



Chapter 3

Rice terraces in Indonesia - promise of a bountiful harvest.
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Skills and Jobs for Food Security and Agricultural Development





Chapter 3

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“Food production and rural development, particularly in those countries with significant food security inadequacies, require appropriate and up-to-date technologies which, according to sustainable development criteria and local food traditions, promote modernisation of local production methods and facilitate transfer of technology. Full benefit from these technologies will require training, education and skill development programmes for local human resources”.

The Rome Declaration on World Food Security, FAO: 1996.

This chapter aims, first, to underscore the critical importance of ensuring food security and paying attention to related aspects of agricultural and other economic activities and, second, examines the issues of skills development and job creation from the perspective of national food security. The issues relating to food security, its relevant features and characteristics, will be noted in order to understand better the skills and capacities required and their effective use to achieve food security goals. The four parts of the chapter comprise of: (i) fighting hunger in the world and food security trends and strategies in selected regions; (ii) issues of food security and agricultural development; (iii) skills development needs arising from food security goals and priorities; and (iv) how the relevant skills are best utilised in jobs and employment to achieve food security and fight poverty.

There is a potential crisis in the making in respect of global food security which may be far more serious than what has been experienced recently in 2006-2008. The challenge remains to produce and supply enough safe and nutritious food in a sustainable way for a growing global population, which is projected to reach nine billion by 2050. The situation has all the potential of turning into a mega-crisis unless remedial measures of commensurate scope are taken within countries and through appropriate international collaboration.

A commonly accepted definition proposed by the 1996 World Food Summit is that food security is achieved "when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (FAO: 1996).

This definition points to three inter-connected elements, which are essential to achieving food security:

- Food availability: having sufficient quantities of food from household production, other domestic production and availability in the market including commercial imports and food assistance;
- Food access: having the resources to obtain appropriate foods for a nutritious diet, which depends on household income, food prices, and non-market access to food; and
- Food utilisation: proper consumption of food with positive nutritional impact, facilitating a diet with sufficient energy and essential nutrients, potable water, adequate sanitation, and sharing and feeding practices within household as well as knowledge of food storage, processing, nutrition and child care, and illness management.

Food security is clearly a multi-dimensional phenomenon. It is about risks and vulnerability of people and has temporal, geographical as well as economic, social and political dimensions. It is more than a transitory and simple deficit that can be tackled by balancing supply and demand. Nobel Laureate Amartya Sen famously wrote that starvation is a matter of some people not having enough food to eat, and not a matter of there being not enough food to eat (Sen:1981). The irony is that most of the food insecure people live in rural areas where food is produced, yet they are net food buyers rather than sellers. Poverty prevents their access to food in the marketplace.

According to the UN Hunger Task Force, about half of the hungry are smallholders; a fifth are landless; and a tenth are agro-pastoralists, fisherfolk, and forest users; the remaining fifth live in urban areas. Today, agriculture's ability to generate income for the poor, particularly women, is more important for food security than its ability to increase local food supplies. Women, more than men, spend their income on food.

Food price increases around the world between 2006-2008, including more than doubling of the staple grain rice, sent more than 100 million people below the poverty line. The 2008 food price spike caused riots or civil unrest in a number of countries, including Bangladesh, Burkina Faso, Cameroon, Egypt, India, Indonesia, Ivory Coast, Mozambique, Pakistan, the Philippines, Senegal, Somalia and Yemen (BBC: 2010).

More importantly, the recent crisis challenged the complacent notion that agricultural development and technological progress would keep the world's growing population adequately fed and shortages of staples in countries would be adequately handled by international trade and the market mechanism.

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The global price hike, shortages and consequent turmoil drew attention to some basic facts which may not have quite registered on people's consciousness with their full impact.

- More people die each year from hunger and malnutrition than from AIDS, tuberculosis and malaria combined (WFP: undated).
- More than one billion people – almost a sixth of the world's population – are undernourished (WFP: 2009). It is hardly a consolation that globally, there are a billion overweight people, the same number as undernourished, and 300 million of them are obese. Indeed, improper utilisation of food is a serious food security issue (WHO: 2011).
- Of the two billion increase in world's population expected from the present to 2050 – 7 billion to 9 billion – Africa will account for half, its population doubling to 2 billion by 2050. Sub-Saharan Africa arguably faces the most serious food security threat among all regions (WFP: 2009).
- Demand for food is projected to increase by 40% by 2030 and 70% by 2050 globally; it will be more than double for developing countries by 2050 (OECD-FAO: 2009).
- While demand for food is rising, the amount of land suitable for food production is decreasing – mainly through pressures from other uses and climate change (WFP: 2009).

Meeting the basic needs of food and adequate nutrition of all the people, rural and urban, is an essential element of combating poverty and bringing about transformative change in rural areas. The burden of meeting these basic needs fall primarily upon the rural people, their productive activities and how effectively their skills and capacities are developed and deployed. Agricultural development and off-farm economic activities are the twin engines of rural transformation and elimination of rural poverty. Ensuring food security is closely related to both improving agricultural production and other aspects of economic and broader development of people in rural areas.

3.1 Fighting Hunger in the World

The first of the eight Millennium Development Goals adopted in 2000 is to reduce by half the proportion of people suffering hunger by 2015. Despite some progress in the last decade, achievement of this goal remains uncertain. The progress has been particularly slow in South Asia and Sub-Saharan Africa. In both regions, there has been a reduction in the percentages affected by shortage of food, but because of high population growth, the absolute numbers of hungry people continue to go up. A food price inflation has been witnessed in recent years, which appears to reflect a secular trend, and if is allowed to go on unchecked, will push many millions more of already vulnerable people over the edge into starvation. The estimate is that an additional 100 million people are currently in danger. Climate change and depletion of natural resources will continue to have a major negative impact on food production in vulnerable areas of Sub-Saharan Africa (Government of Ireland: 2008).

Food insecurity in Sub-Saharan Africa

Chronic food insecurity and undernourishment, rather than transitory shortages persist in Sub-Saharan Africa. The major reasons for this situation are low agricultural productivity, limited rural development, government policy disincentives, and the impact of poor health including HIV/AIDS and Malaria on the agricultural workforce. Added to these has been the impact of rising global food prices and climate change, which will continue to be critical factors for food security in the region (GAO: 2008).

A study of the International Food Policy Research Institute (IFPRI), based on household expenditure surveys in 12 African countries showed that the prevalence of food energy deficiency ranged from 37 percent in Uganda to 76 percent in Ethiopia. Even at the low level of deficit in Uganda, over one-third of the people do not have access to sufficient food to meet their energy requirements for daily activities. Almost three quarters of the people are in this situation in Ethiopia, Burundi, Malawi, and Zambia. The ranking of the 12 countries are shown in Table 3.1, which illustrates the variation in food insecurity, and at the same time, the overall severity of the problem in Sub-Saharan Africa.

The IFPRI study used a diet quantity and a diet quality measure of food insecurity. These are (i) the percentage of people who consume insufficient dietary energy, or the prevalence of “food energy deficiency”; and (ii) the percentage of households with low diet diversity, an indicator of poor diet quality. A household is considered to have low diet diversity if it fails to acquire foods from at least four of seven groups of essential categories – water, carbohydrates, fibre, fat, protein, minerals and vitamins. An essential nutrient is a food item required for normal body functioning that must be obtained from a dietary source.

As shown in Table 3.1, in seven of the countries – Burundi, Ethiopia, Malawi, Mozambique, Rwanda, Senegal, and Zambia – food insecurity appears to be both a problem of access and insufficient national food availability. In these countries, the average energy availability per capita falls below the average person’s energy requirement for “light activity”, which implies that there is not enough food for all people even if it were to be distributed according to need. In the other countries, enough food was available to meet the energy needs for light activity of all, at least in the survey year. Access problems arising from income inequalities and poverty were more the critical forces contributing to food insecurity in these countries. In Sub-Saharan Africa, both food availability and food access must be given attention,

addressing weather-related transitory food insecurity as well as poverty-related chronic factors (Smith *et al.*: 2006).

The IFPRI study underscores that problems of diet quality are in varying degree widespread in most of the Sub-Saharan African countries. Low diet diversity appears to be a relatively minor problem in the three West African countries, but it is a more serious problem in the East and Southern African countries. In this respect, it is noteworthy that, there is not a strong association between the diet quantity and quality in terms of nutritional outcomes, suggesting that these two aspects of food insecurity have different distributions across and within households and differing determinants.

The study found a mixed picture regarding the prevalence of food energy deficiency in urban and rural areas. In seven of the study countries, the urban rate of food energy deficiency is close to or higher than the rural rate. This may be because urbanisation is increasing in Sub-Saharan Africa and the food insecurity problem is moving to the cities. As expected, income has a very strong bearing on food security. For both diet quantity and quality measures, the incidence of food insecurity decreases quickly as one moves from the poorest 20 percent of countries’ population to the richest quintile in both urban and rural areas (Smith *et al.*: 2006).

Table 3.1 Food Energy Deficiency in 12 Sub-Saharan African Countries

Country	% of population in food energy deficiency	Data time and source
Ethiopia	76.4	1999-2000 Household Income, Consumption and Expenditure Survey
Burundi	74.8	1998-1999 Enquête Prioritaire
Malawi	73.3	1997-1998 Integrated Household Survey
Zambia	71.1	1996 Zambia Living Condition Monitoring Survey I
Rwanda	65.3	2000-2001 Enquête Integrale Sur les Conditions de Vie de Ménages au Rwanda
Mozambique	60.3	1996-1997 National Household Survey on Living Conditions
Senegal	60.2	2002 Enquête Senegalaise Auprès des Ménages
Ghana	51.4	1998-1999 Ghana Living Standard Survey
Guinea	45.1	1994-1995 Enquête Integrale sur les Conditions de Vie de Ménages
Tanzania	43.9	2000-2001 Tanzania Household Budget Survey
Kenya	43.9	1997 Welfare Monitoring Survey III
Uganda	36.8	1999-2000 Uganda National Household Survey

Source: Smith, Alderman and Aduayom (2006).

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FAO has the responsibility for estimating food energy deficiency and monitoring progress in respect of Millennium Development Goal 1 related to extreme poverty and hunger. The FAO estimates and those of the IFPRI study do not quite correspond with each other. The discrepancy arises from the way national level parameters for food security – requirement, availability and consumption – are measured. FAO uses a minimum mean energy requirement for light activity (around 1,800 kilocalories); whereas many household living standards surveys, the data source for the IFPRI study, use an average requirement of 2,050 kilo calories, as recommended by the 1985 FAO/UNU/WHO Expert Consultation on Energy and Protein Requirements. The rationale here is to identify people who consume insufficient dietary energy to meet their needs, beyond physical survival. The latter criterion and estimates of food energy deficiency from household economic surveys (HES) applying this criterion are arguably associated strongly with other MDG indicators of poverty and hunger than the minimalist FAO estimates (Smith *et al.*: 2006, pp.70-71).

Although the data from the IFPRI study regarding food insecurity and malnourishment in Sub-Saharan Africa are somewhat outdated, the magnitude and character of the problems have not changed significantly in recent years. If anything, the recent global food price hikes and food shortages, not reflected in the study, are likely to have aggravated the problems. More important than precise statistics about proportions of people affected by food energy deficiency, which are sensitive to specific transitory conditions, the analyses provide an overall picture and trends which are on the whole worrisome and must be addressed.

The HES-based data for measuring food insecurity provide policy relevant, reasonably reliable and multi-faceted measures. They are essential for multilevel monitoring and evaluation of national and sub-national food insecurity. When collected, processed, analysed and reported regularly, they are essential inputs for formulating and assessing policy interventions.

African agriculture, feeding the population and providing livelihood and employment for the large majority of the people nationwide, and in overwhelming proportions in rural areas, operates largely as smallholdings. The widely

accepted premise regarding Africa as well as developing countries in general, as discussed above, is that the future of agricultural development and protection of food security lie in improving the performance of the smallholders. The prospects for farm workers without land ownership and off-farm rural employment also ride heavily on the shoulders of the smallholders' ability to multiply farm productivity and generate the wealth to create economic opportunities for all rural people. Agriculture and food production is unlikely in the foreseeable future to become highly capital-intensive and technology-intensive industry in Africa as in the high income countries. However, is there a role for large-scale commercial farming in Africa – along the line of what has been witnessed in such diverse countries as Argentina, Brazil, Malaysia, South Africa and Thailand?

Many would argue that large-scale commercial agriculture can be a powerful driver of agricultural growth and can make an important contribution to ensuring food security and reducing poverty in Africa (see Box 3.1).

Food security in China

China's tumultuous history has had its fair share of droughts and famines. More than 5,000 years of farming also has left its soil depleted, more dependent on technology and agrochemicals to boost production. Growth of population and urbanisation has further intensified the pressure on arable land. Unremitting urbanisation and property development have devoured massive amounts of farmland, threatening grain supply and agricultural development. Since the 1990s, an increasingly affluent population, with a growing appetite for agriculturally intensive food products like meat and dairy, has made food price inflation a concern for wider social stability and development in China. Meeting the food demands of 1.3 billion people is a challenge with many ramifications.

In the three decades since the 1980s, Chinese agriculture has maintained a growth rate to feed successfully its large population, still increasing, albeit more slowly than in the past. The outputs of grains increased by 64 percent during 1978 to 2007 – from 305 megatons to 501 megatons. The population increased during the same period by 37 percent, from 963 million to 1.32 billion. The farming land

Box 3.1 Commercial Agriculture in Africa

A recent World Bank study, titled *Competitive Commercial Agriculture for Africa*, investigated how the successful agricultural commercialisation experiences of Brazil and Thailand may be able to inform agricultural development initiatives in Africa. Based on detailed case studies carried out in Brazil and Thailand, as well as in three African counties extensively endowed with underdeveloped land resources in the Guinea Savannah zone (Mozambique, Nigeria, and Zambia), the study found that there are substantial opportunities for farmers in Africa to gain international competitiveness and improve national food security.

The value-chain analysis carried out for the study suggests that large-scale farming may be advantageous in Africa under three sets of circumstances:

- When economies of scale are present as, for example, in “plantation crops” (sugar, oil palm, tea, bananas, and many horticultural crops grown for export).
- When Africa’s producers must compete in overseas markets that have stringent quality requirements and demand traceability all the way back to the farm – which may be feasible through commercially organised contract farming involving smallholders.
- When relatively fertile land must be developed in areas with relatively few people. Without a large, local labour force, large-scale mechanised farming may be the best model, even for growing staple foods.

On balance, the evidence suggests that today commercial agriculture has the same or better prospects in Mozambique, Nigeria, and Zambia as it did 40 years ago in Brazil and Thailand. Policy measures that needs attention for commercial agriculture to play its role in food production and poverty reduction include:

Reform of institutions to make markets work better: Commercial agriculture needs institutions that make markets more efficient and less risky. The state must offer critical services that the private sector currently has few incentives to provide.

Public sector and governance reform: A major challenge is to develop governance structures and capacities for the state to play its vital role in developing a dynamic and equitable commercial agriculture. Personnel at the local level of Ministries of agriculture and local governments and a range of other ministries require far more capacity and skill in marketing and business development services, as well as in forging the public-private-civil society partnerships that typify the state’s new roles.

Managing social impacts: Commercial agriculture cannot support national objectives of broad-based growth and poverty reduction unless the wealth it creates is shared widely. Thailand’s agricultural transformation, dominated by smallholders, seems more compatible with the employment generation objectives of many African countries than Brazil’s transformation, which was dominated by farmers with the wealth and political power to secure large areas of land and leverage the capital to invest in large-scale, highly mechanised production technologies.

Managing environmental impacts: The expansion of current low input African agriculture incurs especially high environmental costs: deforestation, land degradation, lost biodiversity, and the release of carbon sequestered in soils and trees. A more intensive land use pattern could limit these costs by limiting the land converted to agriculture. However, more intensive agricultural strategies can also deplete or degrade water and pose health hazards.

A significant general lesson is that modern commercial agriculture is not synonymous with vast, mechanised farms. Thailand and Brazil show that agricultural revolutions can be catalysed by smallholders or by large-scale farmers. On balance the evidence suggests that the fruits of those revolutions are more widely shared when smallholders participate. Second-round employment and poverty-alleviation effects are likely to be much larger when smallholders lead the way, because growth in smallholders’ incomes tends to generate more demand for locally produced, non-tradable goods.

Source: Adapted from World Bank, “Awakening Africa’s Sleeping Giant: Prospects for Commercial Agriculture in the Guinea Savannah Zone and Beyond” from the Directions in Development Series.

for grain during this period shrunk by 12.4 percent – from 120.6 million hectares to 105.6 million hectares – due to land degradation, desertification, urbanisation and other reasons. At the same time, China’s wheat and maize yields almost tripled and rice yield doubled from 1965 to 2002 (Rozelle, Veeck and Huang: 1997; Yu and Zhao: 2009).

Nobel Prize winning economist Theodore Schultz, contrasting agriculture in developed and developing countries said that the former has a food problem while the latter is faced with a farm problem (Schultz: 1953). He was referring to the situation of subsistence farmers, and poor productivity resulting in farmers not producing enough even to feed themselves in many developing countries. The industrialised countries had reached a stage of high land

and labour productivity with the application of technology; their problem was to manage the farm with optimal efficiency responding to market forces. Hayami and Godo added another problem for the middle income countries, viz., the poverty problem (Hayami and Godo: 2002). They pointed to the problem of disparity in wages between farm and non-farm work, arising from insufficient investment in technology and relevant skills and other policy and inputs constraints, impeding productivity and growth in agriculture and food production.

China has successfully tackled the food problem in the sense of maintaining increase in yield to meet the demands. It faces the poverty problem – the disparity in productivity and returns between agriculture and others sectors,

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which have emerged as a constraint, and which needs to be addressed with appropriate policy interventions in investment, pricing, research, human capital development and institutional changes. This perspective can be taken as an analytical framework for looking at food security issues in China as well as other developing countries which may be poor, middle income or in-between.

The income and livelihood of the vast majority of farmers in China has changed radically in the last three decades. Poverty in rural China has decreased very substantially. The nominal net per capita income of farmers has increased by 25 times and real increase, after discounting inflation, four times between 1978 and 2003 (Fan, Zhang and Zhang: 2004). The number of people in poverty, as it is defined officially, decreased from 250 million in 1978 to 23.6 million in 2005. The corresponding decrease in proportions is from 30.7 percent to 2.5 percent. The economic growth in rural China did not only change the poverty figures in China, but also changed the poverty map of the world (World Bank: 2008).

Researchers attribute China's success in increasing agricultural productivity and farmer's income to three major factors – investment in inputs, investment in adopting relevant technology, and institutional changes to facilitate effective use of the inputs and the technology (Fan: 1991, 1999; Lin: 1987, 1992a; Fan and Pardy: 1997, cited in Yu and Zhao: 2009).

As noted, the land resource in China is decreasing, which implies that the output would be sensitive to other inputs, particularly those aimed at increasing productivity per unit of land. Researchers have shown that fertiliser and power for irrigation have made a major contribution to productivity. It is reported that 21.7% of the agricultural growth from 1965 to 1993 in China can be attributed to use of chemical fertiliser and 12.9 percent from power input (Fan and Pardy: 1997). Productivity increase from labour input has been found to be insignificant, given that an abundant supply of labour renders marginal output from labour close to zero (Watanabe: 1996; Hayami and Godo: 2005).

China has one of the most fertiliser-intensive agriculture sectors in the world. Nitrogen fertiliser uses in China are significantly higher than most other developing

countries. It is more than ten times higher than in the African countries (Yua and Zhao: 2009). In the era of the planned economy, before 1978, China had invested heavily in building a good irrigational system, which contributed a lot to Chinese agriculture growth in the post-1978 period with the provision of energy to keep the irrigations system going.

Technology

Widespread use of two technologies – the use of hybrid seeds and the changes in cropping pattern – is reported to have contributed to 60 percent of the increase in rice productivity between 1975 and 1990, with 49 percent of the increase attributed to hybrid seeds and 11 percent to change in the cropping pattern (Xu: 1999). Researchers agree that technological innovations are the most important factor for agricultural growth in most provinces in China in the 1980s and the 1990s (Jin *et al.*: 2002; Mao and Koo: 1997).

Research plus education is the engine for technical change (Mao and Koo: 1997; Jin *et al.*: 2002). It is claimed that agricultural research contributed 19.5% of the agricultural growth from 1965 through 1993 (Fan and Pardy: 1997). In the 1990s, China has invested heavily in plant biotechnologies to improve agricultural yields in order to feed the increasingly large population. China arguably has the largest biotechnology capacity outside of North America (Huang *et al.*: 2002).

Institutional reforms

The change over from the communal cooperatives to the household responsibility system that came after the 1978 economic reforms is seen as an institutional reform that changed the scenario of Chinese agriculture with far-reaching impact on food production and food security. Various studies have shown a high impact of the institutional changes in the 1980s, soon after these were introduced, and major shifts from previous practices and procedures brought in. The impact became less visible or consequential in the later years, but still the high benchmarks were maintained for productivity and efficiency which were established with the change in institutions and management of the agriculture sector following the economic reforms.

Percentages of contribution to productivity that can be attributed to the changes mainly in the form of household responsibility and relaxation of pricing and marketing control have been attempted to be calculated and figures as high as 60 percent have been indicated (Fan, Zhang and Zhang: 2004). There are obviously methodological issues about attribution of outcomes to one factor when many interacting factors are at work. It can be confidently argued that appropriate institutional changes are necessary to make physical and technological inputs work effectively; and that without the latter, institutional changes can do little to influence the outcomes.

One of the institutional reforms that created incentives for agricultural productivity was in the area of pricing and marketing of grains. Many developing countries have attempted to keep food prices low for the benefit of urban residents and non-agricultural workers to the detriment of farmers. Under the weight of a looming crisis of low food production from Chinese agriculture, the distortions and regulations of grain prices and marketing collapsed and a market-based approach was adopted along with the household responsibility for farms. China started to increase the purchasing prices for food, and subsidise agricultural inputs, such as fertilisers and machineries (Ye and Rozelle: 1994; Qiao *et al.*: 2003; Wiens: 1983).

Human capital

The physical and technical inputs and the institutional changes mentioned above – the essence of the Green Revolution – has made modern agriculture more complicated than the traditional system of the past. Farmers need new knowledge, information and skills, and need to update these, in order to manage production, such as the utilisation of fertiliser, the use of pesticides, and the management of the irrigation system. Human capital development is vitally important for post-Green-Revolution agricultural development.

Some researchers have suggested that the full potential of the technological and physical investments and the reforms in institutions may not have been realised because of inadequate investment and efforts in developing the necessary human resources. Efficiencies in resource allocation and use of techniques and overall economic efficiency

have been found to be better among rice producers who have continued with conventional approaches, for example in Jiangsu and Zhejiang provinces, without adopting the new technologies or investing in new inputs (Xu and Jeffery: 1998; Fan: 1999).

Survey of 7,000 farmers in 1990 from Sichuan Province and Jiangsu Province showed that educational level of farmers were statistically significant for explaining the differences in technical efficiencies of farm production in both provinces. Similar association of education and farm productivity has been found in other provinces (Liu and Zhuang: 2000).

Drawing conclusions from research noted above, it can be said that:

- The potential for realising the benefits of technology such as hybrid seeds is not fully realised due to the increasing complexity of managing production for which investments are needed in developing the skills and knowledge of farmers.
- There appears to be a slowing down in productivity and efficiency growth as realising the benefits of technological and other inputs and the management functions become more complex, which calls for greater attention to skills and capacity development of farmers and workers in complementary rural production and services.
- Regional disparities in agricultural development and food production, including adoption and adaptation of technologies and management and institutional reforms persist, especially between Western and Eastern China; which call for scrutiny of policy initiatives taken in this respect and their implementation.
- Human capital development including specific skills and capacities and general basic and tertiary education and research needs to be considered as essential components in the formulation of policy and programmes for food security and agricultural development.

Food security in India

After remaining in food deficit for about two decades after independence, India became largely self-sufficient in food

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grain production. Food grain production in the country increased from about 50 million tonnes in 1950-1951 to around 240 million tonnes in 2008-2009 recording an annual growth rate of about 2.5 percent per annum.

In the recent two decades, the growth rates for food crops have shown a decline by almost one-third from 1986-1997 to 2008-2009. The decline has been from 2.93 percent to 0.93 percent between these periods (Dev and Sharma: 2010, p.2). The decline has been due to a combination of reasons related to ecology, demography, and the political economy of pricing of agricultural inputs, grain prices, and land tenure.

Availability

The scope for further increase in net sown area does not exist. Per capita land availability is declining rapidly and the average size of farms is shrinking. Land degradation in the form of depletion of soil fertility, erosion, water logging and salinity of soil has increased. There has been a decline in the surface irrigation expansion and a fall in the level of the ground water table as well. Exposure of domestic agriculture to international competition has resulted in high volatility in prices. Disparities in productivity across regions and crops, and between rain-fed and irrigated areas have increased. It appears that farming is becoming a non-viable economic activity for many. To make food production viable for farmers, public policy interventions have to be carefully calibrated. Balances have to be struck between procurement prices for public distribution system and maintaining buffer stocks, on the one hand, and prices and subsidies for inputs such as fertiliser, power and irrigation, on the other.

Increase in total food grain production has not kept pace with the increase in population. In the year 2007, per capita availability of food grains was 443 grams compared to 501 grams in 1991. Because of shifts in consumption habits, away from cereal to non-cereal food, the Ministry of Agriculture has projected a demand of food grains of around 250 million tonnes for 2020, which appears possible to be met from domestic production (Dev and Sharma: 2010).

Achieving self-sufficiency in food grains from domestic production and ensuring access by keeping prices affordable

(mainly through open market intervention with procurement from surplus areas), complemented by the public distribution system, have been the twin objectives of food grain management in India since the great Bengal famine of 1943. The major deficiencies in respect of availability and access in India can be grouped under several categories: (i) investment, credit, and infrastructure deficit; (ii) research and extension deficit; (iii) market deficit; (iv) diversification into crops and non-crop production deficit; (v) institutions deficit; and (vi) education/skills deficit (ibid.).

Access to food

At the individual level, food security means that all members of society have access to the food they need, either from their own production, from the market and/or from the government's transfer mechanism. In order to achieve food security it is also important that the poor have sufficient means to purchase food.

Poor people cannot afford to purchase the food they need at market prices, and therefore, social protection programmes are needed. Adequate purchasing power for the poor to buy food can be ensured in two ways. One is to have an employment intensive pattern of growth which can provide remunerative work to the poor and enhance their power to purchase food. Another way is to increase incomes and subsidise food through social protection programmes like a public distribution system (PDS) and employment programmes.

Even if there is availability as well as access to food, there is no guarantee of proper consumption of food for adequate nutrition outcomes. Realisation of nutrition benefits depends on several factors, such as, the health of pregnant women, breast feeding prevalence, basic health care, hygiene practices, availability of drinking water, and sanitation facilities. It is necessary to look at both access to food and nutritional indicators.

Hunger

Estimates of hunger (two square meals a day) based on self-perception from the national sample survey (NSS) data show that the proportion of households suffering from hunger declined from 17.3 percent in 1983 to 2.5 percent in 2004-2005. There are state-to-state variations

in this regard – West Bengal having the highest proportion of people in hunger at 11.1 percent followed by Orissa (5.9 percent) and Assam (5 percent) (Government of India: 2007).

In spite of high overall economic growth, inequality increased significantly in the period after economic liberalisation in the 1990s. Poverty is getting concentrated among some regions and some groups, especially, scheduled castes and scheduled tribes (Dev and Sharma: 2010). This situation parallels the pattern of aggregate reduction in poverty. In 2004-2005, the proportion of people in poverty was more than 40 percent in Orissa, Bihar, Chhattisgarh, and Jharkhand, and between 30 and 40 percent in Madhya Pradesh, Uttar Pradesh, and Uttarakhand. It may be noted that Orissa's poverty level (47 percent) was almost six times that of Punjab (8 percent). About half of the poor in India are concentrated in a few states. A group of states comprising combined Bihar, combined Madhya Pradesh, combined Uttar Pradesh (including districts that lately have become separate states) and Orissa had 61 percent of the rural poor in 2004-2005 – an increase from 49.8 percent in 1983 – with a concentration among SCs and STs (see Table 3.2).

It is worth-noting that the per capita calorie consumption for the bottom decile of the population on the income scale was very low at 1,485 kcal per day in 2004-2005. This

level is much below the norm of 2,400 calories in rural areas (Dev and Sharma: 2010, p.18).

Income growth and poverty

Low income growth is one of the reasons for low access to food and malnutrition. Annual GDP growth rate in India was 6 to 7 percent during 1992-1993 to 2005-2006 and it was at an average of 9 percent in the last four years. However, child malnutrition declined from 52 percent to 46 percent or at the rate of 0.5 percentage points per annum. This disconnect between GDP growth and changes in the status of malnutrition is at least in part related to the distribution problem or unequal sharing of the wealth created.

The data for India and South Asia show that malnutrition levels are surprisingly high even in rich income quintiles, though there is an overall correlation between income and malnutrition. Under-nutrition for the lowest and highest wealth quartiles respectively was 56.6 percent and 19.7 percent in 2005-2006. It can be said that income growth is a necessary but not a sufficient condition for reduction in malnutrition (Dev and Sharma: 2010, Table 18).

The regional experiences in India highlight differences in basic health care provisions, improvement in child care and health status of women as factors that explain differences in malnutrition across states. The high performing states in India have shown:

Table 3.2 Poverty Ratios of Population by Social Groups: 2004-2005: All India and Selected States

Areas	Rural			Urban		
	SC	ST	OBC	SC	ST	OBC
Bihar	64.0	53.3	37.8	67.2	57.2	41.4
Chhattisgarh	32.7	54.7	33.9	52.0	41.0	52.7
Jharkhand	57.9	54.2	40.2	47.2	45.1	19.1
Madhya Pradesh	42.8	58.6	29.6	67.3	44.7	55.5
Maharashtra	44.8	56.6	23.9	43.2	40.4	35.6
Orissa	50.2	75.6	36.9	72.6	61.8	50.2
Uttarakhand	54.2	43.2	44.8	65.7	64.4	46.5
All India	36.8	47.3	26.7	39.9	33.3	31.4

Note: SC – Scheduled Castes; ST – Scheduled Tribes; OBC – Other Backward Classes.

Source: Planning Commission, Government of India (2009), cited in Dev and Sharma, 2010, Table 9.

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- A rise in women's nutrition status;
- An increase in the proportion of children under the age of three breastfed within one hour of birth; and
- A rise in the percentage of children with diarrhoea who received oral rehydration therapy (ORT).

These "good practices" have resulted in better child nutrition performance in Tamil Nadu, Kerala and North Eastern States. It can be argued that a significant part of the explanation for the so-called "South Asian enigma" – the low child nutrition status in South Asia compared to Sub-Saharan Africa – lies in "women's agency" (Jones *et al.*: 2007, Dev and Sharma: 2010, p.26).

Rural non-farm sector

With 55 percent workers in India in the agricultural sector, the avenues for improvement in income and employment have to be found in the rural non-farm sector. India currently produces about 50 million tonnes of fruits and 90 million tonnes of vegetables. Only 2 percent of these fruits and vegetables are processed, as against 23 percent in China, 78 percent in the Philippines, and 83 percent in Malaysia.

Education and skills are constraints in the development of new non-farm sector opportunities. Half the people engaged in agriculture are still illiterate and only 5 percent have completed higher secondary education according to data for 2004-2005.

Researchers have pointed at China's experience and contrasts in policy emphases in India and China with regard to structural transformation in rural areas which have created off-farm employment opportunities. The State's role has been decisive in building up the physical and social infrastructure including land reforms, and basic education development in rural areas in China (Rao: 2005, Dev and Sharma: 2010, p.27).

Social protection measures

Comprehensive social protection programmes are required to address the problems of access to food and malnutrition, given prevailing high inequality and risks faced by vulnerable groups. The social protection measures are targeted transfer programmes to vulnerable groups. These measures can provide a safety net for the vulnerable

groups and prevent unacceptable losses in well-being in hard times. The social compact guaranteed by the national constitution and various laws regarding rights and entitlements of people require that the state fulfil its obligation of helping the poor in times of insecurity and in ensuring minimum levels of provision to those unable to benefit from economic growth. Government interventions can blend elements of both redistribution of income and insurance against risks.

The current major social protection schemes for the poor in India fall into two broad categories: (i) food transfer like public distribution system (PDS) and providing supplementary nutrition; and (ii) guaranteeing employment for the poor (see Box 3.2).

The public distribution system (PDS), perhaps the largest such programme in the world, is an instrument for improving food security at the household level in India. The PDS evolved as an important instrument of government policy for management of scarcity and for distribution of food grains to the poor at affordable prices. Supplemental in nature, the scheme is not intended to meet the entire requirements of food grains of the households. It is also an instrument for fulfilling the right to food, which has gained wide acceptance in India and is likely to be recognised as an entitlement of citizens and an obligation of the state by the enactment of a right to food law (see Box 3.3).

Direct nutrition interventions targeting young children are carried out through the Integrated Child Development Service (ICDS). ICDS offers supplementary feeding for children of 3-6 years of age complemented by a package of services including health check-ups, immunisation, referral services, non-formal pre-school education, and advice on health and nutrition. The high and persistent child malnutrition in India suggests that the ambitious ICDS programme has not produced the desired result (see Box 3.2).

The mid-day meal programme at primary and elementary schools (grades 1 to 8) is now prevalent all over India and has become a major initiative to improve nutrition and educational performance of primary school children (see Box 3.2).

Rural works programmes (RWPs) of various types have become an important element in the strategies for alleviating

Box 3.2 Social Protection for Rural People in India

Public Distribution System (PDS)

The PDS ensures availability of essential commodities like rice, wheat, edible oils, and kerosene to the consumers through a network of outlets or fair price shops at below market prices to targeted consumers through a network of more than 462,000 fair price shops (FPS). Food commodities worth more than Rs. 300 billion are distributed annually to about 160 million families.

Government evaluations of PDS note some major problems, including: (i) high exclusion and targeting problems; (ii) non-viability of fair price shops; (iii) not fulfilling the price stabilisation objective; and (iv) leakages. The leakages varied, but very high in some states – exceeding 75 percent in Bihar and Punjab and between 50 and 75 percent in Haryana and Uttar Pradesh (Report of the High Level Committee on Long-Term Grain Policy, Government of India, 2002; Performance Evaluation of Targeted Public Distribution System, Programme Evaluation Organisation, Planning Commission, 2007). Recent surveys by National Council for Applied Economic Research (NCAER) has indicated some improvements in the functioning of PDS including larger coverage, improved distribution among the poorest groups, and lower diversion; but the problem of misidentifying the target recipients seem to persist.

Nutrition Programmes

The Integrated Child Development Services (ICDS), launched in 1975, aims at the holistic development of children up to six years of age with a special focus on children up to two years, besides expectant and nursing mothers. It is intended to address the problem of child and maternal malnutrition, but has clearly had limited impact. Child malnutrition has barely declined at all in a decade and a half, anaemia among women and children remains high and a third of all adult women were undernourished at the end of 1990s and also in 2005-2006. The coverage has not spread evenly across states. The answers to making the programme fulfil its promise lie in making the coverage effectively universal, looking at the design critically, and planning the implementation in sufficient detail so that the objectives are not vitiated by the design and weak implementation (Government of India: 2008).

Mid-day Meal Scheme

The mid-day meal scheme (MDMS), begun as a national programme in 2004 at the primary level, has been extended to Upper Primary School from 2007. MDMS was expected to serve 180 million children by 2008-2009. The 11th Five Year Plan has given the following action points for improving the performance of MDMS: (i) MDM to be managed by the local community and NGOs, and not contractor-driven; basic quality and safety to be prime considerations; (ii) sensitization of teachers and others involved in nutrition, hygiene, cleanliness, and safety norms to rectify observed deficiencies; (iii) involvement of nutrition experts in planning low cost nutrition menu and for periodic testing of samples of prepared food; (iv) promoting locally grown nutritionally rich food items through kitchen gardens in school, etc. (Government of India: 2008b).

Rural Employment Guarantee

The National Rural Employment Guarantee Act (NREGA) was passed by the Parliament in August 2005. This is seen as a step towards legal enforcement of the Right to Work by providing at least 100 days of guaranteed wage employment in a financial year to every poor rural household. The auxiliary objectives are to regenerate the natural resource base and create productive assets in rural areas as well as to strengthen grass roots democracy by infusing transparency and accountability in governance. Gram Sabhas (village councils) conduct social audits of all works taken up within Gram Panchayat (village government). The performance of the programme, as may be expected, is uneven due to deficiencies related to (i) lack of awareness among workers and village officials; (ii) implementation and administration weaknesses; (iii) monitoring and evaluation problems; and (iv) insufficient professional skills and capacities, particularly at the panchayat level.

Source: Adapted from Dev, S.M. and Sharma, A.N. (2010): "Food Security in India: Performance, Challenges, and Policies", Delhi, Oxfam India, pp.27-34.

Box 3.3 The Right to Food Law in India

The National Food Security Act (NFSA) is envisaged as a path-breaking legislation, aimed at protecting all children, women and men in India from hunger and food deprivation. There are compelling economic, social, political and ethical imperatives for such a legal guarantee of protection from hunger. Aside from creating new food entitlements, the Act would place a range of existing food-related schemes on a new footing and set new standards of delivery, transparency and accountability for social programmes.

Motivation: The motivation for the proposed NFSA to provide a guarantee of adequate nutrition is derived from the right to food as an aspect of the right to life under Article 21 of the national constitution (interpreted by the Supreme Court as a right to life with dignity), which is a fundamental right of all citizens.

Objectives: The proposed NFSA aims to ensure public provisioning of food and related measures, to enable assured economic and social access to adequate food with dignity, for all persons in the country, at all times, in pursuance of their fundamental right to be free from hunger, malnutrition and other deprivations associated with lack of food and related matters. Although the right to adequate nutrition connects with a wide range of provisions, the main focus of the NFSA should be on legal food entitlements that underscore the duty of central, state and local governments to ensure provision of food to the people, through subsidised grain, direct feeding programmes and related interventions.

Two qualifications: One, even though the NFSA focuses mainly on food entitlements, the National Advisory Council (NAC) recommends that it should take a broad view and not restrict itself only to the Public Distribution System (PDS). Two, the NAC recommends adopting a life cycle approach to food security. The food entitlements created by this Act should cover the entire life cycle of a human being, starting with overcoming maternal and foetal under-nutrition resulting in low birth weight babies, and extending up to old and infirm persons. The first 1,000 days in a child's life (starting with conception up to the end of 2 years of age) ought to receive special attention especially because nutrition deficiencies at this stage lead to lifelong physical and cognitive deficiencies.

Source: Adapted from National Advisory Council (2011): "Draft National Food Security Bill – Explanatory Note", New Delhi, 21 February 2011.

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poverty and hunger in many developing countries. In India, this has evolved into a question of entitlement, especially for the rural poor, and a law to guarantee a certain quantum of employment, called the National Rural Employment Guarantee Act (NREGA), has been adopted (see Box 3.2).

NREGA is a rights-based approach for employment that has been introduced throughout India, but has encountered implementation difficulties. Most evaluations, however, indicate relative improvement in implementation of the programme compared to its predecessor projects. The "leakages" have been reported to be relatively less. Most importantly, an increase in agricultural wage is attributed to the scheme. In some rural areas, outward migration from rural areas has declined and some urban poor has returned home. The 11th Five Year National Development Plan of India (2007-2012) saw implementation of NREGA as a major vehicle of poverty reduction in India with the potential to transform livelihoods of the poor and bring about qualitative change in rural governance.

Right to food and National Food Security Act

The government of India, through the address of the President to the Parliament in 2009, pledged that the adoption and implementation of the National Food Security Act would provide a legal framework for ensuring food security for all. The draft law is winding its way through the legislative process. Ongoing "targeted public distribution system" (TPDS), which will come under the new law when it is passed, provides subsidised food grains to the population below the poverty line (BPL) population. The proposed legislation has a wider scope, making PDS more responsive in reaching out to the targeted population which may include poor people beyond those below the poverty line (Khera: 2009; see Box 3.3).

India's efforts to achieve food security, combating poverty and expanding gainful employment in rural areas have generated experience and lessons which point to priorities in intervention strategies for the government at different levels and other actors including communities, NGOs and the private sector. The interventions must include components of skills and capacity building, knowledge and technology, and changes in institutional and management mechanisms. Some of the action areas in these categories are:

- Small farms need help with access to extension services and better water management to increase their productivity, especially in rain-fed and dry land areas, where food insecurity is greater.
- Local knowledge and local seeds should be encouraged to generate higher incomes for small farmers and to protect the environment.
- Home-grown food should be encouraged to enhance food security and nutrition and setting aside cash for essential non-food expenses such as health and education.
- Sustainable agriculture in the ecological conditions of tribal areas merit special attention.
- Producers' cooperatives should be encouraged to realise economies of scale in buying inputs and marketing outputs, reducing middlemen's high mark-up.
- Promoting the use of information technology for production and marketing, such as, mobile phones, information kiosks, and community radio.
- Organisational and institutional efficiency for major nutrition interventions, such as ICDS and mid-day school meal. Essential micro-nutrients such as Vitamin A and salt iodisation can be made part of the existing programmes mass-targeted at children (Dev and Sharma: 2010).

Food and nutrition security based on a rights-based approach has to be an inter-sectoral effort and requires social participation in policy-making and implementation. It also requires creating a consensus among different views and implemented through decentralised planning and management within the state and local government systems. It is necessary to review and update the rural and agricultural agendas, strengthening the links between access to adequate and healthy food with consumption and production and the role of family farming.

Food security in Bangladesh

Bangladesh has made many important gains in the last two decades in economic and social indicators, including reducing the prevalence of poverty and child malnutrition. Despite these improvements, Bangladesh remains a food insecure country, with improvements needed in food access and utilisation in particular. The country is

also particularly vulnerable to natural disasters, including floods, cyclones and storm surges with major adverse consequences for the economy as a whole and people's livelihoods, food security and health (see Box 3.4).

In absolute numbers, with 70 percent of the people living in rural areas, chronic poverty and malnutrition remain largely a rural problem, which spills over in to urban areas. However, rural areas are burdened with more than their proportionate share of the problem. People living in rural areas are also more likely to be poor and to have malnourished children than those living in urban areas. The degree of food insecurity also varies geographically depending on the ecology of specific areas, which affects the levels of poverty and the risks and vulnerability arising particularly from floods and cyclones.

Despite commendable progress made in the reduction of child and maternal mortality as well as recent progress in respect of child and women nutrition, Bangladesh has one of the highest prevalence rates of malnutrition in the world among children, adolescents and pregnant and lactating women. They suffer from one or more forms of malnutrition including low birth weight, stunting, underweight, vitamin A deficiency, iodine deficiency disorders

and anaemia. Malnutrition contributes to more than 50% of child deaths (Government of Bangladesh: 2010, p.17).

Farming of rice, the staple for the people, and the crop sector generally suffer from low productivity. A decline in soil fertility arising from improper use of fertilisers, expansion of crop cultivation to inappropriate and dispersed locations, and low investment in seed-fertiliser-irrigation technology are the main reasons for low productivity in farming. There are large gaps between yields achieved by experiment stations and those by farmers. Reducing this critical gap requires increased investment and better management in the development of improved crop varieties, seed quality, soil health, pest control, agronomic practices, flood control, irrigation and water management and effective extension services.

Approaches that are being promoted to intensify rice production include strengthening rice research to generate new high yield and hybrid varieties, minimising the yield gap between experiment station and farmer plots with better extension and management practices, and increasing the availability and more efficient use of fertiliser, water and energy (USAID: 2009).

A Bangladesh Country Investment Plan (CIP) for Agriculture,

Box 3.4 Achieving Food Security in Bangladesh

A traditional expression of blessing in Bangladesh is – let there be milk and rice a plenty for the child.

The 31.5 percent of the population estimated to be under the poverty line consume less than 2,200 kilocalories of food energy every day considered necessary for normal activities. Perhaps half of them, regarded as the extreme poor, disproportionately high in number in the rural areas, cannot have even 1,800 kilocalories. The 2007-2008 food price increases, which have stayed at the high level since then, have pushed thousands of families below poverty line. More people than before have moved to city slums in search of livelihood.

The country has always depended on import to meet its staple grain needs. In the 1980s the average annual import was 1.9 million tons. It rose to an annual amount of 3.2 million tons in 2009-2010 including food aid and commercial imports. On average, the estimate of rice consumption is 477 grams per day per person in rural areas and 381 grams in the urban areas. This adds up to a need of 25 million tons of rice in 2011. If the harvests are good, domestic rice production would be 23 million tons, leaving a deficit of 2 million tons.

In the last ten years, the population has grown by 34 percent. The area of cultivable land has decreased by 7 percent. The population will increase to 172 million in 2021 (and to 220 million by 2051 with 140 million living in cities). The demand for rice will grow respectively to 280 million tons and 340 million tons.

With improved standard of living and changes in dietary habits and preference, the amount of rice in diet will come down. One could foresee a 10 percent reduction in the share of rice in daily diet in each decade up to 2051. Bangladesh will still need 23 million tons of rice in 2051, instead of 34 million tons by present trend.

The Bangladesh farmers have increased food production three-fold in the last forty years, while the population has doubled. Food and nutrition security is very much achievable within the decade. Bangladesh has developed a 10 billion dollars plan for food and nutrition security. It will take strong political will and determination to implement effectively the plan to achieve the results. The blessing for the child to be in milk and rice aplenty will then come true.

Source: Adapted from Mohiuddin Ahmed (2011): "Amar shontan jeno thakey dudhe-bhate" (Milk and rice aplenty for my child), Daily Pothom Alo, 17 October, 2011.

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Food Security and Nutrition has been developed through involvement of researchers and wide consultation and endorsed by the Government in June 2010. The CIP is intended to be a comprehensive plan based on the Government's investment priorities and aims to: (i) plan and invest resources in a coordinated way; (ii) increase convergence and alignment of budget and external sources of funding, and; (iii) mobilise additional resources. Proposed investments relate to strengthening physical, institutional and human capacities in the field of agriculture, water management, fisheries, livestock, agricultural marketing, food management, safety nets, nutrition and food safety.

The CIP is designed as a set of investment programmes to fill gaps, scale up current positive interventions and develop new programmes as prioritised by the Government. Table 3.3 summarises the programmes identified so far.

Food availability

The main priorities under the food availability component and the six areas of programme activities listed focused on:

- Sustaining the availability of key food crops increasingly

confronted by considerable challenges including climate change (climatic shocks, increased salinity and sea level rising, floods); decreasing natural resources (scarce water during the dry season, land disappearing at 1% annual rate), and the continuing population pressure. Improving nutrition status through food production diversification is a priority. The need to diversify crop production will shape the programmes, in particular extension, research activities and the development of improved seeds. In addition, in order to complement the current diet, poor in micro nutrients and animal proteins, fishery and livestock development programmes are proposed.

- Increasing purchasing power and rural employment to enhance access to food through improved value added, agro processing, access to markets and the development of rural businesses. A programme is proposed to improve access to markets resulting in improved agricultural value added and increased non farm incomes.

Food access

Under the component of food access, the priorities are two-fold:

No.	Component	Programme Title
1	Food Availability	Integrated research and extension to develop sustainable responses to climate change
2		Improved water management and infrastructure for irrigation purposes
3		Supply and sustainable use of agricultural inputs
4		Fishery development programme
5		Livestock development programme
6		Access to markets, improved agricultural value added, increased non farm incomes
7	Food	Capacity strengthening to formulate and implement food policies and related issues
		Access investments
8		Enhanced public food management systems
9		Development of an integrated multiyear safety net programme
10	Food	Community based nutrition activities through livelihood approaches
11	Utilisation	Orientation of food and nutrition actions through updated data
12		Food safety and quality improvement

Source: Government of Bangladesh (2010): "Bangladesh Country Investment Plan: A Road Map Towards Investing in Agriculture, Food Security and Nutrition", June 2010.

- Different approaches to enhance food access in normal years and in times of unusual conditions such as externally induced market volatility and natural disasters are needed to mitigate food insecurity. Stabilisation of food access in these different circumstances needs strengthening institutional and physical capacities to implement effectively food policy and enhance the public food management system.
- Safety net activities (food distribution, cash transfers) are being financed by the Government. In order to better ensure access to food of the most food insecure, the CIP would finance the development of an integrated multi-year safety net programme built on the existing scattered programmes, with better targeting and other needed improvements, many already identified by studies and analyses.

Food utilisation

Component 3 concerned with food utilisation. Two priorities have been identified:

- Improving substantially the nutrition status of malnourished population, especially the most vulnerable groups, such as, children under 2 and pregnant and lactating women: Two programmes are proposed to complement activities proposed under other components or currently covered by public health interventions and the on-going National Nutrition Programme – Development of community based nutrition activities through livelihood approaches. Communities, particularly associations of women, will be supported to increase production and consumption of micronutrient-rich foods. Home gardening and integrated horticulture, raising small animals, developing small fish ponds, developing food processing, and preservation methods will be encouraged. Advocacy, awareness-raising and nutrition education, and communication for behavioural change will be part of the programme.
- Ensuring food safety: It is an essential public health function. Food and water-borne diarrhoeal diseases are leading causes of illness and death and cause great human suffering and economic losses. A programme aims at improving food safety and quality for consumer

health and nutrition – reviewing and developing policy, strengthening capacities of the existing institutions, enhancing consumer protection and improving food safety practices.

Capacity building

Important gaps have been identified which may put at risk the investment plan for food and nutrition security. These include skill gaps, limited implementation capacities, and the low operating capacity and result orientation of people and institutions. To overcome this obstacle, a key element in all of the major programme components has to be to enhance capacities at all levels, from government institutions to the grassroots level, by strengthening workers, producers, administrators, and community organisers in accessing knowledge and developing skills.

3.2 Food Security and Agricultural Development

Agriculture will continue to play a central role in tackling the problem of food insecurity. Maintaining and increasing global food production, ensuring food availability, is clearly dependent on agricultural productivity gain. It is also the major, and in many cases, the primary means for the poor to earn an income and to have adequate access to food.

Historically, progress in agricultural productivity has helped food production to keep pace with population growth and even to lower food prices until recently. There is a serious concern that this trend may no longer hold true because of the agricultural intensification pattern that aims to squeeze ever higher yields from dwindling land resources using hybrid and modified seeds and high levels of agrochemicals. For food production in developing countries to double by 2050, it will require, above all, more intensive land use and higher yields. The backdrop of ever scarcer natural resources, energy shortages and climate change are making the negative environmental externalities of agricultural production too costly. Improved inputs, technology and techniques will remain critical for increasing food availability along with improved knowledge, skills and capacities of people engaged in production of food, bringing food to the consumers, and ensuring its proper use by individuals and households.

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Sustainable agricultural intensification

An agenda for sustainable agricultural intensification has been emerging and various sustainable intensification practices are being taken up by a growing number of farmers. The agenda requires that farmers, especially smallholders, develop their own practices, capitalising on their local knowledge as well as scientific research to address their specific problems. A combination of a systemic approach, adaptation to the local context, and linking farmers' and scientists' knowledge – are key to the emerging agenda. Developing smallholder farmers' skills to combine their experience and knowledge with science-based approaches require strengthening agricultural education, research and advisory services. It also calls for greater collaboration, innovation and problem-solving among smallholders, researchers and service providers (IFAD: 2011, pp.19-21). We return to this topic of sustainable agriculture in the next chapter.

Agriculture, perceived primarily as the supplier of food, has also become a substitute source for dwindling petroleum resources. The combined effect of rapid development of biofuels and the trend of foreign countries acquiring land in some developing countries, especially in Sub-Saharan Africa, for large-scale commercial farming, has made the issue of competing demands on agriculture for food and fuel a political agenda. The problem of the reduction of arable land has been compounded by shrinking water supplies, and the negative impact of climate change on agricultural land.

Competing demands of biofuels and food

Biofuel production, mainly because of the US government support for ethanol production, has pushed up feedstock prices. Energy and agricultural prices have become much more interdependent with industrialised farming, more processing and increased transport, as well as the emergence of the biofuels industry (particularly for maize, oilseeds and sugar feedstocks) (OECD-FAO: 2009). The price of maize, for example, rose by 23 percent in 2006 and by another 60 percent in the subsequent two years. Because the United States is the world's largest maize exporter, Biofuel expansion in the United States has contributed to a decline in world grain stocks to a low level and has put upward pressure on world cereal prices.

Similar price increases have occurred for vegetable oils (palm, soybean, and rapeseed). Rising agricultural crop prices from demand for biofuels foreshadow an emerging conflict between food and fuel. The reality of this conflict is graphically illustrated by the fact that the grain required to fill the tank of a sport utility vehicle with ethanol (240 kilograms of maize for 100 litres of ethanol) is enough to feed one person for a year. The adverse impact on many food-importing countries of rising cereal prices have been witnessed in recent years. The welfare losses even in the short term of high food prices can be serious for people close to the poverty line with consequences that are longer term for them (World Bank: 2008).

The first generation of biofuels has mainly been derived from agricultural products that are also sources of human food – sugar crops, cereals and crops that produce oil for human consumption – thus in direct competition with food production. There are large potentials for what is called the second generation biofuels, which can be produced from non-edible biomass arising from residues and wastes from crops, forests, industries, cities and households, not competing with food production or using up agricultural land. There are also likely positive impacts on climate change mitigation (see Box 3.5). These possibilities have substantial implications for skills and capacity development for rural people and potentials for new kinds of job opportunities both in rural and urban areas.

Food losses and wastes

The efforts to increase food production must go hand in hand with reduction of losses and waste of what is produced at various stages of production, distribution and consumption. Loss and wastes of food and preventing and reducing such losses have not received due attention, although up to a third of food produced may be lost before it is consumed. The various stages at which losses and wastes occur are related to the components of food security, viz., availability of food, access to food, and consumption of food to maximise the nutritional outcomes.

The losses are a global problem and have a global impact which is transmitted through the effects on global availability of food and through influences on global markets and prices for food. The problems are manifested in different ways in the rural areas of developing countries where much of the food for the developing countries is

produced. Addressing these requires differentiated approaches including investments in infrastructure and technologies and promotion of relevant skills and capacities of

people in rural areas. These approaches need to be important components of the total effort to ensure food security (see Box 3.6).

Box 3.5 Biofuels and Land for Food Cultivation

Does the development of biofuels represent a threat to the supply of land available to food cultivation?

The first generation of biofuels (1G) currently in use are primarily derived from the storage organs of crops that have historically formed a major component of the diet of humans and animals alike: sugar producing crops (sugar cane, sugar beets), cereals (corn, wheat, etc.), and oleaginous crops (soy, rape, palm, etc.). Because of competing demands made on limited resources the growth of the biofuel sector poses a direct threat to global food security and has become a very real concern for policymakers worldwide. The conflict reached a paroxysm as recently as 2007-2008 when the price of basic foodstuff threatened to spiral out of control. The trauma of this recent experience has lingered in a context that is permeated with concerns over how to feed a population that is expected to surpass 9 billion by the year 2050 without destroying the environment in the process.

In the current climate of opinion on this issue, much hope is being placed in second generation biofuels (2G) which are designed to exploit the energy potential of (non-edible) lignocellulosic biomass. Three principle sources that could be developed are: (i) residues or leftover material from crops, forests, industry, cities, and households; (ii) wood; and (iii) annually produced crops such as wheat or corn (using stalks and all); or perennials (herbaceous or forages); or bushy plants using short rotation techniques.

A number of contributing factors have made developments in this area promising. For one, untapped sources of the primary feed stocks are widespread. Secondly, the impact of these sources on our ability to produce food would be negligible if they consist mostly of agricultural residues, wood, or other forms of agriculture unsuited for human consumption needs. Finally, the superior energy efficiency (and corresponding economic efficiency) in terms of biomass produced per unit of land combined with a higher conversion rate for transforming this biomass into liquid fuel creates a compelling case when added to other factors in favour of cellulosic fuel. Nevertheless, the leap of faith to bridge the gulf between mere promise and concrete reality should call for care.

A thorough analysis of the implications of increased competition for arable land is imperative. It has to be acknowledged that the demand for biomass to be used for fuel is set to skyrocket over the coming decades. The crops grown specifically as feedstock for fuel production are likely to be the primary source for the biomass. The positive side of this situation is that higher the yields of 2G biofuels (both in terms of biomass and energy) and greater the use of marginal lands, the more limited will be the damages to crop production.

Source: Adapted from Hervé Guyomard and Agneta Forslund (2011): "Hungry for Land? Potential Availability of Arable Land, Competition Between Alternative Uses, and the Impact of Climate Change", ParisTech Review, March 3rd, 2011, www.paristechreview.com

Box 3.6 Post-Harvest Losses and Waste

Increased production is not the only way to meet global food demand. Waste in agriculture occurs at harvest, through post-harvest handling, drying, storage, as well as in manufacturing and distribution, and both with individual and institutional consumers (e.g., in restaurants and homes). Increased efficiency can reduce waste in each of these areas.

No one knows precisely how much food is wasted or where exactly the waste occurs from harvest to the consumer. Total food waste has been estimated at 20-30 percent of production globally, while in the EU it is estimated at 30 percent and in the US at 40 percent.

Food waste globally can be divided into two broad categories. There is waste related to harvesting and post-harvest losses, which is more common in lower income countries. There is also consumer or institutional waste, which is more common in higher income countries. On the production side, waste most often results from the lack of infrastructure – the lack of adequate on-farm storage which results in losses from insects, rodents, mould and mildew. In addition, post-harvest losses result from inadequate local processing, the inability to dry grains and other food, and the inability to preserve fresh produce. Losses result from inadequate or nonexistent markets, infrastructure or storage for dry goods, and/or refrigeration facilities for fresh fruits and vegetables and animal protein throughout the supply chain. In comparing developing and developed countries, the former appears to have twice as much loss in production, harvesting and post-harvest management than at consumption level; whereas developed countries have double the losses at the retail, foodservice and consumer level than in production and post-harvest management.

Insects, rodents, mould and mildew can destroy half or more of food in some places. It has been estimated, for example, that 80 percent of the mango production in India, the pineapple production in Ghana, and the cashew and acacia fruit production in Brazil rots before it can be harvested because there is a lack of processing capacity locally. According to a United Nations Environment Program (UNEP) report, as much as 30 percent of the calories that are produced by farmers or approximately 1,400 kcal/ per capita/per day are lost due to harvest and distribution losses and overall waste in food supply chains. Investments in infrastructure to improve market access, storage and transportation – and improved skills and capacities to manage and utilise these infrastructures and technologies – could substantially reduce these losses. As populations become more urban in the coming decades, the issue of infrastructure and post-harvest losses, as well as losses at the consumer end, will increase in importance.

Producing sufficient food to meet global food demand by 2050 requires that the food waste issues be given a high priority. At present, 95 percent of all funding for agricultural research and extension is for production, while only 5 percent is for post-harvest issues, although post harvest loss may be one-third of what is produced.

Source: Adapted from Jason W. Clay (2010): "Agriculture from 2000 to 2050 – The Business as Usual Scenario", Washington, DC: The Global Harvest Initiative.

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The multiple dimensions and a systemic approach to food security call for an inter-disciplinary perspective in understanding and addressing problems. A Cross-Government Food Research and Innovation Strategy was developed in UK which comprises four cross-disciplinary themes (DFID: undated).

- Economic resilience – how economic resilience of people and communities, especially in rural areas, can be an important factor in addressing hunger, poverty and environmental degradation across the globe and how this might be addressed.
- Resource efficiency – including water, energy, nutrients and other inputs; land use and soils, with particular focus on the sustainable use of resources; increasing competitiveness, profitability, efficiency and reducing waste.
- Sustainable food production and supply – including farming systems, food production from crops and animals (including fish), food processing, manufacture and transport.
- Sustainable, healthy, safe diets – including food safety throughout the supply chain, nutrition, consumer behaviour, food choice and accessibility.

These themes will have to take into account the sustainability of ecosystems related to food production (including land use, biodiversity and other ecosystem services). These are also pertinent concerns in considering the overarching challenges of reducing greenhouse gas emissions and reducing losses and waste throughout the food system. We return to this question again in the next chapter.

There is obviously no silver bullet solution to the multi-faceted challenge of ensuring food security for the world's growing population. Jayson Clay of the World Wildlife Fund, who has attempted to bring an interdisciplinary perspective to bear on a set of workable pragmatic actions, which he calls "food wedges" that make up the whole pie of mutually complementary strategies with a 2050 time horizon. The eight wedges of the strategy pie for moving towards greater food security for the world, feeding all the people and still keeping the planet safe and healthy, are listed below. The list underscores the key factors that must be considered in working out skills development, knowledge

needs, dissemination of knowledge and technologies, and creation of jobs and employment opportunities (Clay: 2010).

- Harnessing the science of genetics: Ten crops account for nearly 90 percent of all calories. Only two are on track to double production by 2050. Genetics (e.g. traditional plant breeding, hybrids, genetic engineering, or genetically modified seeds) cannot be left off the table. It is necessary to be open-minded about the technologies with an eye on unacceptable ancillary impacts, and a focus on the results desired.
- Adopting and adapting better farming practices: The best producers globally are 100 times better than the worst. The best countries are 10 times better than the worst. To achieve global food security and maintain the planet, far more can be gained in producing food and reducing environmental impacts by pushing the middle and the bottom performing farmers and their practices to a better performance level.
- Optimising technology: All inputs (water, fertiliser, pesticides, and energy) must be used more efficiently. An achievable goal can be to triple or quadruple the efficiency of input use in many situations.
- Bringing back to use degraded land: Instead of expanding into new areas to farm, it is possible and necessary to rehabilitate degraded or underperforming lands applying technology and science, skills and knowledge of people, and better management. The goal should be 100 million hectares rehabilitated by 2030 and 250 million by 2050, which would be a small proportion of the total estimate of degraded land. Depending on criteria applied, this estimate is between 200 million to 2 billion hectares. It may be noted that of the 4.9 billion hectares of land used for agricultural purposes worldwide, close to one-third is suited to annual or permanent crops, whereas over two-thirds are allocated to permanent meadows or pasture.
- Land tenure and property rights: What farmer will plant a tree or invest in sustainability if they don't own the land? What company will invest in new technologies if their intellectual property is not protected? It is necessary to pursue strategies that address these issues.
- Preventing and managing losses and wastes of food:

Globally as much as 30 to 40 percent of all food produced is wasted. The goal should be to cut waste in half in both developing and developed countries. To do this, it is necessary to invest substantially in reducing post-harvest losses and food waste including development of skills, creation of jobs and enhancement of management capacities.

- **Balanced consumption:** A billion people don't have enough food while a billion people eat too much. A reasonable goal would be not only to freeze these figures, so they do not increase, but to reverse these, ideally cutting each by half by 2030.
- **Enhancing viability of food production with carbon trading:** Whether in the soil or perennial crops or trees, carbon makes agriculture more sustainable. The goal for developing countries can be to develop and participate in carbon markets that allow food producers to sell the carbon credits under international climate protocols, to make food production more sustainable and profitable (more on this in the next chapter).

In short, no single strategy will ensure global food security, but there are many things that individuals, communities, institutions, national governments and the global community can do which collectively will make it possible to meet the challenge. A consensus has to be built around the combinations of actions to be pursued. Skills, capacities, knowledge, technologies and institutional structures have to be built, and the energy and enthusiasm of people have to be mobilised to this end.

3.3 Skill and Capacity Needs for Food Security and Agricultural Development

The previous section has attempted to probe the food and nutrition security and the related agricultural development challenges in different developing country contexts. The gist of a systematic country investment plan for food and nutrition security in Bangladesh has been presented as an example of the major programme components and areas of programme activities which may be relevant to address food security and nutrition needs in a developing country. The plan has also indicated the potential interventions necessary and the main tasks that have to be undertaken to implement the plan (see Table 3.4 below). Taking the

Bangladesh plan as illustrative of the tasks and functions which have to be performed, the range of skills and capacities needed in rural communities and among workers in these communities can be derived from the required interventions, applying logic and judgement based on empirical information, as shown in Table 3.4.

The indicative listing of skills and capacities required among the workers in the rural communities are those directly linked to carrying out the interventions identified in the plan to address food security and agricultural development priorities. It is obvious that acquiring the skills and capacities listed call for access to general education of varying levels and certain general skills training opportunities as a prior condition for the potential performers of the skills in their jobs. As discussed in the previous chapter, it is likely that in rural communities in most developing countries these conditions remain to be fulfilled adequately.

As noted in chapter 2, the skills and capacities of people required to pursue the goals of rural transformation can be put under four broad categories – basic tools for learning to learn; skills and knowledge related to improving the quality of life; production and employment related skills and knowledge; and skills, knowledge, attitudes and values related to organisation, management, and social institutions.

Another way of looking at skills and capacities in the rural context, again noted in chapter 2, is to consider the occupational categories in rural communities and the related skills. The main categories mentioned were: (i) those directly concerned with agricultural production; (ii) off-farm commercial activities; and (iii) general services including the work of administrators, planners, teachers and trainers, and technical specialists of various kinds.

The skills and capacity needs shown in Table 3.4 are consistent with the three kinds of categorisation mentioned above, which provide a framework for judging relevance and rationale for skills development objectives and content. The enumeration does not specify, but important to keep in view, that each of the skills represent different levels of general education background, participation in generic and/or occupation-specific skill training and experience-based knowledge and expertise development.

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Table 3.4 Illustrative Interventions and Skills Needs to Ensure Food and Nutrition Security

Programme Areas	Potential Interventions	Skills and Capacity Areas at Local Level
Integrated research and extension to develop and propagate sustainable responses to climate change	<ul style="list-style-type: none"> Enhance research to adapt to climate change Develop community based learning and experimentation practices (expand the Field Farmer School programmes) Promote sustainable agriculture practices (conservation agriculture, integrated pest management or integrated crop management) 	Work in research stations, field trials, and extension work; work of trial farmers
Improved water management and infrastructure for irrigation purposes	<ul style="list-style-type: none"> Improve water management at farm level (capacity building for water users, rehabilitation of infrastructure) Surface irrigation, deep well pumping, balancing ecology & costs Protection infrastructure rehabilitation against sea intrusion; and River dredging and channel maintenance 	Water equipment maintenance, construction and maintenance in irrigation and land management
Supply and sustainable use of agricultural inputs	<ul style="list-style-type: none"> Partnerships of public agencies, private sector, research institutions in seed and genetic technology Building capacities for seed quality testing and certification Improved and rational use and quality control of fertilisers, chemicals 	Farm input supply, distribution, training, extension
Fishery development programme	<ul style="list-style-type: none"> Restore inland open water fisheries Develop small scale inland aquaculture Provide quality enhancement and certification for shrimp culture 	Fishery technology, maintenance, extension, quality control work
Livestock development programme	<ul style="list-style-type: none"> Strengthening animal health services Capacity building and training at herder level and feed processing Cattle and buffalo genetic improvement activities 	Animal health work, training, extension, management
Access to markets, improved agricultural value added, increased non farm incomes	<ul style="list-style-type: none"> Improvement of rural roads and markets Group marketing and training at community level Private storage, value chain facilitation, information provision Assist the development of off-farm activities and rural businesses 	Road construction, maintenance, cooperatives, marketing, communication
Capacity strengthening for food policy and formulation of investment and implementation and monitoring	<ul style="list-style-type: none"> Strengthening and expanding capacity to implement, monitor and coordinate food policy and food security activities Strengthening the capacity to formulate, implement, monitor and coordinate the food security plans and programmes 	Leadership, organisation and operational skills for local organisations and institutions to provide policy inputs and implement food security plans and initiatives
Enhance public food management systems	<ul style="list-style-type: none"> Enhance efficiency of public management systems (improve operational procedure; adopt ICT and computerisation and develop operation research) Build capacities of concerned public agencies, at different levels to manage the food system Increase and modernise public storage and handling facilities Strengthen capacity of quality control of food and food stuffs 	Local distribution, storage, information system, quality control skills, skills for managing, operating and using ICT-based farm production and market information
Development of an integrated multiyear safety net programme	<ul style="list-style-type: none"> Formulate new comprehensive safety net programmes, streamline existing programmes and enhance their impacts Review, redesign, streamline safety net programmes in partnership with relevant stakeholders Improve institutional capacity to effectively operate social safety net programmes 	Local management of social protection and safety net activities and service provider skills

Table 3.4 (continued)

Community based nutrition activities through livelihood approaches	<ul style="list-style-type: none"> • Review, build on on-going nutrition intervention programmes • Assist rural communities to develop their own nutrition activities, through a livelihood approach, complemented by health oriented awareness campaigns • Support to develop home gardens, small animals, change in nutrition behaviour and practices • Link long term measures with immediate treatment of acute malnutrition 	Local management of nutrition initiatives, nutrition education and awareness and service provision skills
Monitor and re-direct as needed food and nutrition programmes through data	<ul style="list-style-type: none"> • Update food consumption survey, food composition tables • Work out updated nutrition messages for nutrition awareness and build capacities in this area 	Data collection and monitoring of nutrition programmes at local level
Food safety and quality improvement	<ul style="list-style-type: none"> • Improve surveillance system of food borne illnesses • Enhance capacities and laboratories for food control and safety 	Involvement in food safety assurance, awareness raising of community

Source: Column 1 and 2 based on Government of Bangladesh (2010); Colum 3 constructed by authors.

The disparities in education and training provisions in general between urban and rural areas have been noted earlier. In assessing skills and capacity development issues for food security and agricultural development, this general problem of adequate and appropriate provisions for general education and technical and vocational training opportunities both in urban and rural areas have to be given due consideration. This is discussed further in chapter 5.

At this point, specifically from the point of view of skills and capacities related to the inter-connected questions of ensuring food and nutrition security, agricultural development and poverty reduction of rural people, the role of non-formal education and continuing learning opportunities for people throughout life need to be underscored. Many of the areas of skills and capacities mentioned in Table 3.4 above, while dependent on prerequisites of varying levels of formal education and training, need to be further developed, maintained and effectively put to use through a range of non-formal education and capacity building activities.

Learning, knowledge and skills network within the framework of lifelong learning: The argument for a central position of the knowledge network and lifelong learning in the national development agenda is well recognised. These challenges as articulated in development priorities and aspiration of societies have to find a place in the curriculum, learning objectives, educational methodology, and in

expanding learning opportunities for all in both rural and urban areas (Ahmed: 2009).

A convergent view of lifelong learning embracing functional literacy, alternative vocational and technical education, alternative and complementary provisions for stages of formal schooling, and diverse continuing education for adults has emerged with new urgency. The developing world, particularly South Asia and Sub-Saharan Africa, has a high concentration of adult and youth illiterates, especially among women and marginalised groups. Structural shifts in the economy from farming to industry and services and the need to acquire and upgrade skills for the competitive and rapidly changing labour market need to be key considerations in shaping social and individual goals for adult and continuing learning.

A multi-pronged approach to promote "critical literacy" and combat poverty

Effective programmes to fight poverty have to link literacy skills, production skills, quality of life components and ancillary support

Skill training can lead to better earning only with ancillary support and creation of necessary conditions, such as access to credit, management advice, market information, and links with potential employers. Moreover, poverty is not just a matter of income. Improvement in health and nutrition and protection from diseases,

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knowledge and practice of family planning, priority to children's education, status of women in family and community and their participation in economic activities outside home, are also some of the factors that affect well-being and quality of life. As are information and knowledge of government services and people's claim to these including food and nutrition security in short and long terms. All of these should be elements of adult learning aimed at fighting poverty.

Networks of community learning centres as the vehicle

Examples of multipurpose community learning centres with community ownership exist in many developing countries. These are effective when they become the base for offering a menu of relevant training and knowledge dissemination and for link-up with ancillary support. These, brought together into national or regional networks for technical support, can be a vehicle for offering the education and learning opportunities which have an impact on poverty. Thus they can become the building blocks for life-long learning in the learning society.

Affirmative action in education to address inequality

A policy of affirmative action is needed to identify and serve the disadvantaged and marginalised sections of the population. Their specific needs have to be addressed with these strategies. A key strategic principle for adult and life-long learning has to be to design programmes and set priorities to play a role in overcoming the gross inequalities in society.

High priority to overcoming gender injustice and disparity

Patriarchal values and culture continue to dominate causing many forms of overt and subtle gender injustice and discrimination. Gender issues need to be addressed both in respect of management structures and in their pedagogical aspects. Special attention is needed to ensure that a higher proportion of women than at present are in management, supervisory roles, and as trainers.

Disadvantaged and neglected groups

Ethnic and linguistic minorities, indigenous people, the ultra-poor, and people with disabilities and special needs continue to be outside most education and training

programmes and are difficult to reach. Specialised and more directly targeted projects would be required for these groups. Mobilisation and awareness raising efforts need to be directed specifically to overcoming traditional attitudes regarding gender, disabilities and ethnic, cultural, and religious differences.

3.4 Turning Skills into Jobs

The mismatch between skills and jobs, how demand and supply of skills and jobs relate to each other, is a ubiquitous and complex question. Development of skills does not by itself create the jobs where the skills would be used. And jobs do not necessarily prompt or cause efficient development of appropriate and relevant skills.

How can the skills and capacity requirement for food security and agricultural development be turned into "decent jobs" with improved productivity and better earning for the workers? More broadly, with huge potential for development in agriculture and its role in fulfilling the overarching goals of fighting hunger and poverty, what need to be done "to awaken the sleeping employment giant for skilled and unskilled labour force in the agricultural sector"? (Kulabako: 2011).

The illustrative tasks and functions indicated in Table 3.4 and the related areas of skills suggest the jobs in which these skills would be used. Many of these exist at present in rural areas and the commercial and service hubs serving rural areas. New ones have to be established by public agencies at local and higher levels, private sector and NGOs and community organisations. Existing jobs and new ones have to be placed within strengthened and newly created organisational and institutional structures so that these can be supported by necessary technical back-up and supervision. The potential for creation of jobs and making existing ones deliver better have to be assessed in the light of the food security and agricultural development strategies and plans.

In Africa, 200 million people are aged between 15 and 24 years, comprising more than 20% of the population. The large majority of the youth lives in rural areas and 65 percent of them are employed in agriculture. Making well balanced choices for employment-intensive

investments in agriculture and rural nonfarm activities, which are consistent with indicated food security and agricultural strategies, can create jobs which can absorb the young people. These can be short-term employment demanding limited skills, such as many of those in the Indian Employment Guarantee Scheme; or longer term ones related to new functions and institutions, requiring new specialised and upgraded skills.

In Uganda, agriculture contributed to 14 percent of GDP in 2010-2011, but employed 80 percent of the labour force. This disproportion between agricultural output and employment, manifested in a more extreme form than in other countries, nonetheless, is emblematic of the dilemma of developing countries – poor productivity and earnings of the large majority of the workers who are in rural areas leading to concentration of poverty among the rural people.

How can a vision of rural transformation help change this scenario with higher productivity and earnings for rural workers in agriculture as well as non-farm activities, while ensuring protection from hunger and poverty for all people?

In the context of Uganda, a number of ideas have been suggested, which lend justification for promoting skills to serve functions indicated above. Uganda has 5.5 million hectares of arable land, fertile soils and plenty of rainfall, but the full potential of agriculture and related development of rural communities is yet to be fully exploited. Among ideas suggested by experts and informed observers in Uganda are promoting cooperatives and other forms of grouping of farmers for procuring inputs, securing credits and marketing produce; investing in appropriate mechanisation of production and processing; and promoting agro-processing which have multiplier effects for off-farm employment.

“Cooperatives will enable farmers to process agricultural products collectively and help them raise enough quantities of final products for regional markets”, said Bernard Tayebwa, a Makerere University economist. Revived and strengthened co-operatives would facilitate collective marketing, and enable easy access to agricultural funds and inputs, he said. He also suggested that the country needs to build capacity for agro-processing to create substantial off-farm employment opportunities (Kulabako: 2011).

In the same vein, Uganda Safety Council Technical Director, Dr David Ongaram, has urged the government to promote group farms where farmers are encouraged to grow similar crops at the same time to make it easier to extend support services. Thomas Mwebaze, an economist from Makerere University, said boosting agricultural production through appropriate mechanisation and promoting agro-processing holds great potential to create employment opportunities for skilled, semi-skilled and unskilled Ugandans. “The agricultural sector has multiplier effects; if you mechanise and boost agricultural production, you create jobs for farmers, engineers, transporters, traders and processors along the value chain”, according to Mwebaze (Kulabako: 2011).

The secular and historic trend in economic development shows that the problem of rural poverty cannot be overcome without a structural change by which the employment in agriculture will match agriculture’s contribution to GDP and eventually, moving towards the pattern in developed countries, the proportion of direct on-farm workers as share of total workforce will be significantly lower than the share of agriculture to GDP. This suggests that a reasonable goal in many developing countries would be to reduce the proportion of on-farm employment by half in the next 10 to 15 years. The goal for Uganda, for instance, may be to reduce agricultural employment to 35 to 40 percent of total employment. For Bangladesh, the target by 2021 may be 25 percent of employment in agriculture, a decrease from the present 48 percent, with agriculture currently contributing 20 percent of GDP. The significance of such a structural change and the implications for skill development and job creation policy and strategy are discussed further in chapters 5 (see also chapter 2, “Pathways out of rural poverty”).

The acceleration of the structural change in the economy will require a mix of strategies encompassing efficient small-holder farming; commercial farming of different scales; and diversification of agriculture with a balance of crop and non-crop production. Investments will be needed in physical infrastructures including roads, water management, and energy supply. Technology including appropriate mechanisation, use of chemicals and application of bio-technology will have to be put to use. Off-farm economic activities have to be identified and promoted. ICT application has to be

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introduced in distribution and marketing and changes will be necessary in organisational and institutional structures. A judicious mix of strategies has to be chosen, keeping in view the labour intensity impact and labour market consequences in the rural areas. It has to be ensured that the changes benefit the poor and the disadvantaged and mitigate any negative impact on them.

In making the right choices regarding change in specific national and local contexts the sustainable livelihood approach (SLA) discussed in chapter 2 would be a useful framework. The framework can be helpful in assessing the broad and longer term structural change goals and targets and the more immediate practical decisions regarding inputs, technology and entrepreneurial choices. Due attention has to be given not to undermine the priorities and the outcomes in fighting hunger and poverty and to avoid inconsistencies between the longer term and the immediate.

The SLA approach, it may be recalled, emphasised understanding the vulnerabilities of poor people and the organisational and institutional environment within which poor people functioned. The poor must be helped to have access and make use of the key assets in working out a livelihood strategy for themselves – human capital, social capital or support derived from belonging to social groups, natural or ecological capital, physical capital, and financial capital. SLA provides a framework for considering the whole range of policy issues relevant to the poor, access to health and education as well as to finance, markets, and personal security. An integrated approach is necessary in making the different assets contribute to the common objectives of turning knowledge and skills into productive work, and productive work improving people's lives.

The operational aspects of the use of SLA framework for designing, implementing and assessing skills, capacity building and job creation are discussed in chapter 5. Sustainable livelihood, by its definition, is intimately intertwined with broader issues of sustainable development and building the green future. The ramifications for skills, capacities and livelihood of such a future must be better understood. These questions are explored in chapter 4.



