Neglected for several decades, nutrition is now firmly on the development agenda. Important landmarks are the initiation of the Scaling Up Nutrition movement in 2010; the adoption by the World Health Assembly of the Comprehensive Implementation Plan for Maternal, Infant and Young Child Nutrition in 2014; and the World Health Organization’s (WHO) Global Action on Nutrition. Nutrition is at the core of prevention, including workforce development. One reason is a lack of understanding of the role of public health nutrition in the prevention and management of the various forms of malnutrition. Another is that low-income countries tend to prioritize doctors and nurses (and sometimes also frontline workers) within their meagre health workforce expenditures. The complexity of nutrition as a discipline and practice tends to be overlooked; doctors, nurses and community health workers need specific preparation or guidance to deliver the nutrition services that health facilities are expected to deliver (as in Indone-
When nutrition professionals are unavailable for field programmes, international nongovernmental organizations (NGOs) may hire other workers, whose nutrition competencies may be highly variable. Another issue is that in lower-income countries undernutrition is a higher priority for interventions than nutrition-related chronic diseases. The latter are currently escalating in these countries. Both food system changes, at the level of production, processing and distribution, and behaviour change communication are needed to reorient the nutrition transition, and nutritionists have a major role to play in this regard. Studies on nutrition workforce capacity conducted in West Africa confirm this, and also highlighted the severe shortage of trained nutrition professionals (except in Nigeria and Ghana). Other weaknesses were that training emphasized food science and the treatment of severe undernutrition at the expense of public health nutrition; teaching was predominantly theoretical; and nutrition training of other health professionals was quite poor. In addition, because of a shortage of nutritionists, the bulk of the nutrition interventions were done by health workers (e.g. nurses or community health workers) who lacked the skills to provide quality nutrition services. The fact that nutritionists often had only a few weeks or months of training drew attention to the lack of regulation in the nutrition profession in the region. In Asia, a study in three countries showed that the nutrition knowledge of health professionals was outdated and that nutrition competencies were limited to curative activities (e.g. correcting nutritional deficiencies or treating severely malnourished children). The limited capacity of trainers was also noted. In the era of the SDGs, nutrition professionals need to be trained to apply a systems thinking approach, with nutrition being linked to broader systems of health, food and the environment.

How can we build this public health nutrition workforce? Several initiatives have been taken to assess and strengthen the capacity of nutrition workforces. However, substantive action is still needed with the support of WHO and other actors, as shown in the recommendations (Box 1). The International Union of Nutrition Sciences and the International Malnutrition Taskforce are addressing capacity development in nutrition. The eNutrition Academy was created in 2014 by a consortium of international nutrition organizations to offer free e-learning modules. The United Nations Children’s Fund and partners have developed e-learning modules on nutrition programming for Africa, and launched an initiative to assess and improve nutrition capacity in West Africa in 2010. The World Public Health Nutrition Association capacity-building taskforce, formed in 2008, held several workshops and developed various tools, including capacity assessment and competency frameworks to be used for curriculum development.

**Fig. 1. The nutrition workforce pyramid**

<table>
<thead>
<tr>
<th>Professional profile</th>
<th>Principal nutrition tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td>PhD Nutrition</td>
<td>Advocacy and planning research training</td>
</tr>
<tr>
<td>MSc Nutrition</td>
<td>Programming and coordination supervision training</td>
</tr>
<tr>
<td>BSc Nutrition (or dietetics)</td>
<td>Programme implementation counselling training</td>
</tr>
<tr>
<td>Health (other than nutrition), agriculture and education professionals</td>
<td>Integrating nutrition interventions into their activities</td>
</tr>
<tr>
<td>Community health, nutrition and extension workers</td>
<td>Delivering specific nutrition services to the community</td>
</tr>
</tbody>
</table>

BSc: bachelor-level degree; MSc: masters-level degree; PhD: doctorate-level degree.

Source: adapted from Shrimpton et al. 7

The nutrition workforce is best portrayed as a pyramid, representing the numbers, levels of training and occupational profiles at various levels (Fig. 1). The base consists of community health, nutrition and extension workers, who need vocational or on-the-job training to deliver some nutrition services directly to populations (e.g. child growth monitoring and promotion). The upper levels are nutritionists (and dietitians where relevant) with different levels of university training for different roles: from implementation of programmes and nutrition counselling at individual and community level, through programming and coordination, up to planning, advocacy and research at national level. Bachelor-level nutritionists and
dietitians could perform most of the required nutrition activities at country and district level, and their competence could be maintained through continuous education, as is the case in several high-income countries. Having more masters-level than bachelor-level nutritionists, as is currently the case in several African countries, for instance, is not cost-effective. At all levels, nutrition professionals can play an important role in training in a cascade fashion.

Although it requires sustained efforts, training can be regarded as the easy part of nutrition workforce development in low- and middle-income countries. The core technical and horizontal skills that public health nutritionists (masters level) need to acquire in the areas of intervention management, capacity-building and research have been proposed, along with assessment indicators. More challenging steps are recognition of the nutrition profession and its regulation, opening up government jobs for nutrition graduates and financing local training programmes and nutritionists’ salaries in the public sector. A current problem is that short, but unsustainable, training programmes are often offered by external agencies to fit the needs of specific development projects. These function independently from local universities, which remain resource-poor. Nutrition graduates may end up unemployed unless hired by international groups. While public financing is the most sustainable source of funding for higher education, other actors – particularly the large NGOs that hire nutritionists for their programmes – should contribute, for instance, by supporting training programmes or offering scholarships. Quality education is expensive and the funding issue is real, even if modern technology allows costs to be reduced through online training. Arguably, distance education is a real, even if modern technology allows costs to be reduced through online training. Arguably, distance education is another barrier to capacity-strengthening, although this is not an issue unique to nutrition. However, the concern is that it hinders training, action and research for improved nutrition. This may be one of the reasons why French-speaking African countries, for example, lag behind English-speaking Africa in nutrition workforce capacity.

The underlying causes of malnutrition, and hence sustained solutions to the problem, lie to a large extent in the non-health sectors. Nutrition therefore has to be addressed not only by other health professionals, but also by agriculture and education professionals and field workers, who need to integrate relevant nutrition tasks into their professional activities (such as orienting food production towards meeting the population’s nutrition requirements or teaching healthy eating to schoolchildren). Fig. 1. Strong workforces in nutrition are essential not only for scaling up nutrition programmes but also for implementing nutrition-sensitive interventions in these sectors. Nutrition professionals are needed in sufficient numbers to ensure adequate and sustainable training and monitoring of those who deliver nutrition-specific or nutrition-sensitive services to communities.

**Competing interests:** None declared.

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