish because the bulk of the farmers do not use external inputs due to the associated costs.

The RRA tools showed us that we are dealing with a resource-poor agricultural situation and that appropriate methods should be followed which encourage low external input practices. We noted that although both water and electricity were available, the water had to be fetched from wells and was not plumbed into each household. Similarly, there were no dams or other irrigation infrastructure and farmers depended almost entirely on dryland irrigation. Although every household was entitled to electricity most could not afford the connection costs and neither could they afford the appliances that use the electricity.

To encourage industrial and green agricultural practices in such an area without the proviso of the necessary resources and an environmental impact study would be ill-fated and be anything but sustainable. This would especially be the case if the supply of external resources was unsustainable. Local farmers achieved a lot in terms of agricultural development when the context in which this has occurred is understood.

Areas for further research and scaling-up of participatory practices

The use of the RRA tools in this study has highlighted various topics and while it has provided some information on these topics, many of them require further research in order to develop 'thick' descriptions that identify specific activities and more detailed knowledge. For example, we noted that local cropping practices prevented farmers from indicating the proportions of land that they allocated to indigenous vegetable cultivation during a single year or season. If this information is necessary to the researchers then they need to set up a process whereby

they can record this detail in conjunction with the farmers over a longer period of time. If more time had been available then this type of information could have been obtained during the course of the current study. However, given the seasonal nature of agriculture further visits would have been required in many instances to ensure that the correct information was obtained for certain seasonal practises.

It is difficult to accurately identify a pest or disease when it is not seen. The current results of the study indicate that a much more participatory approach will need to be carried out with the farmers and more time spent in the field, if the research team intends, for example, to identify the local integrated pest management strategies that the parish farmers employ for particular pests and diseases. Such an activity would require a greater analysis of the chemicals used, volumes and ratios of the applied solutions, frequency of applications, methods, timing and point of application, crop rotation, intercropping and companion planting patterns, etc. As Grenier (1998) has suggested, the RRA method provides a quick insider view and has indicated to us what information still needs to be generated and where more detail is required if it is important to future development activities. The manner in which the tools were used in this study was very rapid, so it was recommended that during the course of the programme or project, further detailed information would need to be obtained by means of using participatory methods for a much longer period. This will increase the accuracy and the depth of the data by allowing researchers to probe and crosscheck, which is important to ensure that the farmers and researchers are talking about the same issues and objects. It will also allow for empowerment and social transformation if this is what local people desire.

To overcome the constraints apparent in the study and to build on what has been achieved by the study a few suggestions can be made with regard to future research activities. Farmers and local people have a vast amount of knowledge on indigenous vegetables. Future research should look at adding value to this knowledge by identifying good and bad practices. The indigenous knowledge needs to be assessed so that improvements can be made if necessary and to include scientific developed practises where they can improve on local practises without disrupting other areas of local life. Certain ‘improvements’ might not be culturally or socially acceptable and consequently might be rejected outright or even worse they might cause irreparable social harm. To this end it is argued that researchers must implement most of the subsequent phases of the proposed research on the diversity of indigenous vegetables in collaboration with the farmers in their parish and in some instances

carry out parallel processes on-station, with the agreement of the farmers. This will allow for the more scientific activities to be done, such as lab analysis, breeding and their subsequent report back to the farmers.

At the same time the farmers, where they are interested, and this is probably of greater significance to the commercial farmers, can carry out research on their farms in conjunction with researchers in the form of participatory technology development. This should increase the likelihood of solutions being found for local problems affecting indigenous vegetables. Research done in this manner allows farmers a large proportion of control over the research process and ensures that it concentrates on local issues. It can become a collegiate experience. The majority of the farmers in Gameru parish were poor and seemed to produce indigenous vegetables for household consumption so researchers need to ensure that they collaborate with farmers in this parish who can afford (in terms of the risk to their production activities and livelihood sources) to carry out future research with them.

In conclusion the use of the RRA method and tools to generate and record indigenous knowledge in this parish was found not to be the most appropriate method that could have been used. However, given the constraints and various factors that affected the project it was considered to be a satisfactory method. Its use can be further improved and strengthened if more participatory methods are used in the implementation of subsequent phases of the project on the diversity of indigenous vegetables. Despite the weaknesses of the RRA method as it was used in this study the information relating to the indigenous knowledge that is presented in Chapters Four and Five is able to afford us the opportunity to reflect on the current debate on the concept of indigenous knowledge, adding value to our understanding of indigenous knowledge. From the recorded indigenous knowledge and our reflection of the concept we will be in a better position to understand the importance of generating, recording and understanding indigenous knowledge in agricultural development research, especially with regard to sustainable agricultural practices. The data collected in the current study is able to increase our understanding of what we are talking about when we use the concept of indigenous knowledge. It is to some provisional reflections on indigenous knowledge that we now turn.

Provisional reflections on indigenous knowledge

Current perceptions of indigenous knowledge

The information on indigenous knowledge generated by means of the RRA method and tools used in this study allows us to provisionally reflect on the current debate surrounding the concept of indigenous knowledge. Until recently conventional science has generally either ignored indigenous knowledge or has incorporated aspects of it into the dominant scientific knowledge (Scoones and Thompson, 1994a). A result of the latter practise is that indigenous knowledge has often been reified and treated as a stock of knowledge from which desirable technical elements can be selected and subsumed into conventional science. In Chapter Six it was suggested that this activity ignores the actual complexity of indigenous knowledge. The fact that it is a system made up of various dimensions, such as spiritual, social, political, economic, etc. is subsequently overlooked.

A second issue that is becoming much debated is the understanding of what is meant when some thing or knowledge system is referred to as indigenous. Some people emphasise that it refers to objects or knowledge that are unique to a particular culture, geographically located group or society (Warren *et al.,* 1995). Others emphasise that it must also include some element of origin in a particular geographic area or at least a lengthy period of existence and use in the particular area, while being able to include elements of knowledge from outside the area (Kotschi *et al*., 1990). Langill (1999) reports that indigenous people are generally considered to be the original inhabitants (in reality they are most probably descendants who claim that their ancestors were the original inhabitants) of a specific geographical area, who have a system of knowledge, belief or culture that is distinct from that of the dominant system of knowledge (scientific knowledge). This implies that the indigenous knowledge identified in one area would be distinct from that used by a different group of people located in another geographic area.

From these statements the notion of indigenous seems to refer to knowledge with the following characteristics:

1. originating or at least existing in a specific area for many years, even generations or centuries;
2. uniqueness to a specific culture, society or group;
3. located exclusively within a specific area; and
4. the ability to include external elements.

Using the information obtained during the study of indigenous knowledge relating to indigenous vegetables in the parish I will now provisionally reflect on the concept in terms of:

1. the system of indigenous knowledge; and
2. the indigenousness of indigenous knowledge
3. internalising knowledge;
4. considering indigenous knowledge as local knowledge.

Indigenous knowledge as a system

A system can generally be understood as any pattern of relationships between the different elements that make up a whole. It is sometimes believed that this whole can have its own set of properties over and above those of the individual elements that form part of it. However, Giddens (1979) has argued that the actions of social actors (local residents) actually determine the properties of the system and that these properties are not independent of the actions. In other words, without the actors there would be no system. It is in fact their actions which give rise to the system or the appearance of a system. Different actors and their actions result in the characteristics that distinguish different systems from each other. Systems tend towards equilibrium but this does not imply that they are static in the Parsonian sense. I would suggest that the opposite is in fact true and that in their attempts to achieve equilibrium the systems are in a constant state of flux in which they include, adapt, adopt and expel internal and external elements as their social actors deem fit. These decisions can be a result of both internal and external factors. For rural people, and probably for all societies and groups, equilibrium means survival.

When discussing indigenous knowledge Grenier (1998: 3) makes the following statement suggesting that indigenous knowledge is a system of knowledge:

> "The development of IK systems, covering all aspects of life, including management of the natural resources, has been a matter of survival to the people who generated these systems."

If Grenier (1998) is correct then the implication is that indigenous knowledge is a system and that people continually strive for survival. As a result the systems they develop tend towards equilibrium by attempting to ensure the continued survival of the system and its actors. Striving for survival will, out of necessity, bring about changes in parts of the system as they adapt to internal and external changes and influences. This continual striving for survival suggests constant flux and supports the idea that systems are dynamic rather than static.

At times indigenous knowledge has been shrouded in a technocratic veil by being referred to only in terms of its technical dimension (see Mettrick, 1993). The emphasis on the technical has (conveniently) excluded the other dimensions, specifically the social and political. Some agricultural development professionals (Mettrick, 1993; Scoones and Thompson, 1994a; Grenier, 1998; Langill, 1998) refer to indigenous technical knowledge (ITK) but stress that the current trend is to consider indigenous knowledge in a very broad sense, which includes indigenous technical knowledge as being one of many elements or dimensions of indigenous knowledge. The initial emphasis on indigenous technical knowledge was probably a result of the importance that conventional agricultural science placed on the technical aspects of agrarian practices and other technical aspects of indigenous knowledge instead of other dimensions such as social, political, spiritual, economic, etc. Rather than considering indigenous knowledge as an integrated whole and placing their emphasis on identifying the different dimensions and how these interact and complement one another, conventional scientists generally prefer to follow an atomistic approach and attempt to understand the different parts separately, denying any real integration between the parts. The change to thinking about indigenous knowledge as an integrated system, leading us to use the term in a more inclusive manner, is the result of the awareness of the importance of all dimensions of the system, i.e., the technical knowledge is actually devalued if it is separated from the other dimensions and denied any causal or integrated relationship with them. As Cornwall *et al.* (1994: 100) remind us:

> "Conceptualising agriculture as a largely technical activity obscures the social, cultural, personal and political dimensions both of rural farming practice [or indigenous knowledge] and western agricultural science."

The technical cannot be separated from other aspects of indigenous knowledge. Unfortunately, the largely atomistic approach followed in the generation and recording of indigenous knowledge resulted in it being reified. Subsequently, it became easier to put the information into separate categories, denying the stronger links and overlaps between the different dimensions that make up the system.

The awareness of the integration of all dimensions of indigenous knowledge has resulted in it now being considered as cultural knowledge in the broadest sense, including the social, spiritual, political, technical and economic dimensions of the local way of life (Langill, 1999). These dimensions need to be understood in terms of their relationships to one another within the dynamic system of indigenous knowledge. We have heard that to do otherwise will devalue the knowledge and make it incomplete. The current study indicated that the indigenous knowledge generated during the study in Gameru parish actually involved numerous aspects of daily life that were intertwined with the agricultural practices and technical knowledge relating to the production and use of indigenous vegetables. From the information obtained during this study the following examples illustrate the intertwined nature of the relationships amongst the different dimensions:

- Certain vegetables are used at specific social occasions to signify respect to special guests. This gives these vegetables further meaning and value beyond that of other foodstuffs;
- Social differentiation indicates who has access to what resources and to which agricultural crops, indigenous vegetables and livestock. It also indicates who directly benefits from these resources and produce;
- There is some differentiation in the technical practices involved in cultivating and using indigenous vegetables and there are some beliefs and taboos integrated with these practices for specific varieties;
- Different vegetables have different economic values and significance for different genders and local groupings;

- Different production practices are applied to vegetable varieties that have commercial value in comparison to those which are produced for household consumption;
- There is a suggestion that politics or at least local practices of social differences have a role in determining who has access to which indigenous vegetables (and other crops and livestock) and possibly what knowledge they subsequently possess about certain vegetables.

The RRA method and tools allowed us to understand the context in which the knowledge we encountered in the parish developed. The combination of the situation analysis data with the other elements of indigenous knowledge indicate that it is in fact a system of knowledge in which various elements are changed by the social actors as they or the elements are influenced by internal and external factors. We can recall that President Amin encouraged Ugandans to farm for commercial purposes. The subsequent inclusion of exotic vegetables for commercial production into their agricultural activities was a result. When the commercial demand for indigenous vegetables developed commercial farmers generally applied the commercial practices of monocropping and the use of external inputs to the commercially produced indigenous vegetables. However, they were not applied to those varieties grown for household consumption. Those farmers who produced almost exclusively for household consumption also did not use these practices. In what appears to be a contradiction, some commercial farmers said they used such practices in attempts to reduce the increased problems with the pests that were believed to be a long-term consequence of the adoption of these practices for the cultivation of exotic vegetables during the 1970s and 1980s. Consequently, to deny the integrated and systematic functioning of indigenous knowledge is to devalue it, underestimate its significance and fail to truly understand it. The situational analysis that we carried out in the parish provides us with examples why we cannot ignore that the identified knowledge is a system of knowledge. Simultaneously, the information also suggests that changes in the context bring about changes within the knowledge system.

So far our discussion has concentrated on the interrelationship of dimensions such as the technical, cultural, social, political, economic, etc. However, I would like to propose that based on the provisional information obtained during the study there exists another set of components that form part of indigenous knowledge and which cut across these dimensions. They are entwined with these dimensions and with themselves. These components are the

beliefs (theories and hypotheses), *practices* (actions) and *objects* (things, icons, implements, animals, plants, etc) that along with the various dimensions make up the system of indigenous knowledge to which a group of people have access. Based on certain beliefs people apply certain practices to specific objects. The outcomes of these practices might result in people formulating new beliefs, strengthening their current beliefs, adopting new practices or continuing with existing practices. They might even result in the eventual exclusion of the object. It is these components, which are found in each of the dimensions mentioned, and which bring about the interrelationships between the various dimensions that form the system of knowledge.

From the study indigenous vegetables, exotic vegetables and animals can be seen as examples of *objects*. The manner in which local residents produce these is considered to be their *practices*. The decisions why these practices are carried out are based on the *beliefs* (theories and hypotheses) of the farmers and local residents. If we move away from the technical agricultural dimension to the social dimension we see that the idea of components in the form of objects, beliefs and practices applies equally to the taboos relating to the use of some indigenous vegetables. It also applies to the reasons why residents replaced some indigenous vegetables and why these are now becoming extinct. Similarly residents believed that some indigenous vegetables had certain medicinal properties if prepared and consumed in a specific manner and administered for a specific ailment. In the Ugandan study indigenous vegetables and some associated beliefs and practices cut across a number of dimensions. Information presented in Chapter Five suggested that some agricultural objects and practices were associated with a particular gender and that the gender analysis indicated that these were possibly linked to social differentiation beliefs and practises.

The indigenous within indigenous knowledge

The proposition that indigenous knowledge consists of a combination of objects, beliefs and practices is useful when making provisional reflections on what the information from the study can inform us about the current understanding of indigenous knowledge. Indigenous knowledge is generally attributed with having the following characteristics (adapted from IIRR, 1996; Grenier, 1998; Langill, 1999):

1. origin in a specific area;

2. duration of use over a long period of time in a specific group or area
3. uniqueness or exclusiveness to a specific culture, society, group or area; and
4. ability to include external elements.

The question we need to ask ourselves is do all three components of indigenous knowledge (objects, beliefs and practices) exhibit each of these characteristics? If they do not, then what should we understand the term indigenous to mean? The study in the parish provides us with some information that allows us to reflect on this issue and again make tentative suggestions regarding our understanding of indigenous knowledge. This is discussed in terms of how the provisional data from the study relates the presumed indigenous knowledge characteristics of origin, duration, uniqueness or exclusiveness, and the ability to internalise external elements to the three components of knowledge: objects; practices and beliefs.

* *Objects*

In an attempt to identify the probable areas of origin of the indigenous vegetables I obtained the common and scientific names of twenty-four out of the twenty-five identified indigenous vegetables from fellow researchers. Based on their species name, I identified the probable areas of origin of twenty-four of the vegetables. These are included in Table 18.

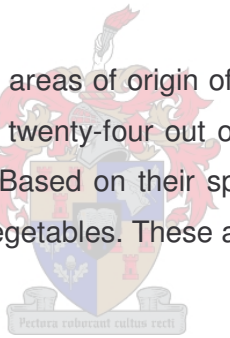


Table 18
A list of twenty-five indigenous vegetables available in the parish and their possible areas of origin

List Indigenous Vegetables	Common Name	Scientific Name	Grown / Wild	Gender Responsible	Reason Why	Known or Presumed Origin
Doodo	Amaranthus	*Amaranthus blitum*	W	Neither	Household	Mexico / Central America
Ebugga	Amaranthus	*Amaranthus dubius*	G	M/F/c	Market	Mexico / Central America
Ejobyo	African spider-flower	*Cleome gynandra*	W/G	F/M/c	Market/ Household	Central and South America
Ensuga	Leaves of Nightshade / wonderberry	*Solanum nigrum Complex*	W	Neither	Household	Uganda?
Nakati	Leaves of the African Eggplant	*Solanum aethiopicum*	G	F/m/c	Market	Uganda
Entula enganda	Biter berries or tomatoes of the African Eggplant	*Solanum aethiopicum gilo*	G	M/f	Market/ Household	Uganda
Enyanya entono	Small tomatoes	*Lycopersicon esculentum*	W	F	Household	Central America
Emboga enganda	Amaranthus	*Amaranthus sp.*	W - but not readily available	Neither	Household	Mexico / Central America
Obiyindiyindi	Lima beans	*Phaseolus lunatus*	G	F	Household	Central and South America

Table 18 (Continued)

A list of twenty-five indigenous vegetables available in the parish and their possible areas of origin

Ekigaga	Leaves of Lima beans	*Phaseolus lunatus*	G	F	Household	Central and South America
Enkolimbo	Pigeon peas	*Cajanus cajan*	G	F	Household	India
Empande	?	*Erucastrum sp.*	G	F	Household	?
Ensuju	Young pumpkin fruit	*Cucurbita maxima*	G	F	Household	South America
Esunsa	Green leaves of pumpkin plant	*Cucurbita maxima*	G	F	Household	South America
Egobe	Cowpeas	*Vigna unguiculata*	G	M/f	Household/ Market	Southern and Eastern Africa
Etimpa	Cocoyam leaves	*Colocasia esculanta*	G	F	Household/ Market	South Asia
Enderema	Malabar Spinach	*Basella alba*	W	F	Household	South Asia
Emboge	Amaranthus	*Amaranthus graecizans*	G	F	Household	Mexico / Central America
Obutungulu	Onion bulb	*Allium cepa.*	G	F	Household/ Market	Near East / Central Asia
Elinyebwa	Groundnuts	*Arachis hypogea*	G	M/f	Household	South America
Ebijanjalo	Common green beans	*Phaseolus vulgaris*	G	M	Household/ Market	Central and South America
Empinde enganda	Cowpea pods	*Vigna unguiculata*	G	F	Household/ Market	Southern and Eastern Africa
Obutungulu obuganda	Leaves of onion plant	*Allium cepa*	G	F	Household	Near East / Central Asia
Komurali	Hot or Chilli Pepper	*Capsicum frutescens L.*	W	F	Household	Mexico / Central America
Ebisiboza	Leaves of the common green bean plant	*Phaseolus vulgaris*	G	F	Household	Central and South America

? = The name is unknown or precise identification was impossible because of the season when the research took place
G = grown/cultivated by farmers
W = mainly found in the wild/reproduces itself
M = male
F = female
C = child
Lowercase letters indicate that the role of that particular sex or age group is less for this activity
Combined uppercase letters indicate that the activities are more or less equally shared
Note: The scientific names were provided by Ugandan colleagues and the identified origin of the various species was obtained from Raemakers (2001) and USDA ARS (2003).

Table 18 indicates that virtually all the indigenous vegetable species identified by parish residents actually originated outside of the African continent. Only two or possibly three (Ensuga - *Solanum nigrum,* Nakati - *Solanum aethiopicum* and Entula enganda - *Solanum aethiopicum gilo*) seemed to originate in Uganda or East Africa. Egobe and Empinde enganda (respectively the cowpeas and cowpea pods of *Vigna unguiculata*) have at least one source of origin as being in East Africa and the other in Southern Africa (Raemakers, 2001). The presence of the other indigenous vegetables in Africa is interpreted as a result of the exchanges made during the slave trade, and the supply stops and trading patterns of the Arab, Spanish, Dutch and Portuguese traders and explorers, during the past 800 years (Raemakers, 2001). Those indigenous vegetables originating in the Americas are believed to

have arrived in Africa during the past 500 years. This information suggests that it is unlikely that most of the indigenous vegetables originated in the parish.

This raises the question as to what is the time-span for the incorporation of a certain object (such as a vegetable crop) practise or belief to enable it to be called indigenous? Parish residents said that most of the vegetables that they identified as indigenous seemed to have been cultivated in the area as far back as they can remember – approximately seventy years. However, two of the varieties of indigenous vegetables (Elinyebwa - *Arachis hypogea* and Enkolimbo - *Cajanus cajan*) identified by parish residents were actually the most common varieties currently cultivated extensively throughout the world for both household and commercial purposes (ICRISAT, 1995) and suggest a more recent inclusion into the foodstuffs of the parish residents.

Waters-Bayer (personal communication - 13 May 2003) believes that given the dynamic nature of indigenous knowledge there can be no time-span that allows one to make the statement: before this time it is "indigenous" and after this time it is "recent". She believes that the issue is not duration but rather whether or not it has been internalised into the local practises and beliefs of a group of people in an area, i.e. in a specific context. To substantiate her position Waters-Bayer (*ibid.*) explains the indigenous knowledge relating to soybeans she encountered amongst a group of Nigerian farmwomen:

> "[They] had indigenous knowledge of how to grow soybeans and process them into a locally popular condiment, although soybeans had been introduced (not to them and not for that purpose) only a few years before. The women had observed and experimented [with the soybeans] on their own and had developed their own ways of processing soybean. They made quite clear distinctions between their "local" varieties of soybeans and those that were being introduced by the extension services. Strictly speaking, all the soybeans originally came from outside, but one set of knowledge (and varieties) of soybeans had become internalised into their local knowledge system, and the other had not (yet – or might never – time will tell)".

This implies that the duration of use is probably not as significant as the actual inclusion into other local practices and beliefs.

With regard to uniqueness we can see from Table 18 that many of the indigenous vegetables identified by local residents are found in other parts of the world. Indigenous knowledge studies, from around the world on the uses of plant varieties, which were identified as indigenous vegetables in the parish, indicate that similar varieties are grown in other parts of Africa for similar purposes (Dupriez and De Leener, 1989; Chweya and Eyzaguirre, 1999; Maundu *et al.*, 1999; Raemakers, 2001). This data suggests that the objects that form part of indigenous knowledge need not be unique to a particular area.

The preceding discussion on origin also suggests that external objects can be included into local systems of knowledge for upon closer inspection it appears that very few of the indigenous vegetables probably originated in the parish or even in Uganda. An interesting example of a more recent inclusion is the case of Emboge (*Amaranthus graecizans*). Residents believed that Emboga (*Amaranthus spp.*) brought about bad luck in certain instances. This resulted in it being almost completely replaced with Emboge a species that did not have any taboo associated with it. As indigenous knowledge changes it can incorporate other objects to fit into its system. An alternative to Emboga was required so the use of Emboge was internalised into the local food culture and is prepared and consumed in the same fashion as Emboga, but excludes the restrictions associated with Emboga.

Our study in Gameru parish provides little evidence to suggest that the vegetables or objects identified as indigenous actually originated in the area. Nor is there evidence to suggest that their presence needed to be of a fairly long duration. The information obtained during the study does not suggest uniqueness of the vegetables to the parish. However, it does suggest that external objects can be internalised when they meet local needs.

* *Practices*

The information obtained from the parish residents suggests that in certain circumstances original practices or at least those of a very long duration are used while in other circumstances external practices are used. Farmers indicated that they developed their own practices on how to cultivate indigenous vegetables. Some of these strategies have evolved out of local decisions taken with regard to local circumstances. Other practices are the direct result of external practices being included into the local system of knowledge or the direct influence of external circumstances. Richards (1985) has argued that the inclusion of external

practices or the development of new ones can actually take place in the recent past and need not be those that have a long history of use in a specific area. In the 1970s President Amin's policies encouraged the introduction and production of exotic vegetables for commercial purposes. Local farmers acknowledged generally using conventional practices to produce commercial exotic vegetables as these practices had accompanied the introduction of exotic vegetables. With the commercial demand for indigenous vegetables increasing since the 1970s, local farmers who produced the four most popular indigenous vegetables for commercial consumption experimented with the use of conventional agricultural practices. Examples of such practices include the practice of small-scale monocropping and the occasional use of external inputs, such as synthetic agrochemicals. They identified these practices as being external, but nevertheless used them when they could. Sometimes farmers used these practices in conjunction with locally developed practices. In contrast farmers exclusively practised mixed or intercropping and used locally derived pest control strategies when cultivating indigenous vegetables for household consumption. Residents considered these latter practices to be locally developed and based on local circumstances.

Commercial production also brought about the practise of uprooting some of the leafy indigenous vegetables when the farmers harvested them. To facilitate sales, packaging and transportation to the market they uprooted the entire plant and tied it into bundles, which were sold at the market. In the case of leafy indigenous vegetables produced for home consumption the farmers continued to only pluck-off the leaves when harvesting. This allowed the plants to grow until the season was over or no more leaves were produced. These two examples illustrate how internal use, and external demand and subsequent commercialisation have resulted in different sets of production and harvesting practices – one for commercially oriented vegetables and one for those produced for household consumption.

In a brief comparison of some of the findings recorded in the study by Chweya and Eyzaguirre (1999:3,4) on the biodiversity of traditional leafy vegetables in Western, Central, Eastern and Southern Africa it is clear that farmers in different countries carried out similar consumption practices for similar varieties of indigenous vegetables. Parish residents also seemed to follow the same practices for similar varieties. African spinach type plants, whose leaves are consumed, included *Amaranthus spp.* and *Solanum nigrum*. In this parish these were identified as Doodo, Ebbuga, Emboga enganda, Emboge (all *Amaranthus spp.*) and Ensuga (the leaves of *Solanum nigrum*). The study by Chweya and Eyzaguirre (1999) also

identified multipurpose species such as cowpea (*Vigna unguiculata*), cocoyams or wild taro (*Colocasia esculanta*) and pumpkins (*Cucurbita maxima*) of which both the leaves and the fruit were consumed. In Gameru we found a similar trend for these species which were consumed as Empinde enganda (cowpea pods), Egobe (dried cowpeas), Etimpa (the leaves of the cocoyam whose fruit and roots are eaten in other parts of Africa, but were not identified as indigenous vegetables during this study), Ensuju (the young pumpkin fruit) and Esunsa (the green leaves of the pumpkin plant). This similarity in the specific uses of similar plants in different areas suggests that indigenous knowledge does not consist entirely of practices that are exclusive or unique to a particular locality but can consist of practices that are carried out elsewhere. Any distinct variations of these practices might be associated with the local circumstances of each different area. It is also likely that there is actually a limit to the number of variations in practices that can be carried out when consuming a particular plant. It only has so many characteristics and properties that can be exploited as a foodstuff, putting a limit on consumption practices and uses. Similar contexts probably result in similar practices.

Seed storage practices differed slightly between the Kenyans and the Gameru residents. The Kenyans tended to use tins and polythene bags and papers (Maundu *et al.*, 1999), while the parish residents used tins and plastic containers or glass jars. The experiences of the residents in Gameru led them to believe that polythene bags were problematic and they did not use them for storing seeds. The Kenyans did not use banana fibres, which, although seldom used in the parish due to their inability to store vast quantities of seeds, Gameru residents considered them to be a very good means of storage. They were believed to keep the seeds dry without having to repeatedly carry out drying activities in between the seasons. Therefore, the parish residents made a trade-off in terms of space requirements and a superior method of storage.

In both Gameru parish and Kenya the most preferred indigenous vegetables were sold commercially although these were not necessarily the same varieties (Maundu *et al.*, 1999: 77). In their study of the biodiversity of indigenous vegetables in Kenya, Maundu *et al.* (1999) found that males tended to assume greater responsibility for exotic vegetables and other commercially oriented crops. Men also opted for less labour intensive indigenous crops such as *Cleome gynandra* and *Solanum nigrum*. Table 18 shows us that a similar pattern emerged in Gameru parish for *Cleome gynandra* (Ejobyo). In the case of *Solanum nigrum* (Ensuga) neither males nor females assumed responsibility, as it usually grew as a volunteer crop.

Consequently, this indigenous vegetable had no commercial value in this parish. This example stresses the nature of discrete differences that are evident in the indigenous knowledge about similar things in different areas. It is these discrete differences that distinguish indigenous knowledge in one location from that in another location, making the knowledge and practices distinct and resulting in them being termed indigenous.

The information from the study indicates that some practices might be original or at least of relatively long standing duration. Others might have been practised for a much shorter duration but are original to that specific area in that they were developed there. There is also a suggestion that the incorporation of new practices brings about changes in other related practices. Changes in existing practices and the inclusion or adoption of new ones seem to be strongly affected by internal and external factors that influence the local context. Practises relating to consumption and use of indigenous vegetables in different areas indicate that they are neither exclusive nor unique to these people or areas. However, some of these practises and those relating to seed storage and crop sales indicate a few discrete differences. This implies that the context in which the practises are used probably determines their difference.

* *Beliefs*

Local residents and farmers held a number of beliefs regarding the cultivation and use of indigenous vegetables. Different groups in the parish sometimes held different beliefs about similar activities and consequently used different practices. Commercial farmers believed that conventional agricultural practices might be superior when carrying out commercial production. This belief was based on the assumption that such practices were important for commercially grown crops and had initially reduced the effects of pests and diseases when first introduced along with exotic vegetables in the 1970s and 1980s. Although farmers were not experiencing any significant results with the conventional practices at the time of the study, they did not indicate that they intended stopping the use of these practices. In fact they indicated that one of their problems was a lack of finances to purchase sufficient agro-chemicals. They believed that more agrochemicals would probably solve the problems. While it is likely that the use of these practices will continue amongst the farmers who cultivated vegetables for commercial purposes, it is uncertain whether they will become widespread or even be used on a regular basis. Farmers were interested in finding out more about both these and organic practices. The suggestion is that farmers were looking for another or at

least improved practice. The market in Kampala seems to demand that organic practices be followed as close as possible so it is probable that a practice that meets the market requirements and also the farmers' circumstances will emerge. Commercial farmers were able to incorporate recently introduced beliefs about conventional farming methods.

The commercial farmers had some other beliefs why these conventional practices were beneficial. When used correctly agro-chemicals tend to reduce the labour intensity involved in crop production. In economies of scale they might reduce costs, as less labour is required and more time is available for other activities. According to some farmers this is what initially happened when the conventional practices were introduced. Possibly, due to the fact that men assumed greater responsibility for the production of all commercial vegetables they tended to use synthetic agro-chemicals, as these made the work easier when used correctly and the extension services recommended their use for conventional commercial crop production. While the use of synthetic agrochemicals was not common practice to all the parish farmers, there was a tendency amongst the commercial farmers to use them as they used the same chemicals for the exotic vegetables.

Parish farmers increasingly observed the negative effects of pests, diseases and weather conditions in recent years. They believed that these (with the exception of the weather) resulted from the introduction of more conventional practices that were unsuitable to the local circumstances and negatively affected the balance of nature. Some farmers believed that the older cropping practices such as intercropping systems had previously reduced the effects of some pests and diseases. Similarly, they believed that the practices of storey cropping and crop diversification had reduced the effects of crop losses due to weather damage such as rain, heat and wind. The belief in these older practices was widespread and they were extensively used. Commercial farmers tended to use these practices in conjunction with conventional practices.

Based on their experiences residents believed that indigenous vegetables grew well in the area and required little care in comparison with exotic vegetables. Farmers and parish residents pointed out that generally the indigenous vegetables were hardier and more tolerant of the local conditions. They practised mulching and the use of cover-crops extensively with all crops except indigenous vegetables as most farmers reported that such practises had no

effect on indigenous vegetables. On the other hand farmers believed that mulching was effective when used with exotic crops and such use was visible during all the transect walks.

If we compare the beliefs of the residents of the parish with those of the United States Department of Agriculture we see that the USDA has declared Ejobyo - *Cleome gynandra*, Ensuga - *Solanum nigrum* and Etimpa - *Colcasia esculanta* noxious weeds in some states (USDA, 2003). None of these plants have their origin in the USA and only Ensuga might have its origin in Uganda. The parish residents considered these varieties to be essential foodstuffs and important to household food security and survival. It would be interesting to find out if any US residents actually consume any of these varieties, either now or in the past, and if they did what parts of these plants they consumed. The study by Chweya and Eyzaguirre (1999) reported that these same plants were also used as foodstuffs in other African countries. These examples suggest that in different locations there are sometimes differences and similarities in the beliefs surrounding similar plants and their uses.

These examples suggest some interesting points regarding beliefs and the characteristics of indigenous knowledge. Within a specific area it is possible that different groups can hold diverse views about specific practices or objects. This implies that local beliefs are not unanimous to all local people. Similarly, farmers are capable of including beliefs from outside areas into their own system of knowledge where they are believed to be suitable and do not necessarily reject these beliefs when the associated practises appear to become increasingly ineffective. The duration of beliefs can be of both short and long duration. Beliefs can appear to be unique and also original to a specific group or area but comparisons with other areas suggest that there are similarities and differences.

The information obtained during the study indicates that the three components do not all have to exhibit the characteristics of origin, duration, uniqueness or exclusiveness, and the ability to internalise external elements for knowledge to be considered indigenous. In fact the information obtained from the study suggests that indigenous knowledge is not necessarily original or exclusive to a specific area, it is seldom unique and often it has been practised for a short period of time. It is also able to include external elements.

Indigenous knowledge, including objects, practises and beliefs cannot entirely be considered exclusive to a particular area or group of people. Similarly it cannot be considered to be

knowledge in its original state as it is unlikely that any knowledge in the world can remain unchanged. Rather, it is the few discrete differences that make it distinct from other systems of knowledge about the same subject which give it an exclusive and unique appearance. These differences regarding the same subject are a result of the different contexts in which the subject is found. It is possible that differences are sometimes exaggerated by the people themselves in order to stress distinctness and claim exclusiveness or uniqueness of their beliefs, practices and objects. This is often used to support certain claims to various rights and abilities. In recent years the use of the term indigenous has become highly politicised (see Vail, 1989).

Based on the information discussed in the two preceding sections the suggestion is that it is possibly the combination of the various beliefs, practices, objects and dimensions within a specific context by a group of people located within that context which distinguishes a system of knowledge from other similar systems of knowledge. This combination is contextual and gives the knowledge system its indigenous or distinctive flavour.

When is external knowledge internalised?

One of the issues that is ignored by the discussion on objects, practices and beliefs is when and how do local people actually decide that knowledge (or one or all of its parts) is now part of the system of indigenous knowledge? The preceding discussion on the components and characteristics of indigenous knowledge improves our understanding of what is meant by indigenous knowledge by illuminating some of the inconsistencies within the characteristics, but it simultaneously attempts to simplify a rather complex issue. By doing so it faces the charge of becoming positivist and allows us to place our own interpretations on what residents and farmers have said. Consequently, the complex issue of what parts of the knowledge system are internalised, why and when this happens, and by whom, needs to be given some attention. Following Waters-Bayer (personal communication – 13 May 2003) I understand the concept of internalisation to mean that people consider something to be their own and use and recognise it as if it was their own, irrespective of whether it was known to originate elsewhere or is used elsewhere. This is done if and when it meets their requirements. Unfortunately the results of the study in the parish only permit a provisional discussion of this issue. Consequently, it revolves mainly around objects (indigenous and exotic vegetables) rather than beliefs and practices.

The production of exotic vegetables in the parish and the use of their associated conventional practices in the cultivation of indigenous vegetables is a good, but complex example when considering the issue of internalisation. The study shows little evidence to suggest that residents actively internalised exotic vegetables into their local beliefs and practices beyond the agricultural dimension, despite these vegetables being an integral part of the local knowledge relating to the agricultural production systems in the parish. For example the need to maximise the use of their land resulted in farmers not carrying out the recommended resting of their soils when cultivating exotic vegetables. Therefore, the inclusion and cultivation of exotic vegetables into their agricultural activities tended to have negative effects on the soil. As a consequence of local experimentation commercial farmers realised that when they rotated specific indigenous vegetables with exotic vegetables this improved the development of the plants because the one variety replaced the nutrients into the soil which the other variety had removed. Farmers indicated that they rotated green beans (*Phaseolus vulgarus*), Ebugga (*Amaranthus dubius*), and tomatoes (*Lycopersicum lycopersicon*). Farmers believed that this practise improved the soil nutrient content. Despite the inclusion of exotic vegetables into this practice, the practice is considered to be indigenous or local because the farmers developed it locally. Parish residents used the expression – *"amagezi gaffe agawano"* which means "what we know and do locally" during discussions. The expression *"amagezi amalongoseemu"* meaning "improved knowledge, information, technology" was used to contrast local knowledge with scientific knowledge (Prossy Isubikalu, personal communication – 10 September 2003). However, residents did not explicitly distinguish local practices or knowledge that had elements of external or scientific knowledge in them from those that did not. The implication is that any locally derived amalgamation of objects, practices or beliefs is part of local knowledge, irrespective of whether or not it contained external components

The lack of active internalisation of exotic vegetables in their socio-cultural practises was in spite of their significance as an important livelihood source in the form of income. Local farmers grew and sold the exotic and some of the indigenous vegetables for commercial purposes. They pointed out that they grew more exotic vegetables than indigenous vegetables, even when they included indigenous vegetables grown for household consumption. The transect walks verified this statement. Despite the obvious significance of exotic vegetables the farmers still distinguished between exotic and indigenous vegetables.

Farmers identified some other crops which might provide some clarity as to their application of the term indigenous. These crops were traditional food and traditional cash crops (see Tables 5 and 6). Farmers and residents tend to use the words traditional and indigenous to indicate a similar state of affairs. Their use of the term here suggests that the duration of cultivation in the parish is important but being considered to be indigenous or traditional also implies that it is also locally consumed. Virtually all the residents said they consumed some of the traditional cash crops although most of these crops are sold. However, very few local people reported consuming exotic vegetables. Here the implication is that if it is locally consumed and has been cultivated in the area for a number of decades then it is referred to as indigenous, irrespective of origin.

In an attempt to narrow down the focus as to what local people consider indigenous Chweya and Eyzaguirre (1999) looked at the consumption patterns and uses to which the plants were put. This is important because if we consider the distinction between indigenous and exotic vegetables in Gameru it had less to do with origin and duration of presence in the parish, and more to do with whether or not it was locally consumed. Local residents did not usually consume exotic vegetables. They produced them almost exclusively for commercial purposes. Residents considered indigenous vegetables to be those varieties that most people consumed as vegetables or condiments, irrespective of their known or assumed origin. Although, local residents consumed the four most popular varieties of indigenous vegetables fairly infrequently, as a result of their commercial status, they were still labelled indigenous. These varieties had formed a major part of the local diet, and were still desirable as a foodstuff, while this was not the case with the exotic vegetables. Those vegetables that were preferred had been internalised by local residents and given the label indigenous. There is an implication that possibly local residents only considered an object or practice to be indigenous / traditional if it was used in more than one dimension of the indigenous knowledge system: in agriculture and also as a local foodstuff[4].

Is it possible that there are degrees of internalisation in that some things become more deeply and generally internalised than others? Commercial farmers seemed to be in the process of considering the internalisation of the conventional practices used for the cultivation of exotic vegetables. Some farmers were trying out these practices with commercially grown

[4] Local residents considered green beans (*Phaseolus vulgaris*) to be exotic and they did not really consume them, but they consumed the leaves, locally known as the indigenous vegetable Ebisiboza. See Table 18.

indigenous vegetables. While they regularly used these practices with exotic vegetables this had not taken place to the same extent with indigenous vegetables. There is a tendency amongst the commercial farmers to use these practices with the commercially grown indigenous vegetable varieties. However, they do not use them for indigenous vegetables cultivated for household consumption. Those farmers who are only engaged in subsistence farming do not use them at all, indicating that only a small group is using them. This lack of widespread applicability is possibly a reason why they are not being generally internalised to such an extent that enables them to be considered indigenous practices.

In Gameru parish the indigenous vegetable was a plant that had been cultivated and consumed in the area for as long as current residents could remember or seemingly occurred naturally. However, residents considered some fairly recent introductions of newer varieties to be indigenous. Indigenous vegetables were believed to grow well and relatively easily in the local soils and climatic conditions, irrespective of the duration of their use and whether farmers cultivated them for commercial or household use. Typically they required few inputs and farmers indicated that plants were hardier and more tolerant of local soil, water and climatic conditions than exotic vegetables. The latter tended to require more care and more inputs. The indigenous vegetable had also become integrated into local cultural practices or way of life in a number of areas and not just local agricultural and commercial activities. It was used as a medicine, part of ritual practices, it had associated taboos, it appeared to imply social differentiation, etc. Once it was internalised in this manner a vegetable was always considered to be an indigenous vegetable even if it was no longer available or no longer used. Its continued use and presence had to do with taste preferences, popularity, commercialisation, associated taboos and knowledge of how to prepare the vegetable. The label indigenous remained even if the vegetable did not.

The local use of the term indigenous seemed to refer to plants that were grown locally but which were also integrated within local cultural practices such as eating preferences, social customs, taboos, etc. This incorporation into the many dimensions of knowledge might determine when local residents apply the term indigenous. Indigenous vegetables seemed to be those vegetables available to most people, indicating that indigenous might also refer to the fact that it is widely used by most people. It is possible that locals use the term to make distinctions of a political nature by indicating what they believe to be theirs, conferring local ownership on beliefs, practices and objects. In the case of indigenous vegetables it is

possible that the means of introduction to the area – farmer to farmer as opposed to extension to farmer – might indicate whether or not an introduced crop is considered indigenous or exotic, but this was not explored during the study. Only further study that is more participatory and of longer duration will actually uncover more of the local criteria for distinguishing between what is considered exotic and what is considered indigenous. What is clear is that the identification of whether something is indigenous or not is far from simple and that different criteria are used in different circumstances.

From indigenous to local knowledge

In Gameru parish the knowledge evolved in a specific area where social actors adapted it to the local environment and to meet changes that occurred as a result of internal and external influences. While it might be argued that external influences did not become part of indigenous knowledge they definitely influenced the indigenous knowledge system and brought about changes in local beliefs and practices. They also introduced external objects such as synthetic agrochemicals. Consequently, the system of knowledge is not bounded, as people might like us to believe and the external objects, beliefs and practises were locally selected and included to suit local purposes. Similarly, some external influences were not included but they still brought about changes in the knowledge system as its actors tried to bring it into equilibrium, i.e. ensure their continued survival. As the contextual factors changed so the knowledge changed.

The study in Gameru parish suggests that indigenous knowledge is not the knowledge of the original inhabitants of a particular area that has been passed on unchanged for generations. It is rather the knowledge that has evolved in a specific context. It can include the knowledge of previous generations, that which was introduced from outside and that which was recently and locally developed. Context can include issues of space, time and application. The complete system of knowledge is specific to the area or context in which it develops rather than the actual components of the system being specific to that area for many of these come from outside the area. Local people make decisions based on access to resources, be they of local or foreign origin.

In the 1970s President Amin's policies encouraged commercial production of exotic vegetables while increased urbanisation resulted in a commercial demand for indigenous

vegetables. Consequently, some of the latter crops were produced for commercial purposes. In the case of conventional agricultural practices it seems that these have not yet been included into the knowledge systems of all the farmers as only a few commercial farmers use them for their indigenous vegetables. Possibly we can consider such practices to be part of the indigenous knowledge of this group of commercial farmers. This knowledge differs from that of other farmers who are not farming for commercial purposes. This suggests that indigenous knowledge refers to nothing more than the combination of different sources of knowledge – internal and external – to meet the requirements of specific people. Indigenous knowledge seems to be the system of knowledge that is developed in a specific context by a specific group of people. It does not exclude the possibility of having similar objects, beliefs and practices to other knowledge systems of which it might or might not be aware (see also Chweya and Eyzaguirre, 1999). These local people do not need to be the original inhabitants of a particular area and given current globalisation tendencies it is unlikely that they are all descendants of the original inhabitants.

Throughout this discussion I have been referring to the system of knowledge that was encountered amongst the parish residents as indigenous knowledge. However, to avoid the confusion that seems to be attached to the use of the word indigenous, brought about by the use of its assumed characteristics, it is probably more appropriate to refer to it and other indigenous knowledge systems as local knowledge (or contextual knowledge). It seems to be nothing more than a system of knowledge that evolves in a particular place and which changes over time in accordance to the continually changing context in which it is located.

We can recall from our discussion in Chapter Six that the process of generating and recording indigenous knowledge actually changes the knowledge implying that the context in which knowledge is developed is vital to its content – its structure or combination of components and dimensions. Removing the knowledge system from the context in which it develops changes it. Is it possible then that once indigenous knowledge is removed from the context in which it is developed, it changes and is no longer the same system of knowledge that it was before removal? Hence, it can no longer be identified as indigenous knowledge? This seems to be the argument of a number of development professionals (see Scoones and Thompson, 1994a) and implies that context is a vital determinant of the content and appearance of the knowledge system. It is possible that scientists might see elements of scientific practice in a local system of knowledge but it is unlikely that they would term this knowledge system

science. In Gameru parish the researchers were able to identify some scientific practices or those based on scientific research, but none of us identified the system of knowledge that we encountered as science. This was probably because it was taking place in a different context and was no longer pure science.

To replace the term indigenous with local appears to simplify and more clearly indicate what we mean by indigenous knowledge. However, such a change might be problematic. It does not have the political implications inherent in the use of 'indigenous.' For example indigenous is often used to claim specific ownership of various objects, practices and beliefs by a specific group or groups of people living in a particular area (Vail, 1998; NRF, 2003). Similarly it is often used to distinguish between the European and African or native citizens of a country, with the latter claiming indigenous rights if it is assumed that they were the earlier inhabitants of the country. It is a politicised term and its use is vogue because of its politicisation rather than in spite of this.

A further problem might well be the threat that such a stance poses to positivist science. If indigenous knowledge is context bound and local but having similarities and differences in other areas could we not equally apply the term local knowledge to scientific knowledge? Instead of having a science that is objective, value free and able to be applied uniformly the implication is a science that is definitely context bound. This will detract from scientists' claims of scientific objectivity. However, given the increasing critique of positivist science the idea of all knowledge, including scientific knowledge, being locally developed or at least a local combination of various internally and externally derived objects, beliefs and practices seems more appealing than the current indigenous knowledge – scientific knowledge dichotomy.

Within both indigenous knowledge and science there are dichotomies which emphasise internal distinctions. From the study it is clear that commercial farmers had agricultural practices that were different to those of farmers who farmed for household consumption purposes. There is also evidence to suggest that female residents might have different knowledge in comparison to male residents. This supports the idea that local knowledge is not universally similar within a specific location and probably makes a strong case for an argument that indigenous knowledge itself consists of different levels of knowledge within the same locality and group. Western Science encounters a similar problem. Often different theories are held by different groups of individuals. Social science literature referring to

psychology often talks of the Jungian School or the Freudian School and emphasises specific differences between the two schools of thought. Within sociology we often hear about the Chicago School, referring to specific social scientists based at Stanford University during a particular period. Mention is also made, and contrasting differences highlighted between the American, British and European Schools of Sociology and Social Anthropology. None of these schools completely exclude some of the knowledge or elements of it that are found in other schools, although there are some unique attributes that provide each school with its distinctive characteristics. This situation seems to encourage a move towards talking about local knowledge that includes ideas from the systems of indigenous and scientific knowledge, while simultaneously realising that it is the combination of these components and dimensions within a particular context that gives it its local distinctiveness. Local knowledge seems to imply more inclusiveness than that implied by indigenous knowledge. It identifies the knowledge system as including a combination of components from all available sources. The idea of an indigenous knowledge on the other hand tries, like western science, to exclude some elements and emphasise others.

Conclusion

The first part of this chapter looked at the value of using the RRA method to obtain information on indigenous knowledge regarding indigenous vegetables. The manner in which the research team applied the RRA method and tools to generate and record indigenous knowledge in the parish is not considered to be the most appropriate method that could have been used. However, given the constraints and various factors that affected the project it was considered to be a satisfactory method.

One of the main benefits of RRA was its multidisciplinarity that enabled it to provide a good and simple platform on which researchers from different disciplines and local residents could interact effectively to generate knowledge. Some of these people had diverse levels of education and spoke different languages. However, RRA provided a suitable platform for interdisciplinary engagement. The tools are simple, easily understood and easy to use, fitting into almost any situation and topic with minimal, if any, adaptation.

The use of RRA was vital in achieving the objectives of the first phase of the broader study. Any other method would have had more significant flaws than those identified for RRA. This is especially so regarding issues such as a need for contextual data and a broad overview of the current situation and practices, in spite of the extremely short time frame allowed for this. While not being the most participatory method available it fitted in with our constraints, while affording an element of participation and to some degree allowing the parish residents and farmers to control the process and information generated.

The RRA method provided us with a large amount of information on a number of pertinent issues. This information is considered valid by virtue of the ability of the tools to triangulate with each other. Despite this broad overview of the context in which indigenous vegetables are embedded in the parish the tools were unable to provide us with depth and detail on a number of interesting topics. This was largely due to the short duration of the study and associated weaknesses, such as trust and timing. To this end then the data is probably less reliable than we might have desired. Unfortunately, as a consequence of working in an applied setting we had to make a number of trade-offs. The initial use of this method and its tools during the Ugandan study can be further improved and strengthened if more participatory methods are used in the implementation of subsequent phases of the project.

Despite some weaknesses inherent in the use of the RRA method in this study, the information relating to the indigenous knowledge that is presented in Chapters Four and Five affords us the opportunity to reflect on the current debate on the concept of indigenous knowledge, adding value to our understanding of indigenous knowledge.

The second part of this chapter made some provisional and cautious reflections about our understanding of indigenous knowledge based on the information obtained during the study. At times indigenous knowledge has been shrouded in a technocratic veil (see Mettrick, 1993), but the study confirmed that it is more than technical knowledge – it involves social, political, economic and other dimensions as well as the associated objects, beliefs and practices that are found in these dimensions. It is a system of locally developed knowledge that has incorporated elements from outside as well as developing its own elements from within. This process generally takes place in a specific context, which gives local knowledge its distinctive character and distinguishes it from knowledge systems in other locations. The interactions between local people and outsiders influence the knowledge which local people develop.

Similarly, external events can influence local people to make changes in their knowledge system at any time in attempts to bring the system into equilibrium, thereby ensuring the survival of the social actors. Local knowledge is dynamic and is in a state of flux rather than being bounded and static, enabling it to include external elements. The study in Gameru suggests that local knowledge is not necessarily original, exclusive or unique, although it can exhibit some of these characteristics. Local knowledge includes the application of knowledge and this changes as the objects, beliefs and practices change with the changing context. Local knowledge, as signified by the actions of the farmers involves a process of identification, selection, innovation, and internalisation or rejection.

Knowledge seems to go through a period of local innovation during which it is tried and tested before it becomes accepted in whole or in part and internalised to the extent that local people consider it an integral part of their knowledge system. Exotic vegetables and associated conventional cultivation practices are an example of this. Exotic vegetables are part of the knowledge contained within the agricultural dimension. The practices associated with their cultivation are now being applied and tested in the cultivation of indigenous vegetables by some of the local commercial farmers. We noticed that certain exotic plants became indigenised and referred to as indigenous vegetables while others were not so recognised. This might be because they were not as significantly included into other parts of the knowledge system. Generally, these plants were not locally consumed and did not have associated taboos. The main purpose of exotic vegetables and the associated beliefs and practices seems to be for generating an income. Exotic vegetables were important parts of the knowledge system amongst commercial farmers in the parish during the study, although they were not considered to be indigenous.

Different levels and access to knowledge exist within any given locality. Not everybody in a specific locality will know what people do in that particular location with regard to all areas of their lives. Knowledge is not equally shared amongst local people. Local beliefs and practices of social difference have a significant role to play in the types and degrees of knowledge that people have access to. Often those who are involved in certain practices do not always know all the reasons why they do them. At other times people will have applied continued, conscious inquiry into why they follow certain practices and have made changes to these as a result of this inquiry. No formal system of knowledge exchange about indigenous vegetables

and other agricultural crops and their practices exists within the parish or between parishes and districts. Any exchange that takes place is informal.

There will be both similarities and differences between indigenous knowledge developed in different localities and also between these systems of knowledge and scientific knowledge. These differences and similarities should be acknowledged as they reflect the dynamic and strategic nature of all knowledge. These dichotomies are not as simple as science has made them out to be by means of its reification and selective process of knowledge creation. Rather than stumbling blocks they are the catalyst from which truly integrated knowledge can develop. The information obtained during this study allows us to provisionally suggest that indigenous knowledge and scientific knowledge are possibly nothing more than different systems of local knowledge that have developed within a particular context and are able to exhibit similarities and differences with other systems of local knowledge. Rather than integration of scientific and indigenous knowledge resulting in a third knowledge, it will result in a change in the local knowledge that develops within the context in which such integration occurs.

From the recorded indigenous knowledge and our reflection of the concept we are in a better position to understand the importance of generating, recording and understanding indigenous knowledge in agricultural development research. Hopefully we are now also in a position to do this better. The data collected in the current study is able to increase our understanding of what we are talking about when we use the concept of indigenous knowledge, and especially with regard to its importance when considering sustainable agricultural practices.

CHAPTER EIGHT

- CONCLUSION -
WHAT WE HAVE LEARNED

Introduction

Our discussion introduced us to the fact that shifts in thinking about agricultural development priorities are taking place internationally. In line with these shifts increasing emphasis is being placed on the idea of sustainable agriculture and associated sustainable practices. This has brought about the realisation that the world's resource-poor farmers might provide a means of understanding how sustainable agriculture can best be achieved. Historically, conventional agricultural research and extension practices have failed to adequately support the majority of these farmers. Yet, despite this and the fact that they typically farm in the most marginal areas they continue to survive. The adoption of complementary methods, particularly those emphasising the participation of local farmers and residents, indicated that these farmers relied heavily on locally available resources, their own creative innovations and the adaptation of externally developed practices. This awareness prompted increasing interest in what is referred to as indigenous knowledge. Such interest was often the result of a desire to include selected elements of this knowledge into the dominant form of knowledge, western scientific knowledge.

This thesis focused its attention on determining the value of the RRA method and tools, one of the many methods currently found in the participatory research paradigm, in generating and recording indigenous knowledge. A parish in Uganda was selected as the site for the study. The study on indigenous knowledge was part of a larger research project studying the genetic diversity of indigenous vegetables. Therefore, it took place in the context of agricultural development research in an applied setting. Consequently, the method could be tested in the applied situation. However, this increased the number of contextual factors that affect a study in the applied situation. The benefit of this was that it enabled the reflection of the value of the selected method in the context of a field application. It also permitted a

reflection of the effect of the context in which such methods are identified, selected and used. This enabled the reflection on the manner in which indigenous knowledge is generated and recorded. From a methodological standpoint this process of reflection is important if we are truly interested in testing a method in terms of the context in which it is typically applied.

Following the collection of data, using the RRA method, some provisional reflections were made with regard to what this data might illustrate about our understanding of the concept of indigenous knowledge. The data obtained from the study by means of the RRA method has also provided us with some indication of the significance of indigenous (or may I now call it local) knowledge to our understanding of sustainable agricultural practices. In concluding this thesis this chapter first looks at this significance. It then goes on to summarise the findings regarding the value of the method used and the provisional reflections on indigenous knowledge permitted by the data obtained using this method. The chapter closes by identifying some possible issues for further research on indigenous knowledge.

The importance of understanding indigenous knowledge

If we accept that indigenous knowledge is more than just technical knowledge and that it is a locally developed system of knowledge made up of all the objects, beliefs and practices related to different dimensions of the local way of life, which are intimately integrated with one another to various degrees, then it becomes important that we actually understand the significance and effects of these relationships on the topic we are interested in. This topic could be health, natural resource management, agriculture, religion, etc. or even specific aspects of these such as prenatal care or animal husbandry.

Food security is an important issue in Africa (Wolf, 1986; Pretty, 1996) so the relevance of farmers' local or indigenous knowledge becomes important to us if we want to work together with them to ensure sustainable local food security. But given the integration of different dimensions and parts of knowledge within the composite system of indigenous knowledge we need to consider a number of issues that relate to sustainable practices that ensure food security. In Gameru parish indigenous vegetables were mainly used and consumed for food security purposes. In fact the information generated suggests that they were the largest contributor to food security. Consequently, the importance of indigenous knowledge for

sustainable food security initiatives is discussed within the context of indigenous vegetable cultivation and use in Gameru parish. Here I highlight a few pertinent examples to illustrate some of the important issues that the study uncovered.

Local people have a vast knowledge of cultivating and using indigenous vegetables. Their system of classification is different to that of conventional science and it is possible that the uninformed outsider would find it confusing when one plant is actually given two different local names. Further clarification indicated that, for local residents, the plant signifies at least two different types of indigenous vegetables. The different parts of the plant can provide different sources of food at different times during the life of the plant. These are in fact identified as different vegetables. The implication is that from a food security perspective a single crop is capable of supplying diverse sources of fresh food during different seasons without having to undergo more than the basic preparation. No costly processing is required to extract these different foods. This is important to resource-poor farmers and households in terms of the sustainable supply of nutrition and diverse foodstuffs.

Equally important is the local belief, and subsequent practices, that emphasise that indigenous vegetables are generally those plants which grow more easily in the area. Local people are poor and farmers have adapted to their circumstances to ensure that they spend very little, if any, income derived from economic activities on agricultural inputs. The vegetables that they consider indigenous are those which they believe require less attention and grow easier than the exotic vegetables. While they tended to use some external inputs and external farming practices when cultivating indigenous and exotic vegetables for commercial purposes, by and large they used locally developed and available inputs to cultivate indigenous vegetables for household consumption, i.e. to meet food security requirements. When undertaking commercial vegetable production some farmers made use of limited external technical inputs, such as the use of the synthetic agrochemicals Dithane® and Ambush® when they could afford these. Given that farmers did not experience tangible results with the use of these agrochemicals it is possible that they treated the agrochemicals as scarce commodities and possibly applied them incorrectly in attempts to extend their availability, irrespective of whether they used them on indigenous or exotic vegetables. Only a few commercial farmers seemed to be able to afford agrochemicals and other external inputs. The implication is that any agricultural development in the parish should concentrate

predominantly on the use of low external input sustainable agricultural principles and not on high external input use as required by conventional farming systems.

Parish farmers are resource-poor and use their scarce income for purchasing commodities and services other than agricultural inputs. Consequently, they have developed ways to improve soil nutrient structure and integrated pest management strategies that almost exclusively make use of local resources:

1. By means of a series of innovations farmers have worked out ways to reduce erosion, the loss of scarce topsoil and the loss of scarce water.
2. They practise a slash and burn system when preparing new or fallow land. They also plough organic matter back into the soil after harvest. Both of these activities return nutrients to the soil.
3. They observed that while mulching is important for exotic vegetables it is of little benefit to indigenous vegetables.
4. Farmers practise seasonal rotation of crops in attempts to refertilise the soil and restore nutrients used up by the previous crop.
5. Various crops, and not only indigenous vegetables, were rotated or planted in ways that allowed them to make use of each other's properties. Trees provided shade and windbreaks for other crops while bushes provided similar services to smaller crops.
6. Monocropping was only used for vegetables that were sold for commercial practices, but rather than monocropping vast areas with a single variety they planted numerous small monocropped beds, each containing a different vegetable variety. This allowed each of these beds to make use of trees for shade at certain times of the day. This practise enabled a regular cycle of crop rotation that restored soil nutrient levels, while the diversity of the crops grown allowed the farmers to spread their risk.
7. Attempts were made to mimic nature by planting border and companion crops that would attract both insect pests and their predators. It is also worth recalling here that some border crops served the purpose of protecting the homestead from unwanted human and animal visitors. While these crops might not serve any 'scientific' purpose they had an important social function.

These strategies are all based on local resources and are used in a sustainable manner. This again suggests the importance of using low external input principles and not high external input practices in marginal and resource-poor areas. It also emphasises how the technical dimension is entwined with the social and other dimensions.

Indigenous vegetable cultivation is labour intensive. Local farmers do not have access to mechanised or animal traction implements. The ability of the RRA tools to contextualise the information they generated, informed the researchers that most of the farmers' livestock had been decimated in the 1970s and 1980s. At the time of the study farmers were still trying to replenish their herds. Only the wealthy had livestock that could be used to draw implements. However, none of the farmers had implements and did all the necessary cultivation and harvesting activities using handheld implements. They expressed a sexual division of labour that was based on the amount of physical strength required to perform a particular task. To promote agricultural practices requiring mechanical or animal traction would be problematic in this parish and probably impossible to implement given the existing situation regarding resources such as livestock, implements and finances. Even if such implements were provided the lack of resources would make their use unsustainable.

The expansion of commercial agricultural activities, requiring more land and focusing on exotic vegetables and crops made it difficult for women to find many of the indigenous vegetables in the wild. Commercial agriculture has increased the size of the land under cultivation. Women indicated that the increasing lack of availability of indigenous vegetable crops in the wild and changes in planting methods (from mixedcropping to the monocropping systems in which cash vegetable crops were planted) had resulted in them having to spend more time growing indigenous vegetables for household consumption. The result is that they had less time for activities in other areas of agriculture and local life. From a sustainable food security perspective this information is vital as it suggests that the introduction of conventional commercial practices poses a threat to food security and also bring about lifestyle changes that might be unacceptable to local people.

The comparison of indigenous knowledge in one locality with that in another stresses the importance of considering and understanding the indigenous knowledge encountered in each different location. The study by Chweya and Eyzaguirre (1999) indicated that women's groups were largely responsible for the success of marketing and sales, giving rise to the

suggestion that they have an important role in developing future sales and marketing programmes. In Gameru parish men were actually responsible for selling the main commercial varieties of indigenous vegetables, while women were only permitted to sell some of these locally, if there was a surplus. In contrast to this Maundu *et al.* (1999) found that in neighbouring Kenya women were mainly responsible for the cultivation and sale of commercially valued indigenous vegetables. The entire activity was in their hands and under their control. In the areas where Maundu *et al.* (1999) conducted their studies the proportion of women responsible for selling indigenous vegetables ranged from 43% to 95%. The male dominance of the selling process in Gameru was based on local cultural practices. Based on their current responsibilities relating to commercial indigenous vegetable production it is unlikely that female residents in the parish would have any direct influence on future sales and marketing. The suggestion that women's groups be used to promote and organise sales, as women were not allowed to transport the indigenous vegetables to Kampala or to sell them at the Kampala market was excluded in this parish. The importance in understanding indigenous knowledge in different locations or settings is important. This is also emphasised by realising that in the USA the USDA classifies some of the same species of plants that Gameru residents consume as noxious weeds. Researchers attempting to encourage US citizens to cultivate and consume these plants might encounter serious opposition. After completing research in one area we would be ill-advised to assume that similar practices were carried out in another area despite the fact that similar crops are cultivated. Indigenous knowledge studies suggest that while there are similarities there are also significant differences, highlighting the importance of context.

At the Kampala market the farmers from the parish met with farmers from other areas and these informal social networks had the potential to be knowledge chains, allowing knowledge to flow between the farmers residing in different areas, encouraging the spread of local knowledge until it becomes internalised elsewhere. According to the commercial farmers in Gameru parish these social networks did not seem to be very strong when it came to exchanging information. They also mentioned that they had no formal local network in the form of farmers' associations that could disperse knowledge on indigenous vegetables and other crops within the parish. Future research might indicate that other local networks serve this purpose. Farmers suggested that such groups did not really exist, but that they occasionally got together informally with neighbours or friends and this was how they shared, exchanged and developed knowledge. At these informal meetings they occasionally

exchanged seeds. Men banded together to share some costs when transporting produce to the market but overt collaboration seemed to be remote.

As with similar studies in other parts of Africa (see Chweya and Eyzaguirre, 1999) this study on the indigenous knowledge of indigenous vegetables showed that these crops not only played an important role in sustaining livelihoods and contributing to food security but that they were intricately embedded within the ritual, belief, social, health and food culture of the parish residents. Parish farmers and residents performed a number of rituals when they planted Empande (species unknown). They believed that failure to perform these rituals would bring about misfortunes in the weather, such as thunderstorms and hailstorms that could destroy the crops in the fields. Some of the indigenous vegetables had taboos associated with them, which affected certain categories of people who came into contact with them. They were used as a means of local social control and explanations of misfortune. The taboos associated with Enderema (*Basella alba)* were so powerful that men did not venture near it. Enkolimbo (*Cajanus cajan*) and Emboga (*Amaranthus spp.*) were believed to bring about bad luck in certain instances. This had resulted in Emboga being almost completely replaced with Emboge (*Amaranthus graecizans*) a species that did not have any taboo associated with it. Local survival and the social system are tied to the land and some of the crops grown in it. An awareness of this is important to agricultural development professionals who might make suggestions to farmers to adopt practices that might not observe local ritual and taboo.

Pottier (1994) has pointed out that indigenous knowledge is not always equally shared or accessible to all local residents and that we cannot assume that the knowledge generated by one farmer is the knowledge of all the other farmers, i.e. it is not common property. Rather access depends on the types of residents (young and old, male and female, powerful and marginalised, etc.) and the types of knowledge. With regard to food security subsistence farming, upon which most parish residents depend for survival, it might be argued that it is most probable that indigenous knowledge on this topic is fairly equally shared amongst farmers and labourers and males and females and across all age groups within the farming system and household structure. However, we noted in the gender analysis that there was a difference in distribution of labour amongst the sexes and age groups. Given this it is likely that different sexes and age groups will have different levels of knowledge based on their areas and levels of responsibility. This might account for the preference during the workshops

of talking in general terms about the indigenous vegetable cultivation and processing practices and also for the reason why women tended to talk the most about these issues.

It is possible that with the onset and growth of commercially focused cultivation of indigenous vegetables and the competitive nature inherent in commercially oriented agriculture that the sharing of indigenous knowledge relating to various commercial species might become less. During the study we noted that discussions on commercial indigenous crops were often referred to the commercial farmers and at times we were told to consult some of the more active commercial farmers after the workshop to get more detail. This suggests that these farmers apparently had more / different knowledge about these commercial crops by virtue of their purpose for producing them and their greater experience with the crops. Discussions with members of this group of farmers indicated that this was the case. They also seemed to include a number of innovations in their practices, which were not practised by other farmers. Indigenous knowledge makes us aware of who has what information and for what purposes. It also identifies class and caste systems and suggests ways of communicating and understanding that are important if we are to improve our understanding of local knowledge.

Studies attempting to understand indigenous knowledge systems and the integration of the different dimensions and parts that make up the composite whole not only explain and clarify various aspects but they also make us consider questions that we might not have previously considered. I suggested earlier that our interest in indigenous vegetables and indigenous knowledge was from a food security perspective. Our discussions on some of the components and dimensions of indigenous knowledge and the relationships between them, which are intertwined with indigenous vegetables raises a number of questions:

1. What will the social consequences of increased commercialisation of more varieties of indigenous vegetables be for relationships between the genders and for Ugandans as a whole?
2. Will these plants be able to remain a source of household food security despite their commercial significance?
3. What will the effect be of the possible costs involved in producing indigenous vegetables if farmers replace locally developed low external input practices with conventional organic or inorganic methods in their attempts to maximise yield?

4. If the plants become subject to excessive scientific manipulation (such as being genetically modified) to enhance their resistance or tolerance to something will they be able to grow locally without excessive and costly external inputs?
5. Will the creativity of the people of Gameru parish persevere in that they will internalise other crops and develop appropriate low external input practices to take care of their household food security needs and ensure their continued survival?

We can only hope to answer these questions by means of adopting long-term and truly participatory methods in conjunction with the local residents. With such methods empowerment can occur and appropriate social transformation should result.

The value of the RRA method

Although it is fairly extractive, RRA encouraged some participation and interaction between the researchers and local residents. This participation was more than consultation and definitely more than that typically evident in a questionnaire survey. RRA provided us with an awareness of the contextualisation (and holistic nature) of indigenous knowledge surrounding indigenous vegetables and the significance of the relationships between different parts and dimensions of this knowledge. While the research process covered a wide range of information (this is significant given the short duration of the study) it did not provide a lot of detail. The purpose of RRA is in fact to provide general information about a particular topic or topics rather than to provide detailed or “thick” descriptions. While the data obtained was reliable given the results of the triangulation of the tools, absolute accuracy was the trade-off we made for more general information. Patterns, trends and possibilities are what interested us and these were attained using this method. Given the constraints inherent in all social research the RRA method seems to be more reliable than quantitative methods and slightly less valid than qualitative methods such as ethnography. This latter shortcoming can be significantly reduced when the project moves into the next phase. The researchers can adopt a more participatory method such as PTD and will be able to explore in greater detail those issues that are relevant to the farmers, such as IPM, fertilisation, irrigation, etc.

An important characteristic that distinguishes the RRA method from conventional social science methods and is invaluable in the development context is the ability of the tools to

allow the residents and farmers to control the process to a certain degree. This permitted them to discuss issues that they believed important within the broader framework of the study. It had the effect of actually making the information we obtained more valid than that which we might have obtained from the exclusive use of a researcher controlled survey questionnaire. We are not able to make inferences from the subsequent data to the population, but in terms of the objectives of the study this was not required, so such an attempt was not warranted (see current trends to do exactly this in IIED, 2003).

One of the main benefits of RRA was its multidisciplinarity that enabled it to provide a good, simple and single platform on which researchers from different disciplines and local residents could interact effectively to generate knowledge. Some of these people had diverse levels of education and spoke different languages. RRA is a suitable platform for generating indigenous knowledge as the tools are simple, easily understood and easy to use, fitting into almost any situation and topic with minimal, if any, adaptation. However, more time and the encouragement of increased participation would have optimised the interaction.

The use of the method and tools achieved the objectives of the first phase. RRA was extremely useful in our study and was used acceptably in view of the time and other constraints which impacted on the study. Many of these constraints are typical of applied agricultural development and research interventions. Consequently, I would recommend the use of RRA methods in similar situations when more participatory methods cannot be used initially. The reasons for this are:

1. It is better to use an approach within its limitations and to be aware of these than to believe that the use of the same method and approach described here is in fact a PRA and to present it as such. The subsequent weaknesses that might result would actually discredit a very good method, as a result of user error;
2. It has provided us with useful information from which we can make a number of valuable decisions and develop useful subsequent research strategies and plans. The information obtained on indigenous vegetables informed us of areas for future research;
3. It encouraged the generation and sharing of information among the local residents, some of whom might not all have previously been aware of the information that was generated by this process;

4. It has included greater degrees of participation and contextualisation than we would typically encounter in the use of a questionnaire;
5. It increased our awareness of the various relationships amongst the different dimensions and elements of local knowledge than we would ever have realised if we had used a questionnaire survey. In the latter case the topics and questions are pre-selected and there is very little space for flexibility;
6. We can cautiously suggest that it has allowed us to collect significant contextual data in a much shorter time than typically associated with applied anthropology and ethnography, although not in anywhere near as much depth. Given current development interests the time saving factor and associated trade-offs are worth considering;
7. Within the current study it identified what the most popular commercial and food security varieties are and made us aware of the role and significance of indigenous vegetables in the parish, especially as a livelihood source. It also made us aware of the resources that are used to cultivate these crops and the associated practices and beliefs, i.e. the knowledge involved in indigenous vegetable husbandry.

The study carried out in Gameru parish was done in an extractive manner using a populist method. By using this method we attempted to put the farmers first, or at least that was the theory, and we can recall from our discussion in Chapters Three and Six that such methods seldom do this as completely as desired. However, by reflecting on the factors that influenced the process we become aware of the constraints of generating knowledge in this manner. On the other hand, the more recently developed complementary methods, such as PRA and PTD, do not offer the perfect means of generating and recording indigenous knowledge. What they do offer us are some improved tools to look at contextual issues of difference, power, timing and location while affording awareness that knowledge is not generated, recorded and presented in a value free manner.

As researchers we must reflect on all methods that we use in our interactions with farmers and other research subjects if we are to come close to the understanding of the truth that we seek. It is important to understand issues of difference, power and control within rural and urban communities. This helps to understand the farmers and other residents as social actors involved in many spheres as opposed to being solely involved in agricultural production.

These other spheres of involvement might influence a farmer's agricultural and technical decisions more than his / her agricultural needs, expectations and experiences. Of course they might also influence these areas. Consequently, we realise that the farmer's life and focus does not evolve exclusively around agricultural production when interacting with research and extension officials. Rather, the RRA method indicated that the average farmer has far more things to contemplate than merely maximising yields and income. This suggests that his decisions are far less technically and economically inclined than the research and extension agents would believe. They are less neutral than we originally supposed.

Our discussion on the context in which research methods are selected and used indicated that the researchers and extension agents should also become aware that their decisions are less related to neutral technical and economic criteria than they might expect. Such choices and applications are more often influenced by many factors that cannot always be controlled to the same extent as technical and economic criteria, and examples include politics, scientific discipline and background, peer pressure, donor demands, etc.

The reflections on the fieldwork process emphasise that when we are attempting to generate and record indigenous knowledge we need to spend more time in an area, be more participatory in our approaches and interactions with local residents. We also need to continually reflect on the knowledge that is generated, the methods or tools that are used and the process whereby knowledge is generated and recorded.

There is a need to overcome the inadequacies encountered in the use of the tools in this study, or at least to reduce the affect of these. In the future one should essentially plan and budget to use more participatory methods. Although the current debate suggests that such methods can be subject to the same constraints that affect the RRA method they are more likely to ensure the best generation, recording and subsequent use of indigenous knowledge. These methods are part of the participatory research paradigm, which arose from the need to involve local people throughout the research process and attempts, ultimately through ownership and empowerment, to encourage social transformation as opposed to simply focusing on social reform. The use of such methods will allow us to achieve more desirable results.

However, our discussion has shown that in consideration of the real constraints that affect agricultural development projects, such as limited funding, limited time, the fact that funding is often stopped halfway through a project, etc. one needs to opt for a method that encourages as much participation as possible within these constraints. In essence the circumstances might require (or even dictate) that the research team adopt a less participatory populist approach, such as RRA. Despite this, every attempt should be made to overcome the associated pitfalls that we have discussed. This can be ensured by encouraging a greater degree of participation, ensuring that fieldstaff are adequately trained and by following a more participatory method such as PTD during later stages of the project. In conjunction with this the team members will need to continually reflect on their methods, practices and the context in which these are selected and applied. To avoid doing this would result in us never truly understanding the indigenous knowledge system which is made up of numerous intertwined dimensions and elements.

In agricultural development the recommendation would be to follow the principles of participatory technology development throughout the project, bearing in mind that the PTD framework or steps are flexible and do not need to be applied in a linear fashion. This suggests loops that can allow the team to start on a certain level and then return to a seemingly earlier one or advance to a seemingly later one as the farmers dictate the pace and the focus. More creativity is required to improve the current participatory methods so linearity and absolute rigidity should be avoided if they are not necessary or appropriate.

Should insufficient resources be available for an agricultural development intervention it is important to remember that the purpose of the intervention dictates the method, which dictates the resources required and that we should subsequently acknowledge our constraints and in view of these take appropriate decisions. Although, social transformation and empowerment are desirable, where sufficient funds and time for this are unavailable a choice must be made with regard to the implementation of the project. We must either continue with the intervention as proposed, with the realisation of what can realistically be achieved given the constraints, acknowledge these and make necessary adjustments where possible or we should discontinue the project.

The volume of data generated and recorded while using the RRA method during the fieldwork in the parish, including the subsequent analysis of this information and assessment of the

method, permitted a few provisional reflections on our understanding of indigenous knowledge.

Some provisional reflections on indigenous knowledge

Most of the vegetables that are identified as indigenous in Gameru parish are in fact not indigenous in terms of the characteristics of origin, length of duration and exclusiveness or uniqueness to this parish, or even to Uganda. Some of the practices and beliefs relating to their use, cultivation and inclusion in the local social system are exclusive and appear to have been specifically developed in this parish, but others are not, with some identical practices being found elsewhere. This suggests that these exclusive practices might have been incorporated along with associated external beliefs or objects. A second possibility is that they were locally developed and later exchanged with travellers and have been adopted elsewhere. A further possibility is that there is in fact a limit to the extent of knowledge that might be developed about a certain object, practice and belief within a particular context and that people in different places would have eventually developed similar practices and beliefs if they had access to similar resources. In our study it is the vegetables (or objects), and the practices and beliefs surrounding them that, in conjunction with the various social, technical, political and other dimensions, form the system of knowledge that develops in the parish. This resultant combination of components (objects, practices and beliefs) and dimensions is what we identify as the indigenous knowledge that is developed in the parish. It is not the actual origin of the objects, beliefs and practices that should determine whether or not they are indigenous or whether the knowledge is indigenous. More importantly, it is rather the manner in which they are actually combined and used at the local level that gives rise to the distinctiveness of the knowledge system of which they are a part. This gives rise to their indigenous or possibly original and exclusive appearance. If we are to use the term indigenous we should use it to refer to the specific system of knowledge that develops within a specific context. This system is able to continually include and exclude internal and external beliefs, practices and objects. We should not simply attribute origin, length of duration, exclusiveness or uniqueness to the actual parts of the system.

Indigenous knowledge is particular to a specific context as a total system rather than all the parts of the system having originated within this context. If we accept that knowledge is

dynamic then it is very likely the parts of this system will change. Some will leave the system, some will change within the system and new ones will enter from outside the system. As the context changes so will some of the components and subsequently the appearance of the system. It is the composite whole that is indigenous although it seems preferable to call it local as it develops within a specific locally situated context. This whole or system is what is used by local people, based on their experiences in a particular context and the objects, practices and beliefs that have entered and developed within the context, irrespective of their form or origin. Local people cannot easily separate the different parts of the composite whole from one another, nor do they actually attribute origin, duration, natural existence, exclusiveness, etc. to all of these different parts. As Giddens (1979) has suggested the actions of the local residents (the actors in the system) actually determine the properties of the system and that these properties are not independent of their actions. An important action is the ability to include, exclude, adapt and develop elements of the system and to combine this in a manner that makes meaning within and sometimes across dimensions of the system. The actions people take are a result of the context in which they find themselves.

The system of indigenous knowledge is constrained by the local resources to which it has access, as it is developed in terms of these resources. Once external resources enter they can become part of the local resources if their existence is sustainable. They then become part of the knowledge system by being included into the different dimensions and providing meaning for the actors. As soon as the resources are no longer sustainable then it is likely that they will be excluded from the knowledge system. Indigenous knowledge is specific to particular locations giving rise to the tentative suggestion that it is in fact nothing more than local knowledge. Although similar elements of knowledge in one area can be found in other areas it is unlikely that the entire system will be found unchanged in another area, i.e. precise duplication is unlikely, especially if the resources differ. Therefore, it is unlikely that the indigenous knowledge developed in one area can be universally applied in the same fashion as attempted by conventional science which often attempts to keep variables constant. This universal applicability is not a trait of indigenous knowledge and probably is not really a trait of scientific knowledge, although it is sometimes argued as such. Once indigenous knowledges attempts universal application it will probably be conventional science or at least subsumed into conventional science. Indigenous knowledge is a system of context specific knowledge.

Issues for further research on indigenous knowledge

The purpose of the thesis was to asses a method in terms of its ability to generate and record indigenous knowledge but in the process of doing this it has also made some provisional reflections about our understanding of indigenous knowledge possible. In order to increase our understanding of this complex and often politically charged topic there is a need for further research in this area. Some possible areas for this are now suggested.

Given the constraints regarding our ability to collect detailed knowledge and to verify all that we were informed of and observed there is a need to assess the indigenous knowledge that was generated and recorded in the parish. This is particularly important with regard to the technical aspects. While there are often differences between scientific and indigenous knowledge if we truly wish to integrate the two types of knowledge we need to assess them in terms of one another and determine how they can complement each other. This will permit the optimal use of both systems of knowledge. Future phases of this particular project and other similar projects focusing on indigenous knowledge should consider such assessments.

Are there degrees of internalisation to which some things become more deeply and generally internalised than others? Do different people within the same location or group internalise different elements of the same system of knowledge at different levels? Commercial farmers seemed to be in the process of considering the internalisation of the conventional agricultural practices they use for exotic vegetable production in their cultivation of indigenous vegetables that are grown commercially. They have internalised these practices for use with exotic vegetables but this has not taken place to the same extent with the commercial indigenous vegetables. Further research should look at the idea of how and why different levels of internalisation of beliefs, practices and objects occur and also why some of these are internalised and others are not.

Over time a practice or thing becomes internalised into the way of life of a group of people if it is deemed important to that particular group as a whole or to particular members of that group. Later it can be removed when it is believed that it no longer serves a relevant purpose. This is how knowledge changes. But in order to change there need to be changes in the

context in which the knowledge develops – this can be brought about by external or internal influences. Consequently, one wonders if *in-situ* conservation of scarce indigenous vegetables will actually occur. In Gameru parish beliefs, associated taboo and taste preferences play an important role with regard to the conservation and continued use of a crop. We were informed that some indigenous vegetables became scarce because of local preferences and taboos. In an attempt to achieve equilibrium the system developed and applied these preferences and taboos. However, in another attempt to achieve equilibrium it got rid of these plants. I would suggest that it is unlikely that local people are actually going to set aside land and time to conserve them. Given the current beliefs and practices and in particular the taboos and preferences there seems no reason for them to do this. Natural conservation also seems unlikely. Most plants have been introduced into the area and have become internalised within the local agricultural activities and the lands used for agricultural purposes. Consequently, it is unlikely that the seedbed will be high enough to sustain their 'natural' occurrence beyond the short to medium term. Similarly the desire to commercialise agricultural activities will probably result in the emphasis on commercially favourable varieties. If scarce indigenous vegetables are conserved it will be a result of human intervention. It will be interesting to see what prompts people to conserve these particular varieties that are not generally preferred and have associated taboos. This will provide us with some further understanding of why things are included or retained in a particular knowledge system.

The gender analysis that was carried out in the parish indicated that both men and women had knowledge of the cultivation, use and processing of indigenous vegetables. However, it was clear that the women were more involved in most of the activities, from planting to harvesting, processing and consumption. While men were involved in some of these activities this was mainly for those varieties that had greater commercial significance. Men controlled the sales of these commercial varieties. Should other varieties gain commercial significance it is possible that women in the parish might lose their access to these resources which they use for household food security. However, this might not be as severe in this parish as in other countries because men and women did some of the work together and women acknowledged having a say in the expenditure of income derived from the sales of the four most sought after commercial varieties. However, instead of interdependency between the gender groups, the dependency of females on males would still be the order of the day.

There is further reason for concern because at the time of this study women had sole access to the revenue derived from those indigenous vegetable crops that did not enjoy the same commercial significance as the four most popular ones. While the income so derived probably did not amount to much, if any of these crops become commercialised in the future it is likely that women in the parish will lose the little income that they previously derived from local sales. There was a tendency to sell very few commercially valued vegetables at the local market and this was mainly to passing traffic. The local market was the women's source of income as cultural practices prevented them from travelling to the Kampala market. The social repercussions that can result from external interference in local systems of knowledge, which are often done in the name of local improvement and betterment, often have dire consequences for those who are supposed to benefit and need to be done with caution. If the local system of knowledge is understood beforehand and if local people are involved in the development and implementation of these policies and interventions they might have more far-reaching positive effects within the areas that they are implemented. Such studies of local knowledge systems should become part and parcel of all development interventions. In those cases where this has not happened in the past, it is fortunate that the system always strives towards equilibrium, attempting to restore balance.

Our visit to the parish and the methods that we used will probably only become part of local knowledge within the parish to the extent that our visit is discussed occasionally while residents wonder when we will return. Possibly our visit might be mentioned to other researchers who visit the parish. To hope that the tools and some aspects of the RRA method might be retained and used is to be overly optimistic given the manner in which it was conducted. However, is it not the purpose of the participatory methodology and methods such as PRA and PTD that by emphasising empowerment and bringing about social transformation they become part of indigenous knowledge, i.e. an integral part of the local system of knowledge? Our reflection of these methods suggests that this is very likely the case. Unfortunately, the nature of RRA and the manner in which it was used in this study prevents us from expecting such internalisation of the method. Research on the internalisation of participatory methods within local knowledge systems should be carried out as it would be valuable to identify what elements are included and what are excluded, the reasons for these, as well as local adaptations of these methods that will most likely emerge. Remember, many of the methods were borne out of the practical application of natural, physical and social science methods with the ultimate intention to bring about desirable local

social transformation. Surely social transformation is based on and results in changes occurring within the local knowledge system? Research on the internalisation of participatory methods might also help us to understand the contexts within which social transformation is possible and in which agricultural and other forms of development are sustainable.

Conclusion

This study has indicated that participatory methods are valuable in generating and recording indigenous knowledge. In similar circumstances to those in which the study in Gameru parish was conducted the RRA method is useful in obtaining a quick and general understanding of indigenous knowledge. However, such a study would need to be followed up with a longer and more participatory study. Using the information generated in Gameru parish the study has stressed the significance in understanding indigenous knowledge and its importance for agricultural development interventions. It also pointed out some of the possible inconsistencies inherent in the notions of participatory research and indigenous knowledge, making us aware that they are not as simple as sometimes believed. Future research on indigenous knowledge and participatory methods will allow us to develop a deeper understanding of the value of participatory methods, the significance of indigenous knowledge and the issues inherent in its generation and subsequent use.

GLOSSARY OF IMPORTANT AGRICULTURAL DEVELOPMENT TERMS

Agroecology: The holistic investigation and analysis of agroecosystems that includes environmental and human components, the interrelationships and the processes in which they are involved such as competition, replacement, symbiosis, etc. (Reintjies *et al.,* 1992: 210).

Agroecosystem: An ecological system that has been modified by humans to produce products for human consumption such as food, fibre and fuel (Reintjies *et al.,* 1992: 210).

Arid Climate: Potential evaporation exceeds rainfall during each month of the year so that cropping is only possible with the use of water-harvesting and irrigation. Usually refers to an area with an average of less than about 200 mm of annual rainfall (Reintjies *et al.,* 1992: 210).

Cover Crop: An annual crop sown to create a favourable soil microclimate, reduce evaporation and protect the soil from erosion. Cover crops can also be used in managing soil fertility (Reintjies *et al.,* 1992: 211).

Crop: Annual or perennial plants that humans cultivate to produce products which they desire to satisfy their needs. Examples include vegetables (edible leaves, stems and roots), fruit, grains, fibre, fuel and flowers (Reintjies *et al.,* 1992: 211).

Cropping Pattern: The spatial and temporal combination of crop varieties and cultivars in a single field or plot unit (Mettrick, 1993: XXII).

Cropping System: A subsystem of the farming system that consists of all the necessary components or inputs required for the production of the crops and the relationship between them and the environment (Mettrick, 1993: XXII).

Cultural Control: This is a method of crop protection in which a combination of precise timing and agronomic practices are used to make the environment less friendly towards certain pests and diseases, thereby controlling or reducing their proliferation. Such agronomic practices include tillage, planting, irrigation, crop rotation and mixed or intercropping (van Alebeek, 1989:xi).

Desertification: A process whereby the biological productivity of arid or semi-arid land continually declines, resulting in poor, thin soil that is difficult to revitalise. The term is also used to refer to land degradation – the reduction in the capacity of the land to satisfy a particular use (Reintjies *et al.,* 1992: 211).

Diseases: Harmful organisms that cause damage or annoyance to farmers, their crops, animals and other possessions. Diseases typically include fungi, bacteria, viruses and virus-like organisms (van Alebeek, 1989: x).

Ecological Agriculture or Eco-farming: Agricultural practices that improve, or at worst do not harm the environment, and aim at minimising the use of chemical inputs (Reintjies *et al.,* 1992: 211).

Extension: All the various methods, techniques, actions and processes that are used to disseminate and increase agricultural information and technologies to farmers and those undertaking agricultural type activities in such a manner that these are made more easily accessible to these recipients so that they can use them in their agricultural decision making (van Alebeek, 1989:xi; Reintjies *et al.,* 1992: 212).

External Inputs: Those inputs having their origin outside of the farm system, village, district, region or country. Artificial external inputs require enormous volumes of fossil fuel to be manufactured and distributed and include, synthetic fertilisers, pesticides and pumped irrigation water (Reintjies *et al.,* 1992: 212). Due to their external origin these inputs are expensive and often difficult to obtain.

Fallow Land: land that has been left uncultivated for at least one or more growing seasons. Usually it becomes overgrown by natural vegetation and can be used for livestock grazing (Reintjies *et al.,* 1992: 212).

Farm System: At the level of the farm-household this term is used to refer to the composite production and consumption decisions of a particular farm-household, including the selection of crops, livestock, farming practices and involvement in off-farm enterprises (Reintjies *et al.,* 1992: 212).

Farming System: This term is used to refer to the production and consumption decisions customary to a group of farms / farm households that experience similar environmental conditions and follow similar farming practises and enterprises as opposed to those practised in another farming system (Reintjies *et al.,* 1992: 212; Mettrick, 1993: XXII).

Farming Systems Analysis (FSA): A method used to understand the structure and functioning of farming systems and the constraints to agricultural production within these systems in order to develop accommodative research programmes (Mettrick, 1993: XXII).

Farming Systems Research (FSR): An applied research approach attempting to increase the productivity of farming systems by analysing their constraints and opportunities, to implement appropriate accommodative research programmes, and to develop appropriate technology and interrelated policies (Mettrick, 1993: XXII). Research is usually done by means of on-farm trials (Reintjies *et al.,* 1992: 212).

Formal Survey: A questionnaire-based survey of a sample of respondents who are selected in such a manner as to be representative of a specific population, allowing the researchers to make statistical inferences about that population (Mettrick, 1993: XXII).

Green Revolution: The introduction of improved crop varieties in the 1960s which resulted in significant increases in yield when combined with favourable circumstances such as reliable irrigation, access to external inputs and markets (Reintjies *et al.,* 1992: 213; Mettrick, 1993: XXII). This type of farming is heavily reliant on a package of inputs that are usually compiled by means of conventional research.

Group Discussions: There are usually two types. The one is more participatory and involves a discussion with a group of people in which ideas, issues, insights and experiences are discussed with the assistance of a facilitator. The other is an interview with a group of people whereby the interviewer tries to get an approximate and quick overview of an area or topics (Mettrick, 1993: XXIII).

Herbicides: Pesticides that are applied to destroy or reduce the negative effects of weeds (Reintjies *et al.,* 1992: 213).

Humid Climate: Rainfall exceeds the potential evaporation during at least nine months of the year. Typically refers to areas that receive more than 1500 mm annual rainfall (Reintjies *et al.,* 1992: 213).

Hybrid Seeds: Seeds which are propagated by crossing genetically dissimilar plants (different varieties or species). The yield of such crops is usually higher than that of parent lines but cannot be maintained in the succeeding generations. The implication is that the seed must be purchased every season (Reintjies *et al.,* 1992: 213).

Indigenous: People, plants or animals which occur or live naturally in a specific area. Indigenous is the opposite of exotic but is distinguished from endogenous which refers to plants or animals that have their origin within a specific area (Reintjies *et al.,* 1992: 213).

Indigenous Knowledge (IK): This is the knowledge of people who live in a particular area which is generated by their and their ancestors' experience and includes knowledge originating from other areas which they have incorporated (either directly or with appropriate adaptations) into their pool of knowledge, often to the extent that it is not distinguished as having originated elsewhere (Kotschi *et al.,* 1990: 65; Reintjies *et al.,* 1992: 213).

Indigenous Technical Knowledge (ITK): Normally construed as the knowledge local or indigenous people have of their environment and the technical practices they use in their farming activities. This includes the ability to develop this knowledge by means of empirical methods of observation and experimentation (Mettrick, 1993: XXIII).

Inputs: These are the elements that farmers add to their agricultural resources to influence productivity, stability and continuity and include, water, energy, nutrients, seeds, chemicals, equipment and information or technology (Reintjies *et al.,* 1992: 213).

Interdisciplinary: A term used to describe a multidisciplinary team in which the members work together within a common framework on a set of problems and are expected to cross disciplinary boundaries (Mettrick, 1993: XXIII).

Integrated Pest Management (IPM): A strategy, developed within the farm's environmental context and pest population numbers, which uses all suitable means (genetic, mechanical biological and chemical) in the most appropriate manner to maintain pest populations below those that cause economic damage (Van Alebeek, 1989: X; Reintjies *et al.,* 1992: 214).

Intercropping: Cultivating two or more crops at the same time in the same field, giving rise to the increased spatial and temporal intensification of the cropping practice (Reintjies *et al.,* 1992: 214).

Livelihood System: The mixture of people, resources and environment in which humans use the stocks and flows of food and cash to meet their basic needs. The livelihood system of a rural household can be diverse and complex, including cropping, animal husbandry, tree cultivation, fishing, hunting, gathering, processing, trading, wage employment and a number of off-farm and non-farm activities (Reintjies *et al.,* 1992: 214).

Microclimate: Usually used to refer to the climatic conditions, such as the temperature, sunlight, rainfall, wind, etc.) in a small localised area such as a field or stand of trees, etc. (Reintjies *et al.,* 1992: 214).

Monocropping: The repeated cultivation of the same single crop on the same field (Reintjies *et al.,* 1992: 214). This is very much the conventional agricultural practise but is believed to lose many of the natural benefits associated with other forms of cropping.

Mulching: the use of green or dry organic matter, plastic, stones and sand as a protective covering of the soil surface to prevent the evaporation of moisture, regulate temperature and control weeds (Kotschi *et al.,* 1990: 56; Reintjies *et al.,* 1992: 215).

Multidisciplinary: Contrasts with interdisciplinary in that the multidisciplinary team members work towards a common goal but only within the boundaries of their own discipline (Mettrick, 1993: XXIII).

Multiple Cropping: The cultivation of two or more crops in the same field during a single year at the same time, or one after another, or a combination of both (Reintjies *et al.,* 1992: 215). This is an attempt to mimic nature and thereby utilise the benefits that are believed to accrue from such practises.

Multistorey Cropping: The simultaneous cultivation of tall crops such as trees (usually perennials) and shorter crops such as vegetables (usually biennials or annuals) (Reintjies *et al.,* 1992: 215). This is an attempt to mimic nature and thereby utilise the benefits that are believed to accrue from such practises.

Nematodes: Microscopic organisms that are found in large quantities in moist top soil. While some are beneficial many live parasitically on plants and animals (Reintjies *et al.,* 1992: 215).

On-farm Research (OFR): Often used to describe on-farm research trials in farmers' fields in which varying degrees of farmer participation take place (Mettrick, 1993: XXIII). However, there is often a tendency for this participation to be minimal.

On-farm Trials: Usually conventionally designed research experiments conducted with farmers' crops or livestock on their farms, as opposed to trials conducted at the research institute (Mettrick, 1993: XXIV).

Organic: A chemical compound that contains carbon or which is derived from living organisms (Reintjies *et al.,* 1992: 215).

Organic Farming: A farming practice which encourages healthy soils and crops through the use of nutrient recycling of organic matter, proper tillage, crop rotations and the avoidance of synthetic fertilisers and pesticides (Reintjies *et al.,* 1992: 215).

Participatory Research: Research that is undertaken in collaboration with farmers. In the true sense of the meaning the farmers define the research agenda, carry out the research, evaluate the results and disseminate the findings (Mettrick, 1993: XXIV).

Participatory Rural Appraisal (PRA): Various rapid rural appraisal (RRA) techniques and other recently adapted informal research techniques conducted by rural people themselves in collaboration with outside researchers and assisted by an external facilitator (Mettrick, 1993: XXIV).

Participatory Technology Development (PTD): An approach to sustainable agricultural development whereby the indigenous knowledge and research capacities of local farmers and residents are combined with those of formal research and development institutions in such a manner that they strengthen the existing capacities of the farmers (Mettrick, 1993: XXIV; Reintjies et al. 1992:216).

Pesticide: Any substance that is used to control or kill any pest and includes insecticides, acaracides, herbicides and fungicides (Reintjies *et al.,* 1992: 216).

Pests: Organisms which cause damage or annoyance to farmers, their crops, animals and other possessions. Pests typically include creatures such as insects, mites, aphids, nematodes, rodents, monkeys and birds (van Alebeek, 1989: x). When agriculturalists talk about 'pest control' and 'integrated pest management' they usually mean these to include the organisms listed here as diseases and also weeds giving the word pest a much broader meaning (Reintjies *et al.,* 1992: 216).

Rapid Rural Appraisal (RRA): Informal methods of generating and recording rural data, adopted in the 1970s and 1980s with the purpose of being quicker, friendlier, more open to rural people's knowledge and more cost-effective than traditional survey methods (Mettrick, 1993: XXIV).

Resource-poor farmers: This term is used to refer to farmers who do not generally have access to the conditions and resources required by green revolution and industrial agricultural practices. They are usually not situated in areas where these practices can be carried out and

even if they are they tend not to have access to these resources for a number of reasons, which can include politics, finances, etc.

Rotation: The repeated cultivation of a succession of crops, either as sole or mixed crops, on the same land and sometimes in combination with a period of resting which allows the soil to become fallow and rejuvenate itself. One cycle can take months or several years to complete (Reintjies *et al.,* 1992: 216).

Semi-arid Climate: A climate that has a high variability of rainfall, typically with an annual amount of between 200 and 900 mm (Reintjies *et al.,* 1992: 217).

Subsistence Agriculture: An agricultural farming system in which the producers consume a large part of the final yield but one that does not preclude the cultivation of some products for sale. The ratio of subsistence to cash production might vary significantly from year to year (Reintjies *et al.,* 1992: 217).

Sustainability: The ability of a system to remain productive over the long-term, especially when subject to shocks and stress that disrupt its harmony (Mettrick, 1993: XXV). Generally, a term that is difficult to define because each scientific discipline accords its own definition.

Sustainable Agriculture: The management of agricultural resources in such a fashion that they satisfy fluctuating human needs, while consistently improving or at least maintaining the quality of the environment and quantity of natural resources (Reintjies *et al.,* 1992: 217).

Systems Approach: A scientific method in which the understanding of the complexity of systems is carried out by focusing on their interrelationships rather than merely examining their components (Mettrick, 1993: XXV). Reintjies *et al.* (1992: 217) stress the importance of the environment as one of the components in agricultural systems.

Technology: The knowledge, inputs and the management practices which are used with productive resources to attain a required product (Reintjies *et al.,* 1992: 217).

Transfer of Technology Model: The conventional extension model in which the transfer of technology is seen as a one way process from the researcher to the farmer via the extension

official with very little farmer feedback encouraged, and only informally encouraged (Mettrick, 1993: XXV).

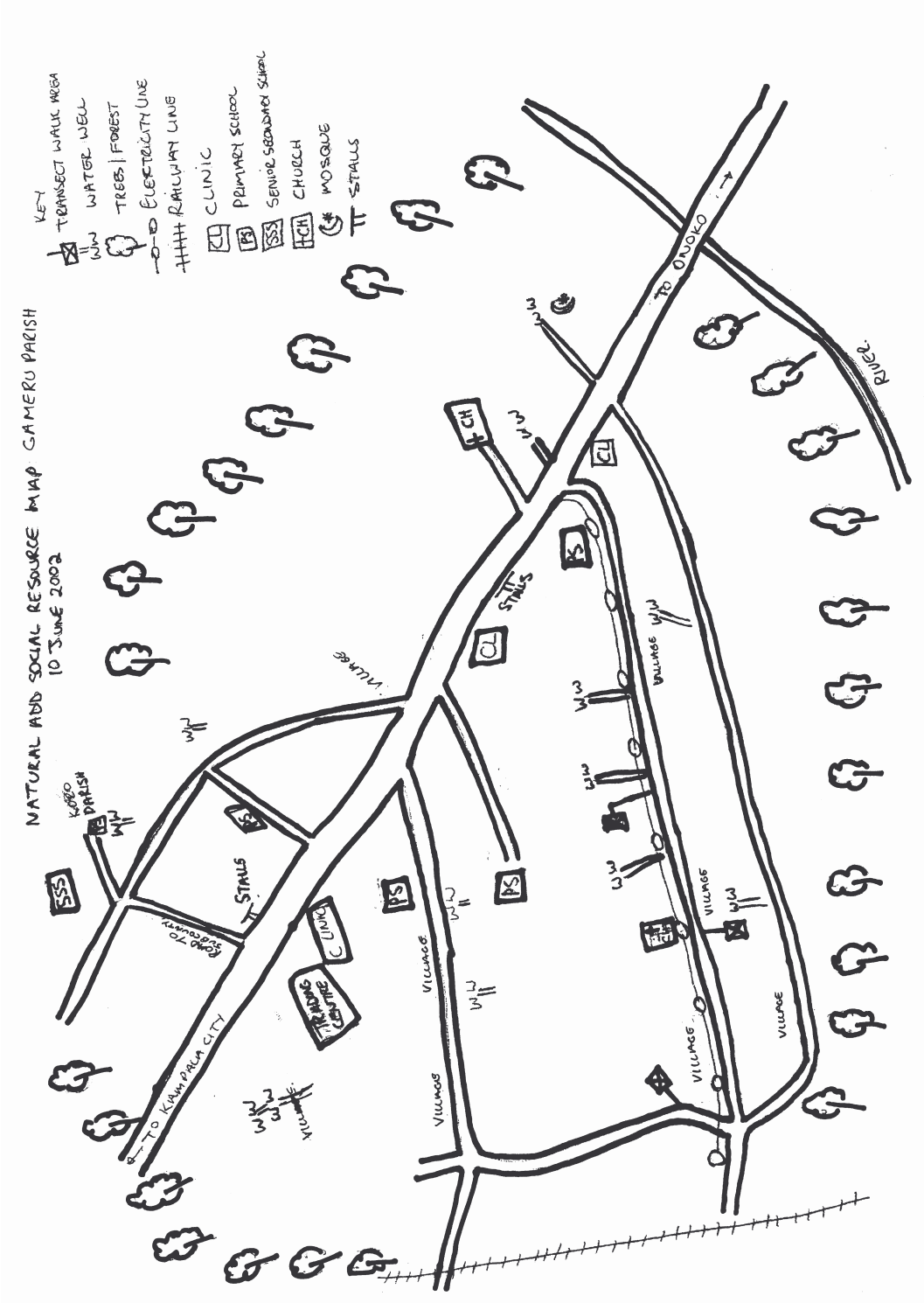
Variety: A plant that has been naturally propagated and is often referred to as a species or sub-species, i.e. it is the lowest level of the scientific classificatory system. Although manipulated by man hybrid plants are also known as varieties.

Water Harvesting: The means of collecting and storing water to secure or improve its availability for crop growth, and human and livestock consumption (Reintjies *et al.,* 1992: 218).

Weed: Not necessarily a bad or a harmful plant but rather one that is in a place where humans do not want its presence (Reintjies *et al.,* 1992: 218).

APPENDIX 1 (a)

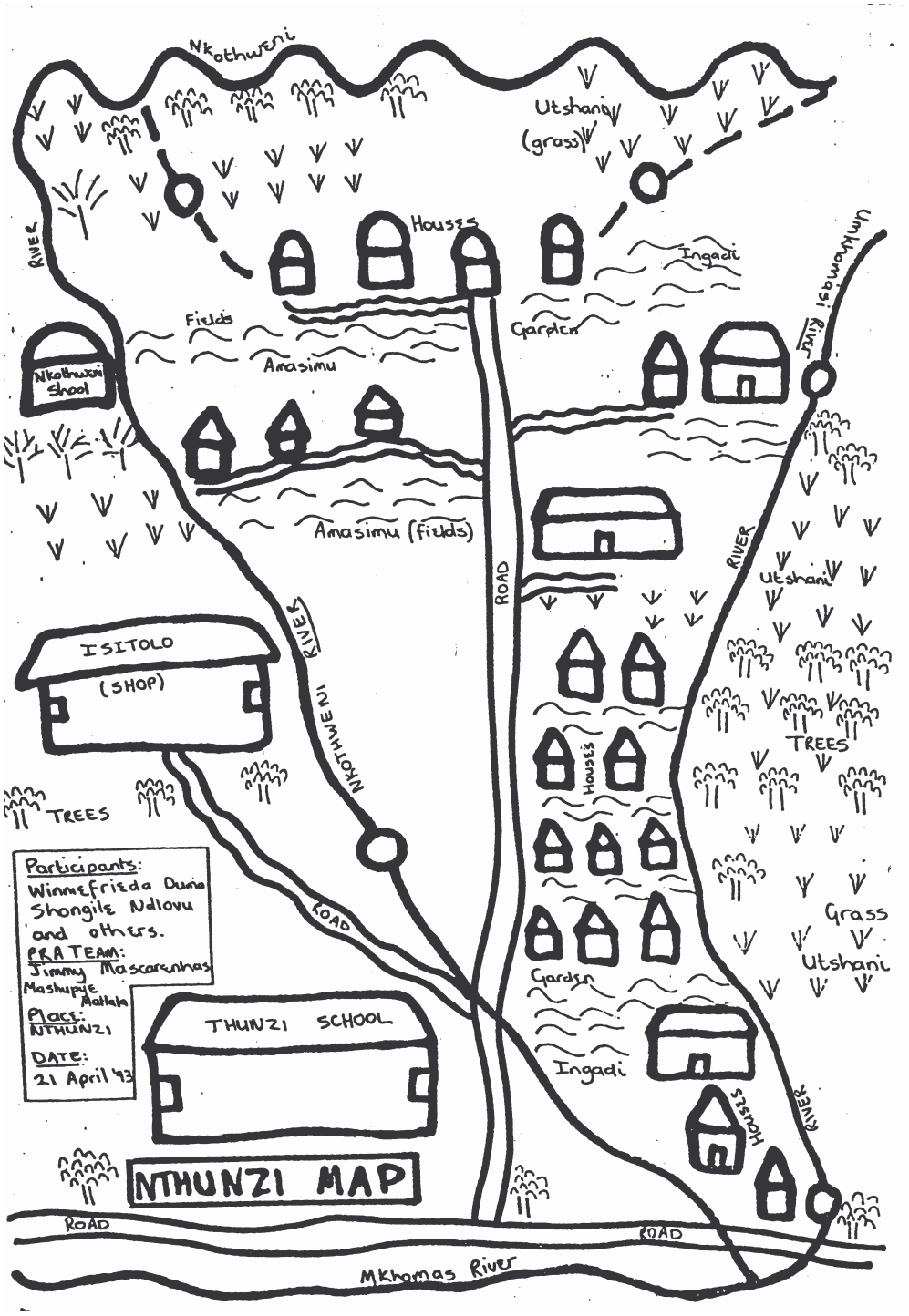
Natural and Social Resource Map of Gameru



Source: Fieldwork – June 2002

APPENDIX 1 (b)

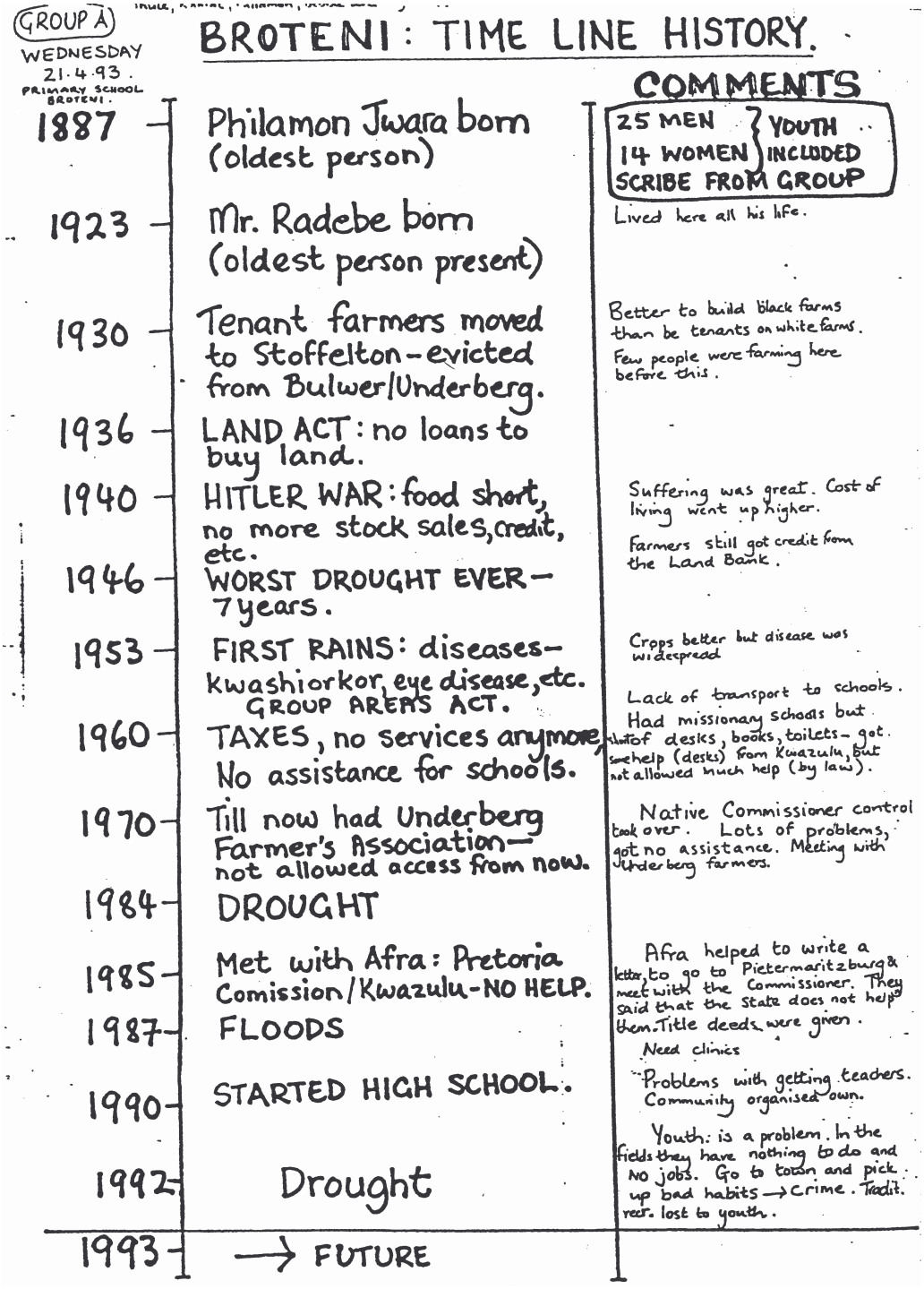
Natural and Social Resource Map (Example)



Source: Bulwer Participants (1993)

APPENDIX 2

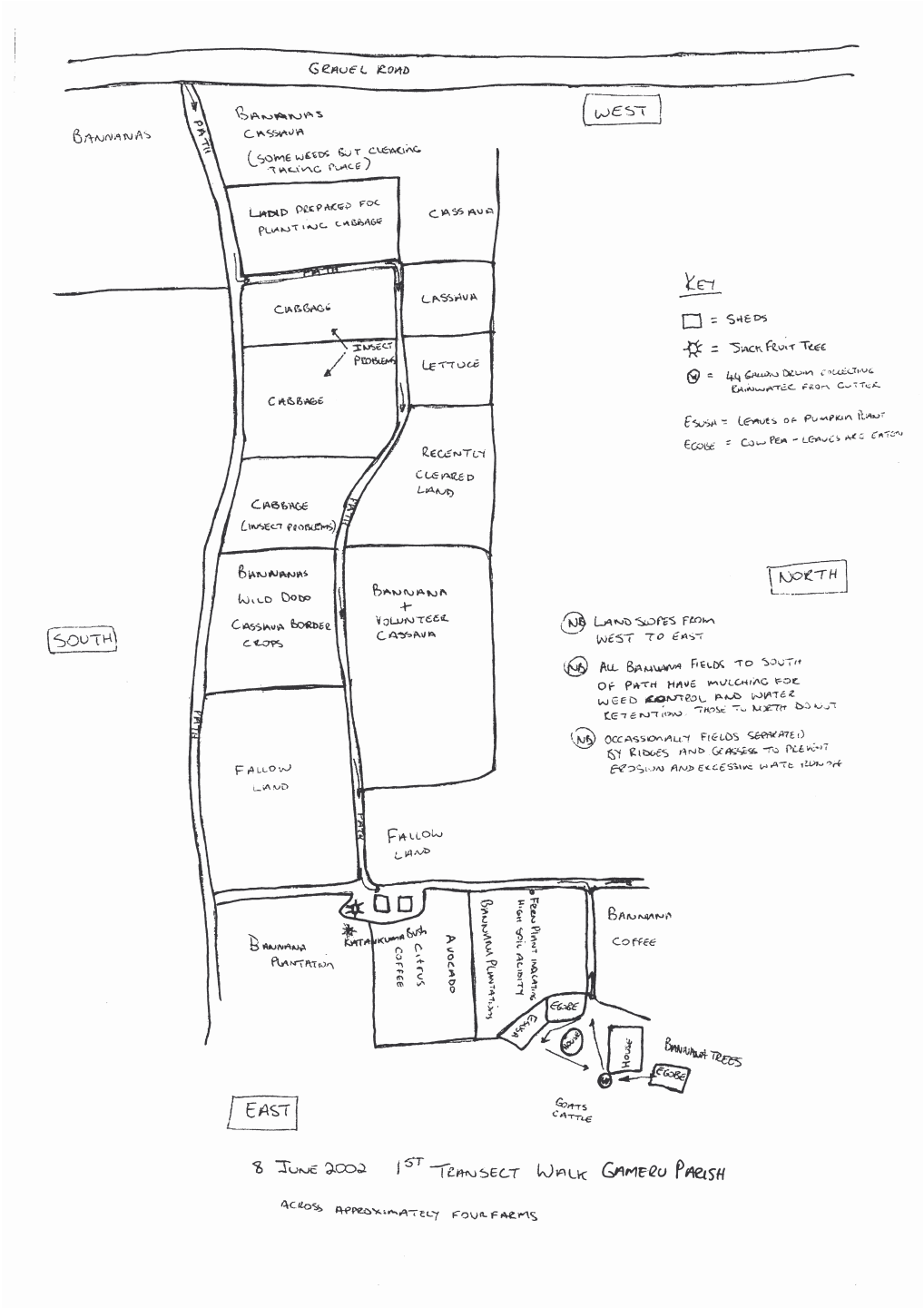
Time Line (Example)



Source: Bulwer Participants (1993)

APPENDIX 3(a)

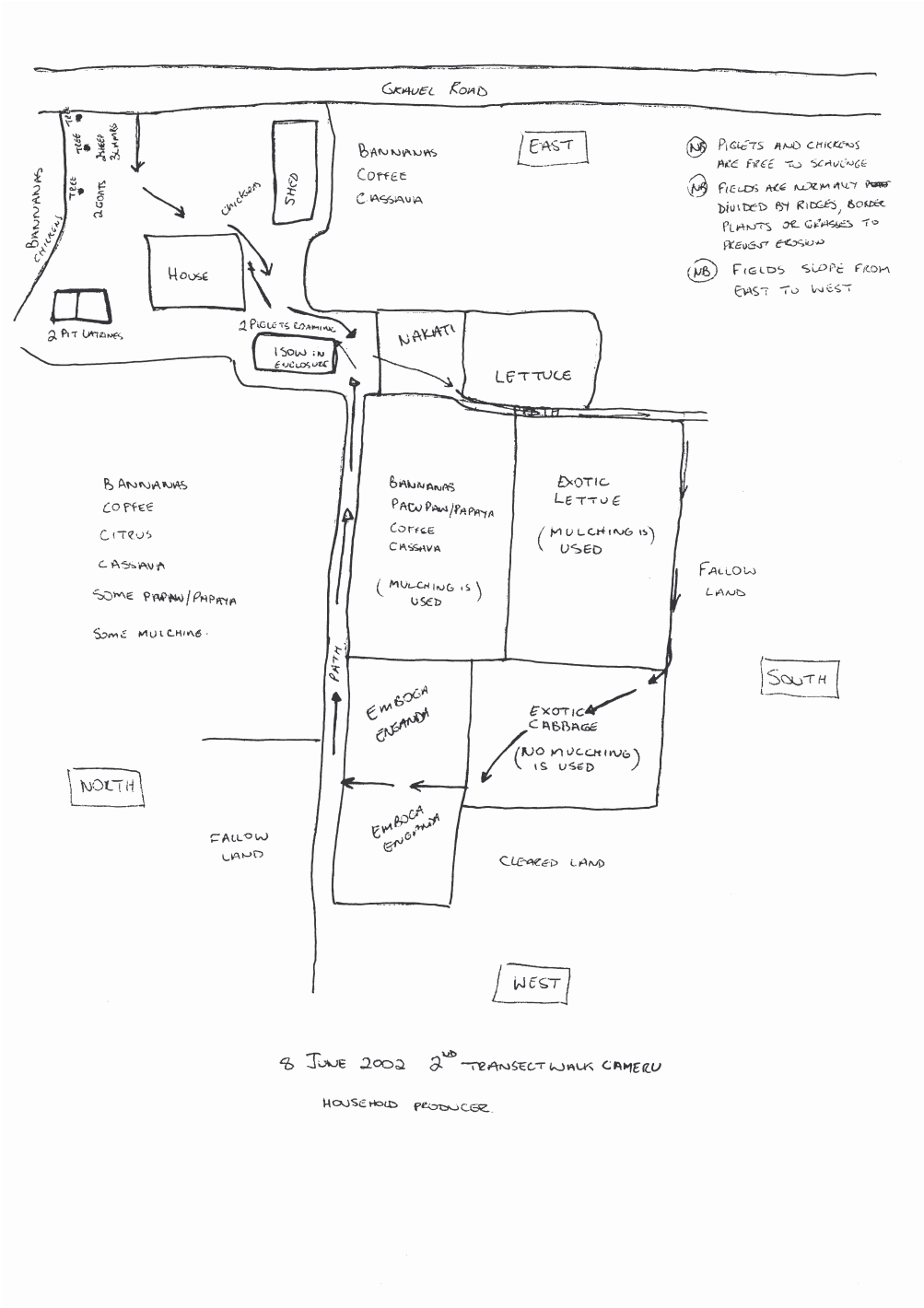
First Transect Walk Gameru



Source: Fieldwork – June 2002

APPENDIX 3(b)

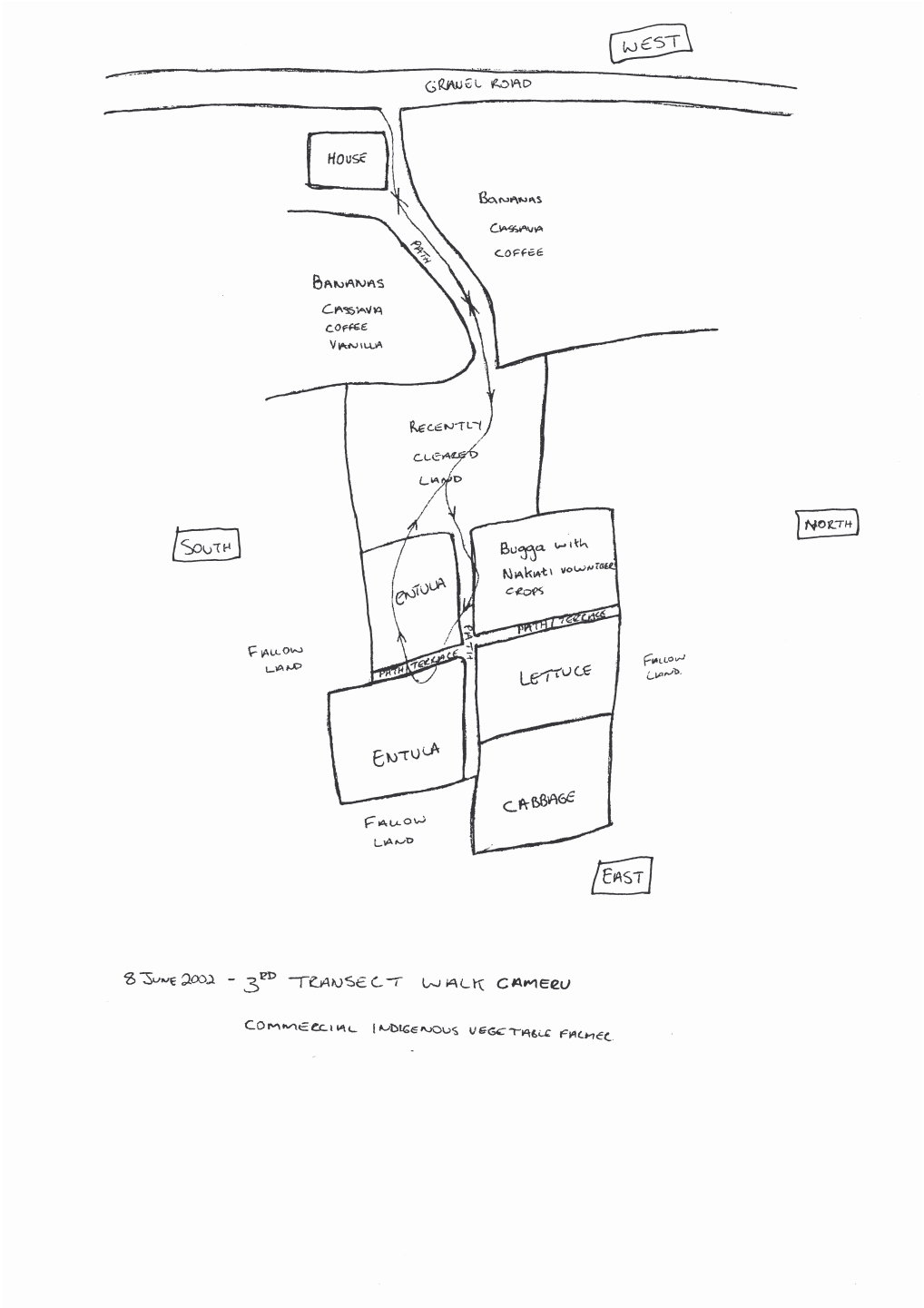
Second Transect Walk Gameru



Source: Fieldwork – June 2002

APPENDIX 3(c)

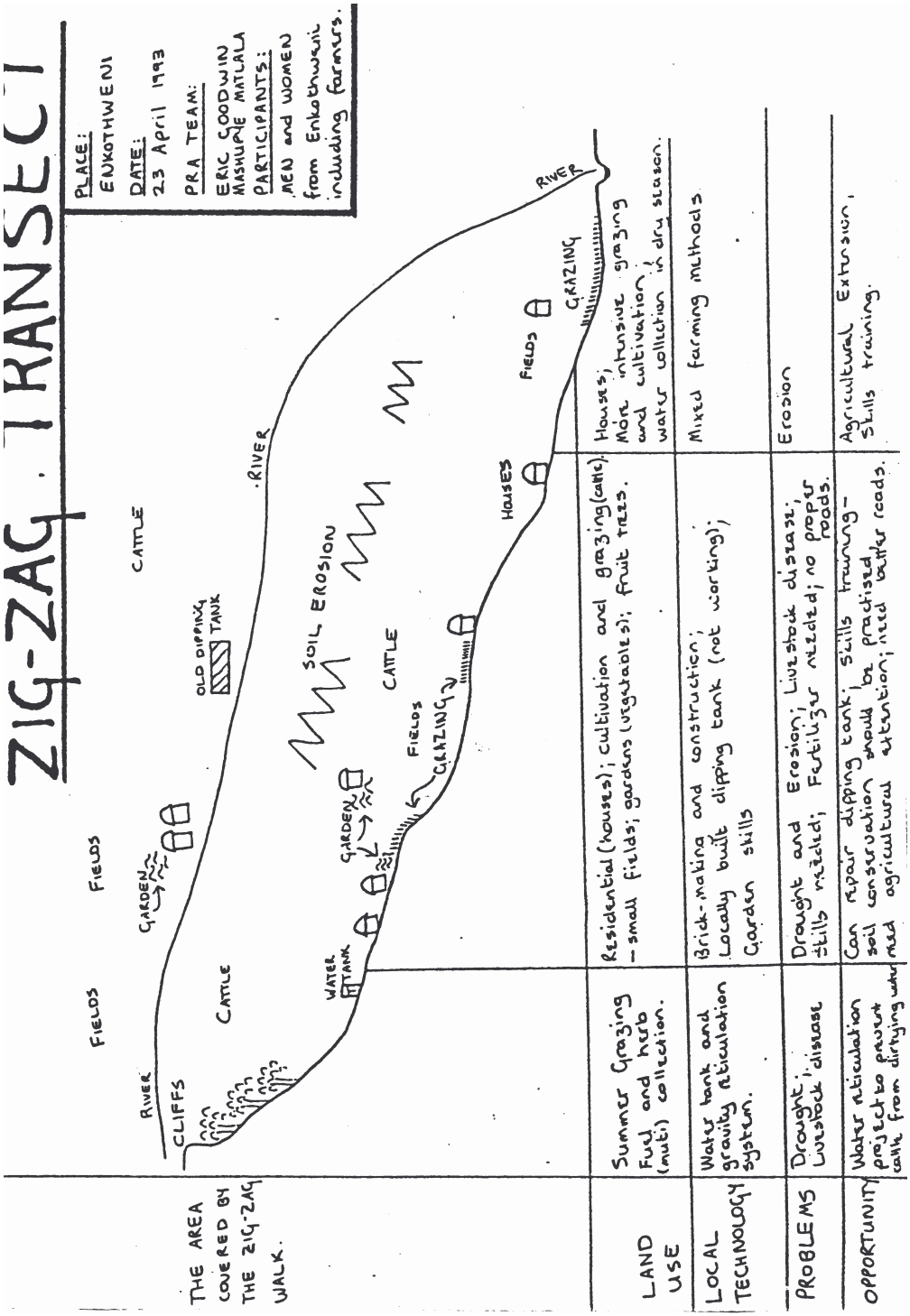
Third Transect Walk Gameru



Source: Fieldwork – June 2002

APPENDIX 3(d)

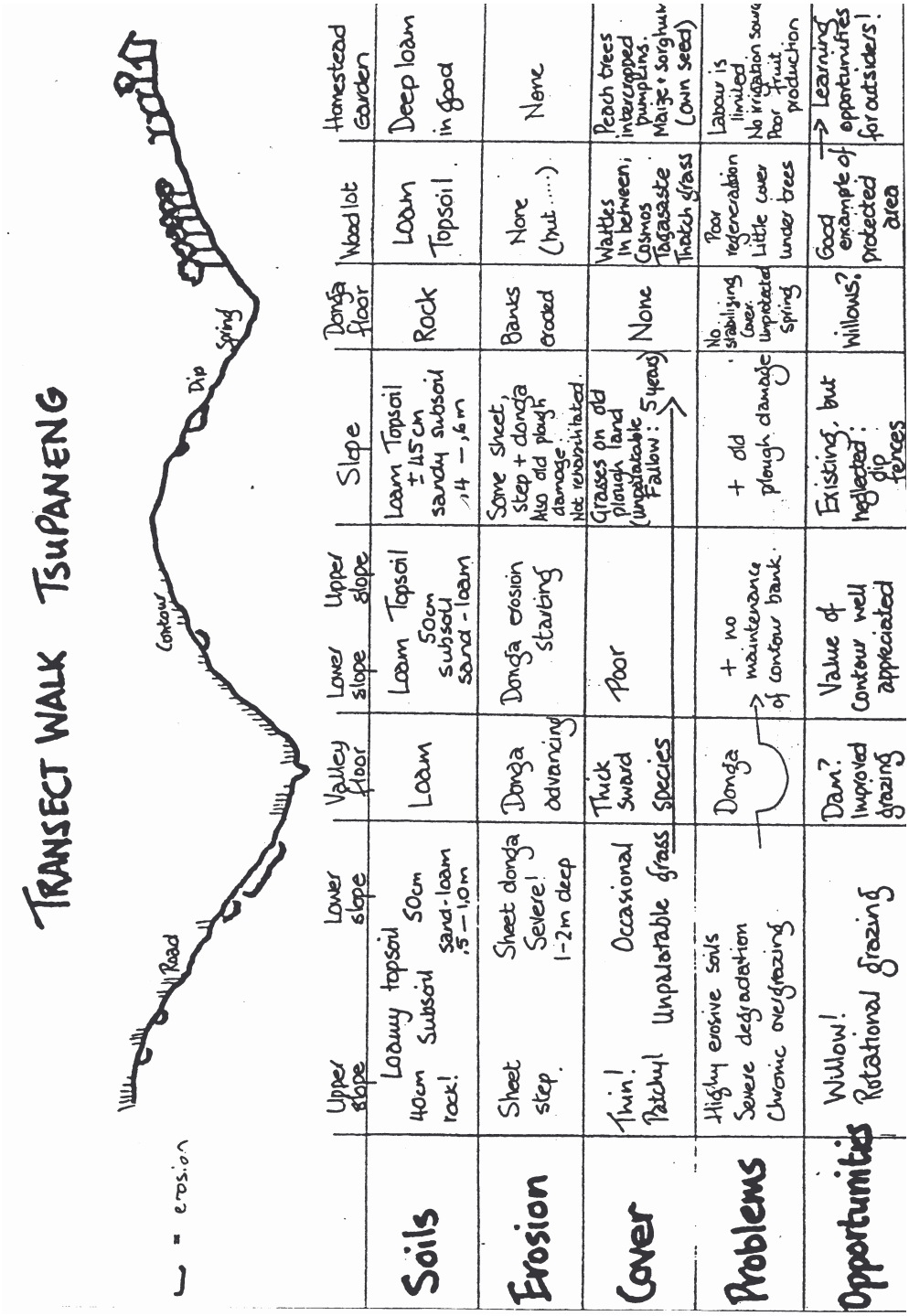
Zig-Zag Transect Walk (Example)



Source: Bulwer Participants (1993)

APPENDIX 3(e)

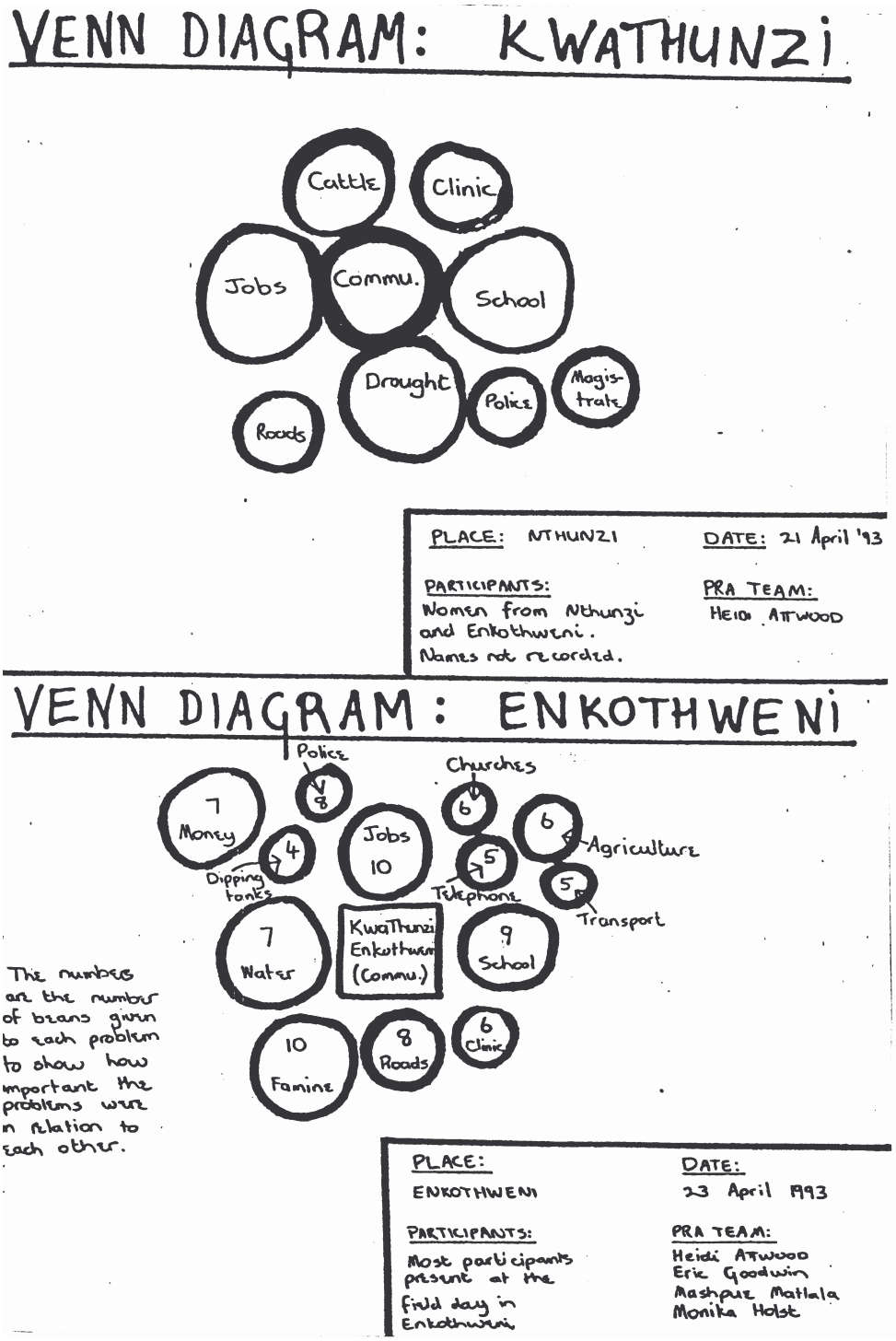
Straight Transect Walk (Example)



Source: Bulwer Participants (1993)

APPENDIX 4

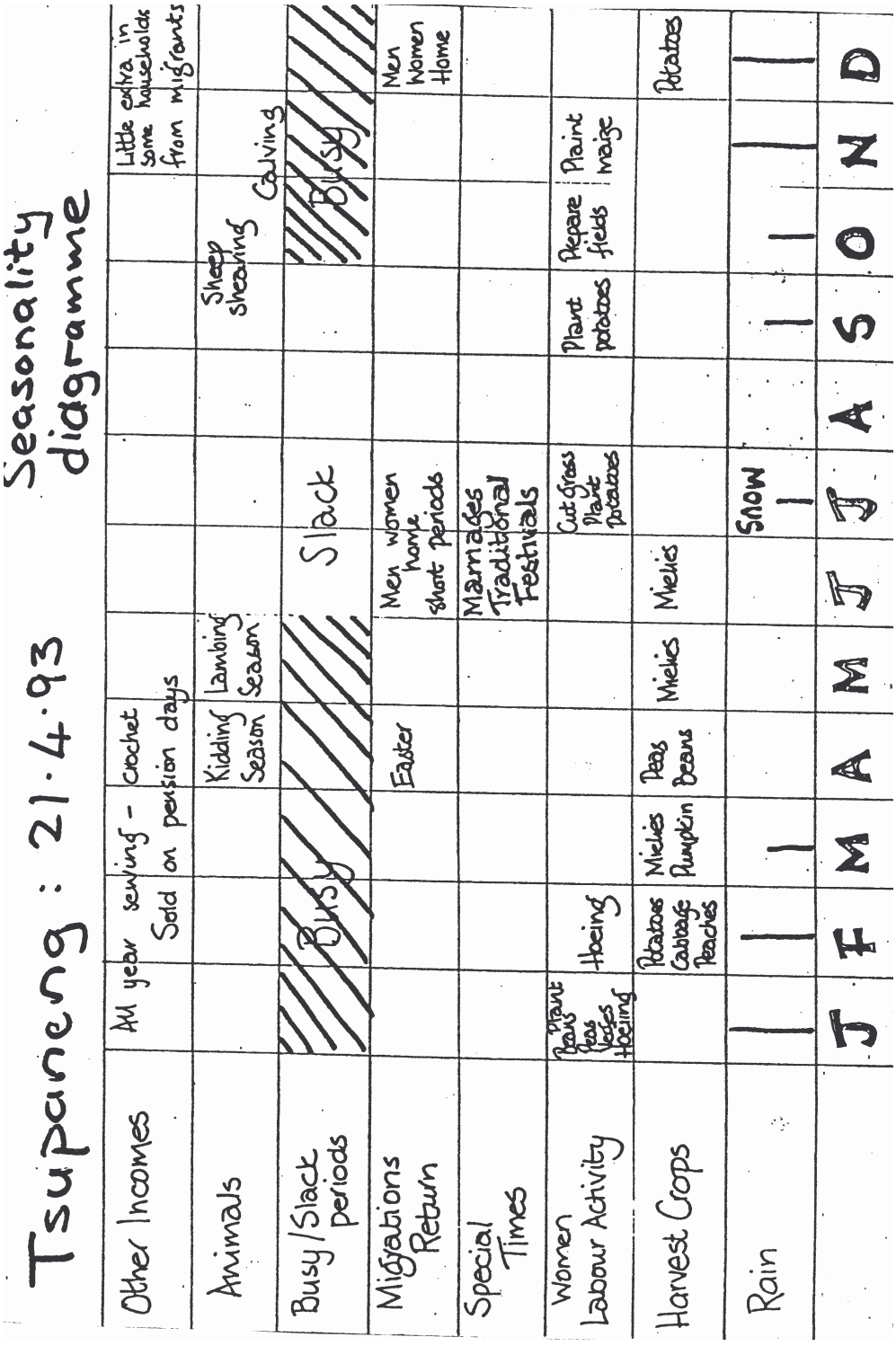
Venn Diagrams (Examples)



Source: Bulwer Participants (1993)

APPENDIX 5(a)

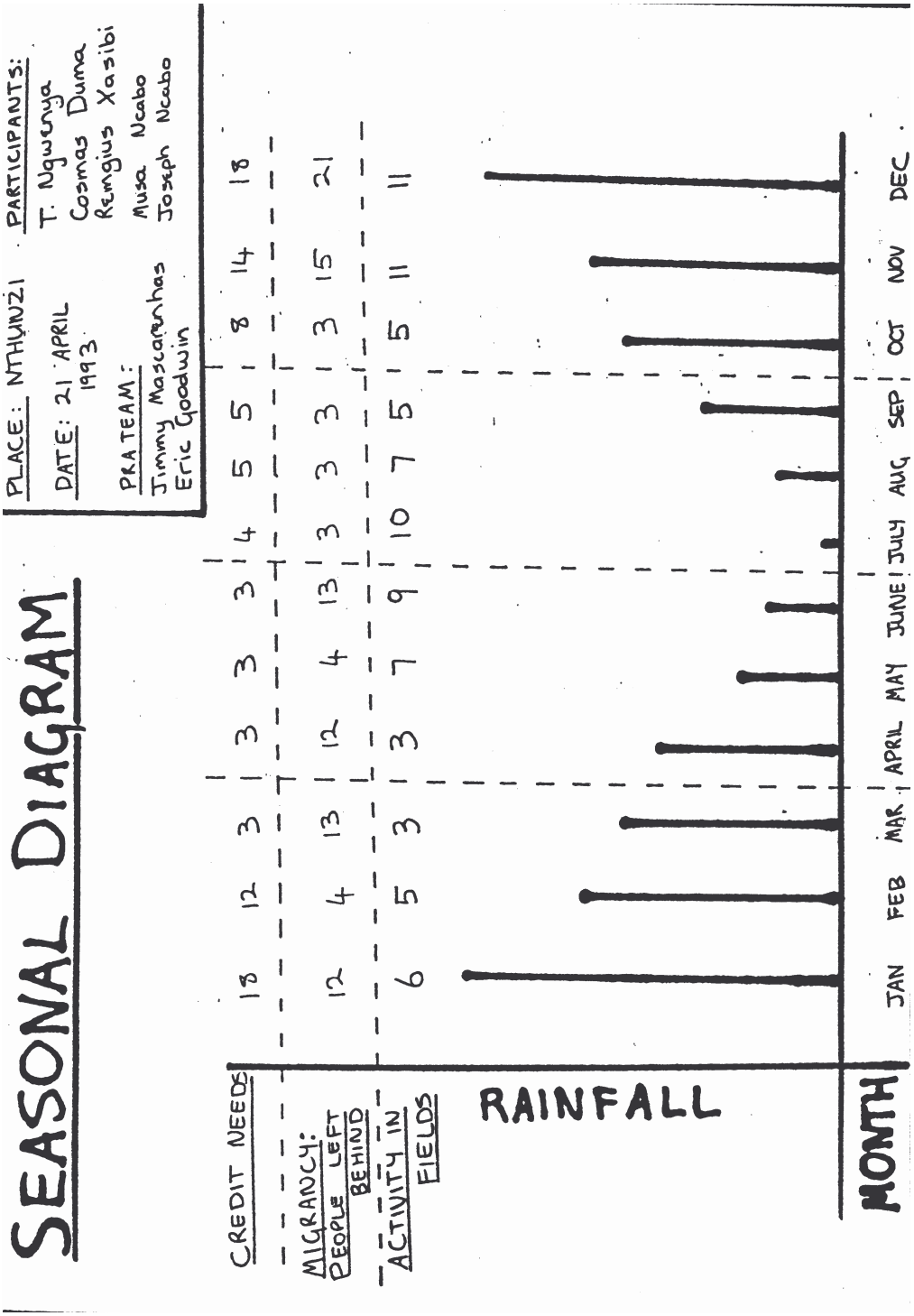
Seasonal Diagram (Example 1)



Source: Bulwer Participants (1993)

APPENDIX 5(b)

Seasonal Diagram (Example 2)



Source: Bulwer Participants (1993)

APPENDIX 5(c)

Seasonal Diagram (Example 3)

Rank and Seasonal Incidence of Most Important Cattle Diseases, Ngurunit, Marsabit District, Kenya 1997

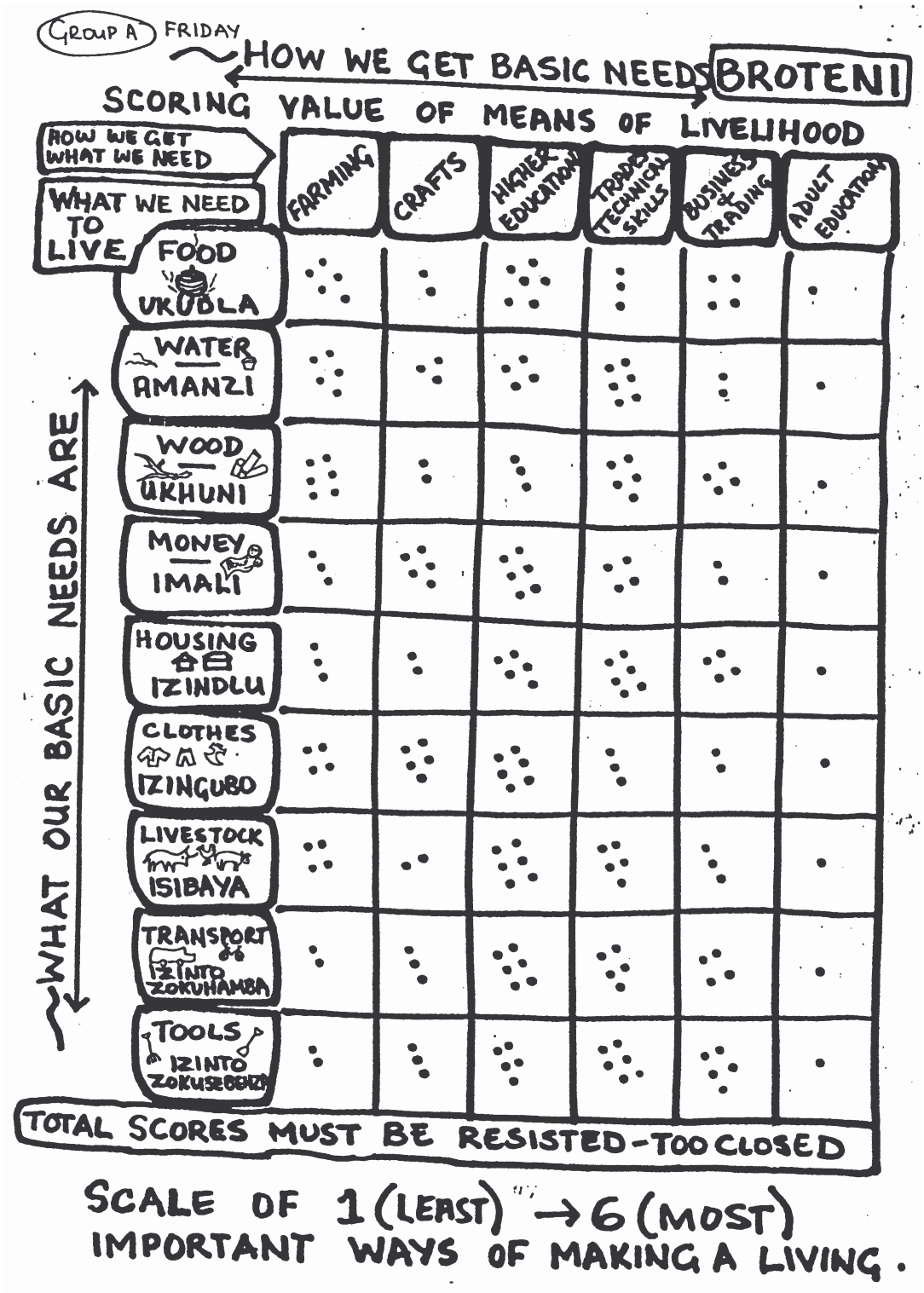
Rank	Disease Name		Season			
	Scientific	*Local*	June to Oct.	Oct. to Dec.	Jan. to March	March to June
			long dry	short rains	short dry	long rains
			lami yoda	*ltumiren*	*lami dorop*	*ngerngerwa*
1	contagious bovine pleuropneumonia	*lkibei*		oo		oo
2	Anthrax	*lokochum*	ooo		oo	
3	Rinderpest	*lodwa*	ooo			
4	Enterotoxemia	*nolgoso*			ooo	
5	foot and mouth disease	*lgulub*	ooo			
6	black leg	*nengeju*				ooo
7	Trypanosomosis	*saar*	o	o	o	o

Key for Disease Frequency:

ooo: high oo: moderate o: low blank:: never
*local Samburu names in italics

Source: Langill and Ndathi (1998)

APPENDIX 6(a)
Scoring Matrix (Example)



Source: Bulwer Participants (1993)

APPENDIX 6(b)

Options Assessment Matrix (Example)

Mbusyani Options Assessment Chart

BEST BET OR INNOVATION	PRODUCTIVITY	STABILITY	SUSTAINA-BILITY	EQUITABILITY	TIME TO BENEFIT	COST	TECHNICAL& SOCIAL FEASIBILITY
BOREHOLES	?	0	-	0	3	3	3
ROOF CATCHMENT	+	+	++	+	1	1	2
NATURAL SPRINGS	+	+	+	++	1	2	2
REHABILITATE DAMS	++	+	++	++	1	2	2
SHALLOW WELLS	+	+	++	0	2	1	2
NEW SURFACE DAMS	++	+	++	++	1	2	2

KEY

?	UNKNOWN
-	NEGATIVE IMPACT
0	NO IMPACT
+	POSITIVE IMPACT
++	VERY POSITIVE IMPACT

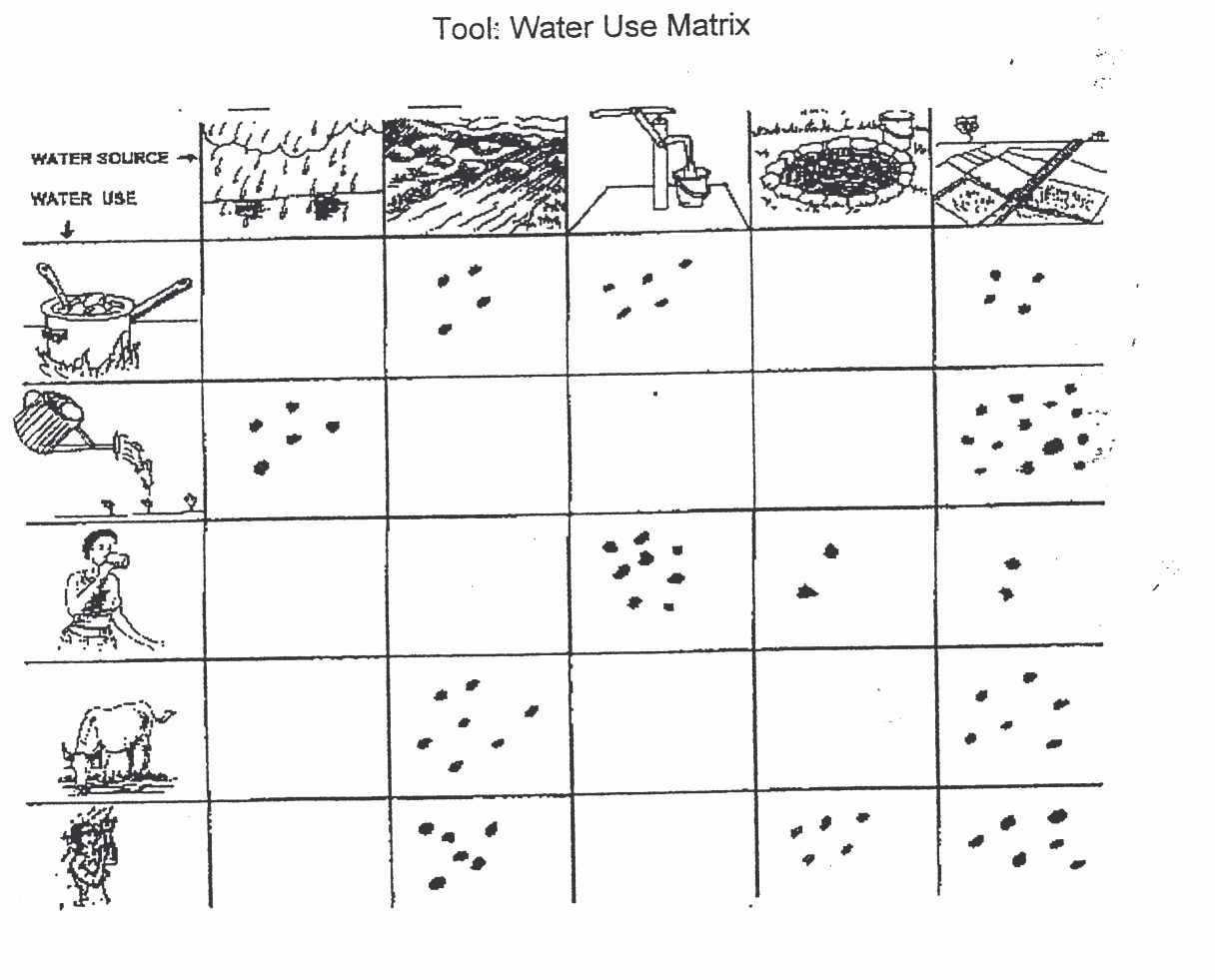
	TIME	COST	FEASIBILITY
3	LONG	HIGH	LOW
2	MEDIUM	MEDIUM	MEDIUM
1	SHORT	LOW	HIGH

Source: Participatory Rural Appraisal Handbook. 1992

Source: FAO (1996)

APPENDIX 7

Resource Use Matrix (Example)

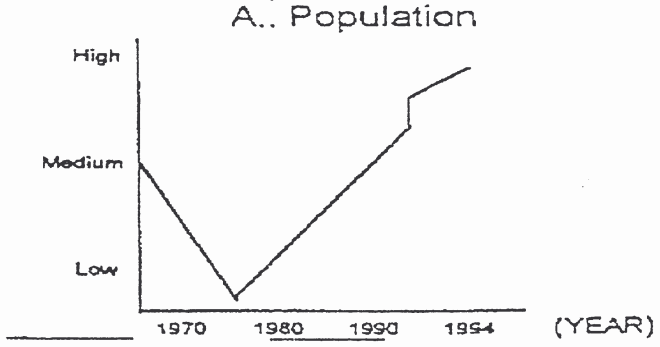


Source: FAO (1996)

APPENDIX 8

Trend Line Diagrams (Examples)

Figure: 5
Tool: Trend Lines
Example: Trend Lines from Jeded Village in Somalia



Source: Ford, Adam, Abubaker,
Fard and Barre. 1994.

Source: FAO (1996)