Food and Agriculture Organization
of the United Nations

The economic lives of smallholder farmers

An analysis based on household data from nine countries

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Contents

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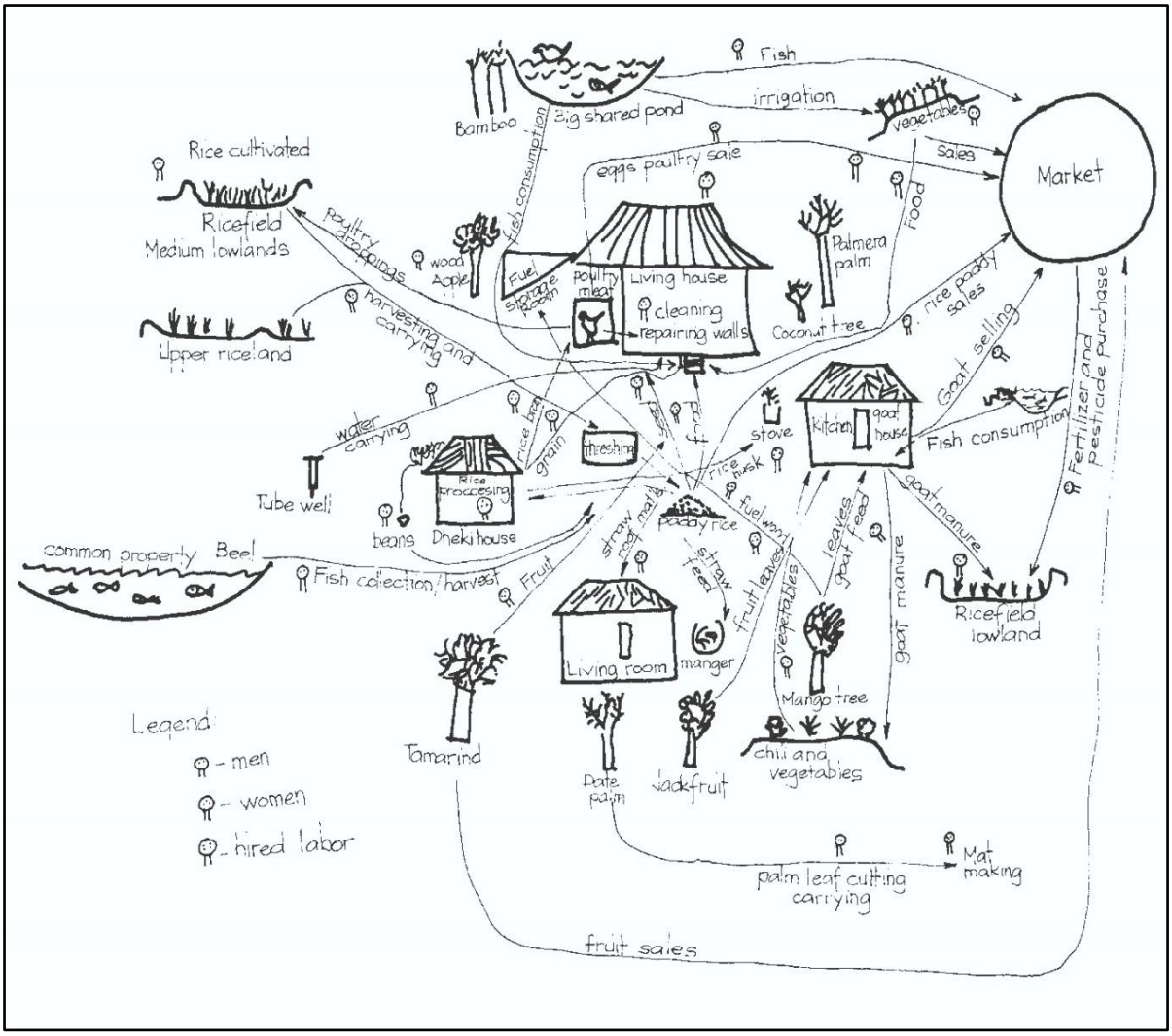
Farmers' view of a farm in Bangladesh*



*Adapted from Lightfoot, C., Feldman, S. and Abedin, M.Z. (1991). Households, Agroecosystems and Rural Resources Management. A Guidebook for Broadening the Concepts of Gender and Farming Systems. Educational Series 12, Bangladesh Agricultural Research Institute and International Center for Living Aquatic Resources Management, Manila, Philippines. Reproduced by John Dixon and Aidan Gulliver with David Gibbon (2001). Farming Systems and Poverty: Improving Farmers' Livelihoods in a Changing World (Principal Editor: Malcolm Hall). Rome, FAO and Washington DC, World Bank.

Introduction

About two-thirds of the developing world's 3 billion rural people live in about 475 million small farm households, working on land plots smaller than 2 hectares.[1] Many are poor and food insecure and have limited access to markets and services. Their choices are constrained, but they farm their land and produce food for a substantial proportion of the world's population. Besides farming they have multiple economic activities, often in the informal economy, to contribute towards their small incomes.

These small farms depend predominantly on family labour. In China, nearly 98 percent of farmers cultivate farms smaller than 2 hectares – the country alone accounts for almost half the world's small farms. In India about 80 percent of farmers are small. In Ethiopia and Egypt, farms smaller than 2 hectares constitute nearly 90 percent of the total number of farms. In Mexico, 50 percent of the farmers are small; in Brazil smallholders make up for 20 percent of the total number of farmers.[2]

The differences in smallholder farms between countries can be significant, and often reflect differences in the stages of development across countries. This is because the evolution of the small farm is intrinsically related to the process of economic development.

But across all stages of development, smallholders operate their farms as entrepreneurs operate their firms, or at least they try. They raise capital from multiple sources and invest in productive assets; for many of them even a spade or a bicycle are important assets. They make decisions and take both risks and profits. And agriculture involves many decisions: What to plant, which inputs to use and how, when to plow, to seed, to harvest; how much to keep for consumption in the household and how much to sell to raise cash, or how much to store. Smallholders often make these decisions in an economic environment in which markets do not function well, if at all, and which is also subject to many risks, such as adverse weather and price surges. And this has significant implications for their choices and their livelihoods. It also affects their choices on investing on themselves and their children – on how to attain social and human capital objectives, such as education and health.

This report draws a picture of smallholder agriculture in nine developing and emerging countries. It does so, using economics to analyze data from rural household surveys. It examines different dimensions of smallholders' lives: their farm and families; their production and the inputs they use for it; their work both on- and off-farm; their income and how it is made up; their consumption; and, their participation in markets. Economics studies choice and this report focuses on the choices of smallholder farmers, but also their role in development.

Agricultural development prescriptions are under debate[3]. The success of the Green Revolution in Asia put small farms on the top of the development agenda. Productivity increases in small farms contribute towards growth not only by reducing the price of staple food, but also by increasing the demand for labour in rural areas, generating jobs for the poor and raising the unskilled labour wage rate.

Nevertheless, in today's modern markets smallholder farmers must overcome considerable constraints. Commercialization and the transformation of food supply chains, best reflected by the rise of supermarkets in the developing world, offer new opportunities for smallholder farmers. But can also marginalize them, isolating them from lucrative markets and making them unviable economic units.

This report contributes to this debate by providing evidence on the strengths and weaknesses of smallholder farmers. It is based on a unique dataset specific to small-scale agriculture, the *Smallholder Farmers' DataPortrait*, which is being developed at FAO.[4] This dataset, built on information in the form of censuses and household surveys, provides a comprehensive, systematic and standardized profile of smallholder farmers across the world. To put numbers on the

drawing of the farm, found at the beginning of the report, is not trivial.

The report is organized in six sections, each shedding light on a different dimension of smallholders' economic lives. Section 1 discusses who are the smallholders and focuses on their farms, families and homes. Section 2 provides evidence on their production and discusses their productivity advantages, technologies and inputs. Section 3 gives special attention to labour both on- and off-farm and reflects on the concepts of smallholders and family farms. This section also discusses women farmers and capital. Smallholder household income is examined in section 4 which focuses on poverty, income diversification, but also on how do smallholder households spend their income and what they consume. Section 5 examines smallholder participation in different markets, and discusses how market imperfections affect household choices and livelihoods. The last section concludes and discusses the future of smallholders.

The Data

Our analysis uses the *Smallholder Farmers' DataPortrait*, a smallholder-specific data set based on Living Standards Measurement Study surveys (LSMS) and the FAO Rural Income Generating Activities data (RIGA). These surveys are designed to collect data on many dimensions of household welfare, including consumption, income, savings, employment, health, education, fertility, nutrition, housing and migration. Their main objective is to assess the living conditions of the population, and to illustrate household behaviour.

We use this wide range of information to build concise indicators which draw a data portrait of smallholder agriculture. This systematic and internationally comparable data tells us how much and what food is produced by small farmers, how much of their income is generated by farming, how much produce they sell, which is their asset base and much more.

In other words, the data 'take stock' of smallholder farmers across countries and identify their characteristics in terms of production, technologies, capital assets, access to markets, contribution to rural income, well-being, food security and poverty, and, to some extent, the effects of policies and programmes.

There is no unique and unambiguous definition of a smallholder. Often scale, measured in terms of the farm size, is used to classify farmers into small and large. For example, a number of analysts classify smallholders based on a threshold size of 2 hectares. The numbers of smallholder farmers presented in the beginning of the introduction are based on this 2 hectares threshold.

However, across countries, the distribution of farm sizes depends on a number of agro-ecological and demographic conditions, as well as on economic and technological factors. Two hectares in an arid region of Sub Saharan Africa do not produce as much as two hectares of good quality land in the Black Sea region. In Kenya, classifying as smallholders those farmers who farm land smaller than 2 hectares and adding them up, would nearly result in the entire arable sector. In other countries, such as Nicaragua, farms smaller than 2 hectares would be really small. The 2 hectares threshold does not provide any meaningful information for an analysis across countries.

In this report and in the DataPortrait, we utilize the *middle-sized farm* as a threshold.[5] The middle-size farm is determined by ordering farms from smallest to largest and choosing the farm size at the middle as the threshold to identify smallholders and other farmers in each country. This means that half of the total land is cultivated by smallholders, and the other half by other farmers. The middle-sized farm threshold varies from one country to another. It takes into consideration country specific conditions which shape the size of farms and their distribution and provides information about the *typical* smallholder farm (Table 1).

We examine the economic lives of smallholders in Albania, Bangladesh, the

Plurinational State of Bolivia, Ethiopia, Kenya, Nepal, Nicaragua, United Republic of Tanzania and Viet Nam. In this way our work spans from Latin America to Asia and from Europe to Africa. Our definition may be disputed, as it may ignore a number of farm households that could be considered small. Are farmers in Viet Nam with more than 0.96 hectares, our middle-sized farm for this country, large? Certainly not, and the term we prefer for farmers with more land than the middle-size holding is *other farmers*, rather than large farmers. But our work focuses more on bottom of the distribution of farm size – the smallest of the small. Those who are more likely to be subsistence farmers and poor. And our data suggests that they are the overwhelming majority in all countries we consider. The analysis also suggests that our definition reveals different behaviour between smallholders and other farmers in many aspects of their lives.

Having a wide coverage is important as it helps to understand the agricultural development process and the different stages in structural transformation, the process that entails productivity growth and rural income increases, rural to urban migration, and at a later stage a declining share of agriculture in the GDP and employment.

For example, Africa has been bypassed by the Green Revolution and a share of its people experience extreme poverty and hunger. Paradoxically, Africa has been urbanizing fast, while agricultural labour productivity remains low. In spite of such exits from the sector, farm sizes decline. Latin America is now urbanized and in many countries small farms coexist with larger commercial farming enterprises. Within the family farm sector, the inequality is pronounced, in spite of land reform policies. Asia offers many positive lessons on agricultural development, but rural poverty remains a problem.

Table 1: Data sources, middle-size farm threshold and sampled household numbers

Country	Source	Year	Threshold (Ha)	Households
Albania	Living Standards Measurement Study	2005	1.04	1 773
Bangladesh	Household income & expenditure survey	2005	0.69	5 031
Bolivia (Pl. State of)	Encuesta de Hogares	2005	1.10	1 384
Kenya	Integrated Household Survey	2005	1.20	6 901
Nepal	Living Standards Survey	2003	1.40	3 696
Nicaragua	Encuesta Nacional de Hogares sobre Medición de Nivel de Vida	2005	35.2	2 836
Tanzania (U.Rep. of)	Health and Development Survey	2009	2.20	1 795
Viet Nam	Living Standards Measurement Survey	2002	0.96	20 084
Ethiopia	Ethiopian Rural Household Survey (IFPRI)	2009	1.80	1 394

1 The smallholder household

Smallholder families live in farms which in many countries are significantly smaller than 2 hectares (Figure 1.1). In Asia, farms are very small. The average size of a smallholder farm in Bangladesh and Viet Nam is 0.24 and 0.32 hectares respectively. In Africa, smallholder farms can be relatively larger, but only marginally. Kenyan smallholders farm 0.47 hectares and in Ethiopia the average small farm size is 0.9 hectares. In Latin American countries, smallholder farms often tend to be over 2 hectares, as in Nicaragua where the average small farm size is 5 hectares. But this is not always the case. In the Plurinational State of Bolivia, small farmers cultivate on average, 0.89 hectares.

Average small farm sizes hide significant productivity differences across countries. These differences arise due to soil quality, technology and productive assets, such as irrigation. In general, farms in Asia are irrigated, while African agriculture is rain fed, as is agriculture in most of Latin America. Population growth rates in the rural areas and urbanization – driven by growth in other sectors of the economy – can also determine average farm size. This could probably contribute towards explaining the average small farm size in Viet Nam, a country which, by the end of the first decade of the new millennium, was characterized by a relatively low degree of urbanization, with 3 out of 4 people living in rural areas.[6]

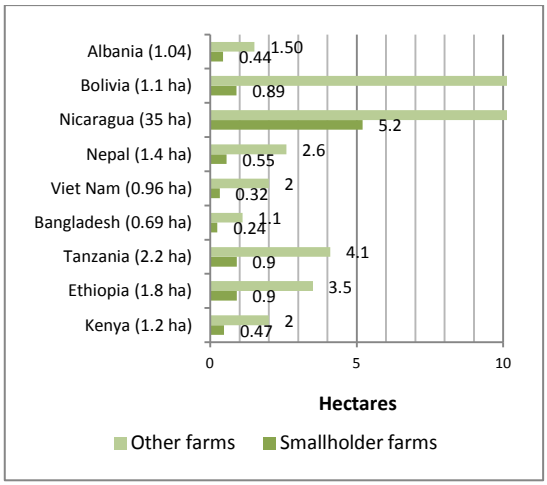
There are many smallholder farmers. In Tanzania, a country where agriculture contributes towards 28 percent of the GDP and 73 percent of the population lives in the rural areas, there are about 3.7 million smallholdings (those smaller than the middle-size farm threshold of 2.2 hectares), which make up for 80 percent of total farms (Figure 1.2). About 19 million people live and farm in these smallholdings (Figure 1.3). In Bangladesh, where sustained efforts in agriculture contributed towards achieving the MDG on hunger in the early 2000s, 60 million people live on 12 million small farms (smaller than 0.69 hectares). In Nicaragua, with 42 percent of 6 million people – the population of the country – living in rural areas, about 286 thousand farms are small (less than 35 hectares) and house 1.6 million people (Figure 1.3). Farms other than small holdings in our sample – those with a size up to 282 hectares – are significantly fewer.

Across the world, both developed and developing, farm sizes evolve but to trace their evolution through time is difficult. Agricultural censuses are infrequent and definitions of who can be considered as a farmer differ from one country to another. In spite of these difficulties, censuses provide us with a broad picture: in many countries of the developing world the average farm size declines. This can only mean that small farms become smaller, and that there are more small farmers.

In Ethiopia, for example, the average farm size declined from 1.43 hectares in 1977 to 1.03 in 2000. Nepal experienced a similar negative trend in the average farm size (from 1.12 hectares in 1982 to 0.79 in 2002). During these years, both countries experienced rural population growth, but no increase in agricultural land (Figure 1.4). In other countries, especially emerging economies, the situation is the opposite. Since 1970, Brazil experienced an increase in average farm size from 60 hectares to 67 hectares in 2006. With new land coming into production, the number of large commercial farms increased, while small farms declined in number, with the exception of holdings under one hectare.

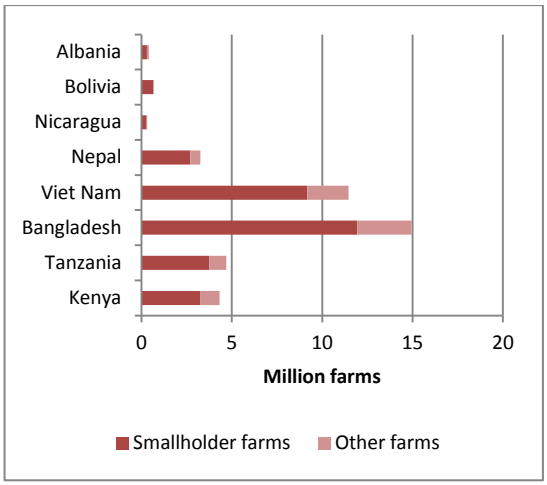
Smallholder families are usually large. On average in countries like Kenya and Bangladesh, smallholder families have seven members, out of which two are younger than 14 years of age. The data do not show any differences in the composition according to gender – there are, on average, as many adult men as women. These families live in houses, which in their majority, they own themselves. Across all the countries we examine, house ownership amounts to 98 percent of the total of small farms.

Figure 1.1 Average farm sizes



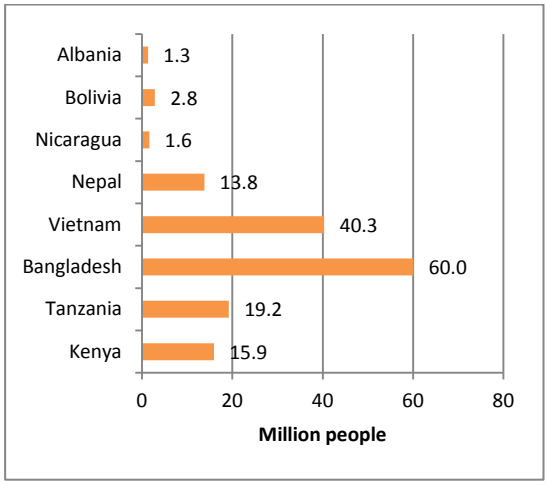
Source: Smallholder Farmers' DataPortrait (middle-size farm threshold sizes in parentheses).

Figure 1.2 Smallholder and other farms



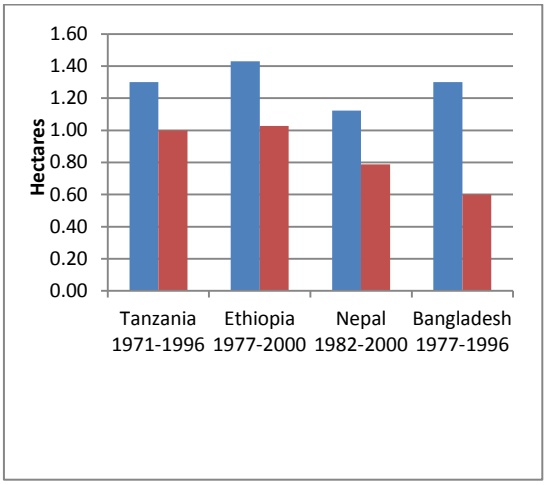
Source: Smallholder Farmers' DataPortrait.

Figure 1.3 Population of smallholders



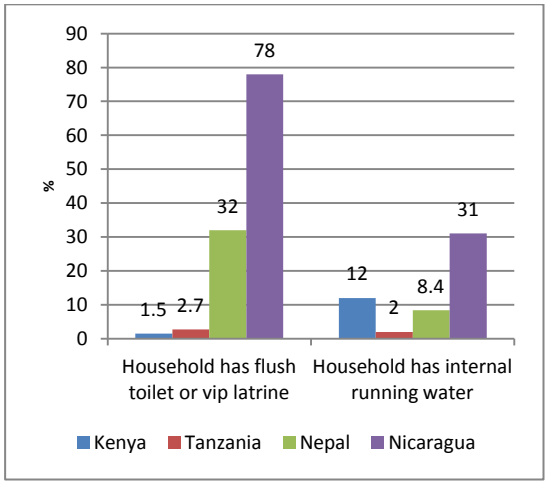
Source: Smallholder Farmers' DataPortrait.

Figure 1.4 Average farm size evolution



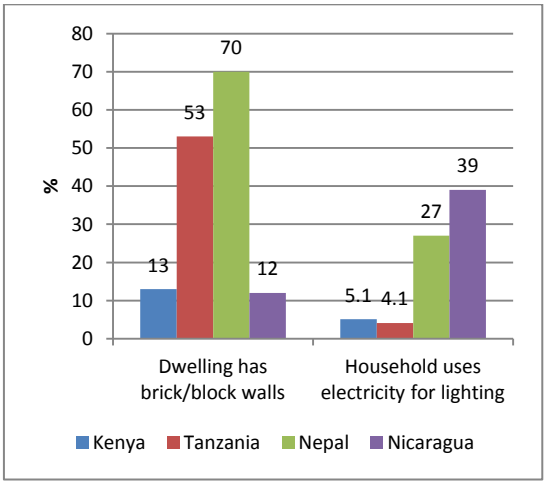
Source: World Census of Agriculture, 2000.

Figure 1.5 Smallholder households with internal running water and sanitary facilities



Source: Smallholder Farmers' DataPortrait.

Figure 1.6 Smallholder households built with bricks and using electricity



Source: Smallholder Farmers' DataPortrait.

But although, smallholders own their dwellings, housing conditions are poor (Figures 1.5 and 1.6). In Kenya for example, 74 percent of these houses have a dirt floor, and only 13 percent have walls made with bricks. Few of them have access to electricity for lighting (about 5 percent), telephone (0.1 percent), running water in the house (12 percent) and only 1.5 percent have proper sanitation facilities (a flush toilet). Safe water and sanitation play a fundamental role in improving nutritional outcomes. Lack of safe water and proper sanitation facilities lead to diarrhea, of which constant presence results in undernutrition. Diarrhea is one of the primary causes of death among children under five years of age in low income countries.

In other countries, water and sanitation conditions are better. For example, in Nepal, about 32 percent of the smallholders' houses have proper toilets and 8 percent access to running water. Most of the houses are built with bricks (70 percent), but only 12 percent have a non-dirt floor, 27 percent have access to electricity and 2 percent have telephone.

In many countries, these smallholder households are often located in remote areas. Although this is not the case in Viet Nam, other countries like Nepal, have few roads, and these are of poor quality. The country's road density in 2008 was about 13.5 km per 100 square km of land area, as compared with 72 km in South Asia. And our data suggest that, on average, it takes more than 11 minutes for smallholder families to reach a paved road. This affects their livelihoods, as poor transport network means that there are few markets, and commodity prices are high due to transportation costs.

For example, in Nepal the market price for rice in difficult-to-access regions can be up to three times as high compared to those in Terai, a region bordering India and the most productive agricultural zone in the country. Especially during the monsoon season, in areas with poor roads, only one-fifth of district headquarters can be accessed by road with landslides frequently preventing people from going to markets, health centers and schools.[7]

Road infrastructure remains underdeveloped in Nicaragua with the length of the country's total road network being only 17 km for every 100 km^2 of land in 2008. On average, small farms are located about 48 km away from a road and less than 12 percent of the country's roads are paved. Within the country, large disparities exist. The average distance between farmers and the closest commercial road is 0.53 km in Managua, 18 km in the central region and 136 km in Atlantic regions.

Lack of access to roads constrains households' access to markets and services. For smallholders, limited access to markets increases their vulnerability to shocks and hinders economic opportunities that could arise if trade was easily available.

2 Production

In the developing world, smallholders produce the bulk of food that is consumed. In Africa, Kenyan and Tanzanian small farmers produce 63 and 69 percent of the food in the country respectively. In Nepal, 2.7 million smallholder farms make up for 70 percent of the food produced and in the Plurinational State of Bolivia, 653 thousands small holdings supply 85 percent (Figure 2.1).

Small farms produce a wide range of foods, often wider than larger and commercialized farms. Small and poor farmers, who may not be fully integrated in markets, choose to produce their main staple but also diversify their production to achieve better diets. Even if smallholders were commercialized, selling and buying food in the market, they diversify their crops as a risk management strategy to stabilize their income. By growing many crops, they minimize their exposure to risk, such as price shocks. Even if specialization in one crop increases efficiency, poor smallholders diversify to spread risk over many crops. The owners of large farms are wealthier and therefore, less risk-averse to employ diversification strategies.[8]

In the Plurinational State of Bolivia, smallholders cultivate more than 13 crops in farms with an average size of 0.89 hectares. Potatoes, the traditional low-value staple in the country, make up for nearly half of their total household production. Maize, the main cereal, adds another 17 percent. But small farmers produce other grains, such as rice, barley, wheat and quinoa, as well as vegetables, legumes and fruit (Figure 2.2). This high altitude farming system stretches from Northern Peru, through the Plurinational State of Bolivia into Northern Chile and Northeast Argentina. In line with altitude, and in the valley floors, subsistence-based production adds cereals to potatoes, the main staple of the country.

In Kenya, maize – which dominates the diets in Sub Saharan Africa – makes up for more than half of a smallholder household production. Together with maize, smallholders cultivate sorghum, millet, cassava, potatoes, but also beans and vegetables (Figure 2.3). This maize-mix farming system is the most important food production system in East and Southern Africa, extending across plateaus and highland areas from Kenya and the United Republic of Tanzania to Zambia, Malawi, Zimbabwe, South Africa, Swaziland and Lesotho. With bimodal rainfall patterns, farmers have two cropping seasons, but in drier areas they usually harvest only once a year. In addition to crops, cattle provide ploughing, breeding, milk and farm manure.[9]

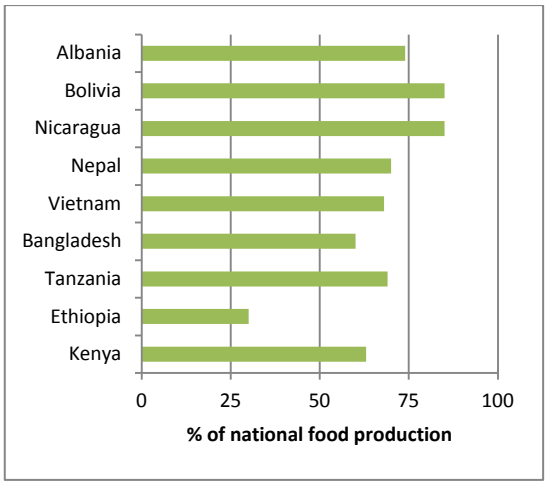
In Nepal, 36 percent of a typical small farmer production is made out of rice. But maize, the most important cereal crop in the hills of Nepal, as well as wheat make up for 24 percent of total production (Figure 2.4). This rice-cereals farming system is found from Northern Pakistan through the Indo-Gangetic plain including the Terai of Nepal, and in Northwest Bangladesh. Production is based on modern rice varieties and some form of irrigation.

Development entails changes in crop diversification patterns as farms become more commercialized and income rises. With farmers participating more and more in the markets, crop-mix gives away to specialized production which responds to market prices and the demand for higher value and quality foods.[10]

The technologies smallholders use are difficult to depict only with data. But in simple terms, farmers combine land with labour, seed, fertilizer and other inputs to produce food and other commodities. Labour, land and other capital warrant a separate discussion – they are inputs that make a marked distinction between smallholders and other farmers (see next section).

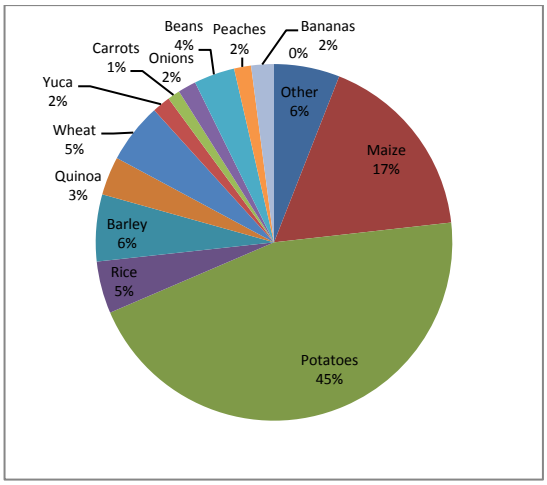
Other inputs, such as fertilizers and seed, are important as means towards intensification of production, and smallholders appear to use both more intensively than larger farmers. For example, a typical Tanzanian smallholder with a cereal-root mixed farming system uses 22 kg of inorganic fertilizer per hectare as compared to 8 kg applied by the average larger farmer in the

Figure 2.1 Proportion of national food production by smallholders



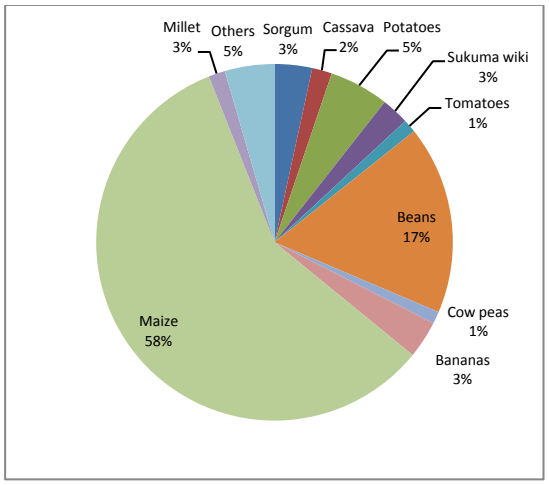
Source: Smallholder Farmers' DataPortrait.

Figure 2.2 Plurinational State of Bolivia: Small farm production diversification



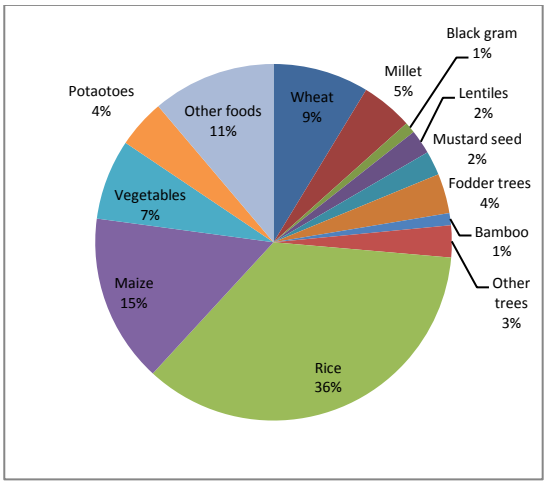
Source: Smallholder Farmers' DataPortrait.

Figure 2.3 Kenya: Small farm production diversification



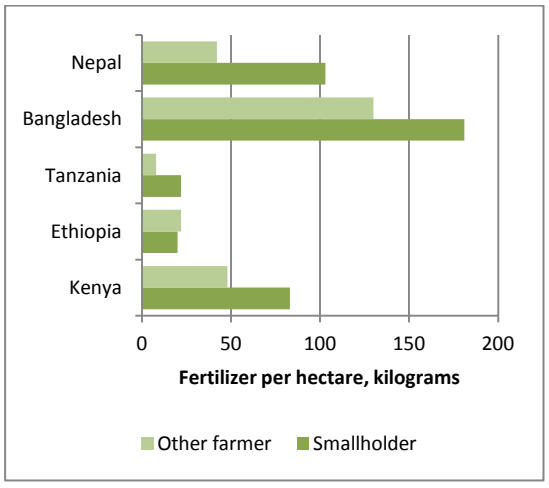
Source: Smallholder Farmers' DataPortrait.

Figure 2.4 Nepal: Small farm production diversification



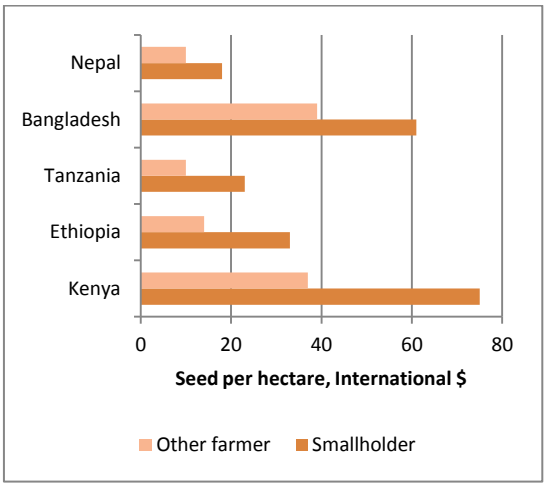
Source: Smallholder Farmers' DataPortrait.

Figure 2.5 Fertilizer applications per hectare



Source: Smallholder Farmers' DataPortrait.

Figure 2.6 Seeds applications per hectare



Source: Smallholder Farmers' DataPortrait..

country (Figure 2.5). Seed is also used in greater amounts per hectare by small farmers. In Kenya, a similar pattern of input use is shown by the data, but the numbers suggest that Kenyan smallholder farmers enjoy better access to fertilizer than those in Ethiopia and the United Republic of Tanzania. However, this does not mean that smallholders in these countries have enough inputs to use. For example, while an Ethiopian farmer applies 20 kg of inorganic fertilizer per hectare, the average use of fertilizer in Europe amounts to over 130 kg per hectare.

Many regions in Sub Saharan Africa are characterized by declining soil fertility including the breakdown of soil structure, a reduction in organic matter and the nutrient content. The cultivation of cereals on the same land without addition of organic or inorganic fertilizers leads to low yields, which in turn lead to inability to afford the purchase of inputs. Fertilizers can increase yields by recapitalizing soil nutrient. Their use, in conjunction with improved seed, can lead to significant productivity growth.

In Bangladesh, intensive rice production depends on soil nutrient recapitalization – smallholders apply 181 kg of fertilizer per hectare. Once more, our data shows that small farmers use inputs more intensively. Larger farmers in the country use 130 kg of fertilizer per hectare. And when smallholders use 66 kg of seed per hectare (of which the value is I$61), their larger counterparts use a smaller quantity – 46 kg per hectare which cost I$39).

More intensive strategies can increase yields, but can also bring risks for water resources and negative health impacts from increased use of agrochemicals. But what the numbers tells us is that conventional technologies which are based on seed and fertilizer are scale-neutral, that is their adoption does not depend on farm size. Smallholders use them intensively, probably to substitute for other inputs, such as land. Fertilizer is a *land-augmenting* input: its intensive use is supposed to substitute for land – a capital input smallholders have not in abundance – through increased yields per hectare.

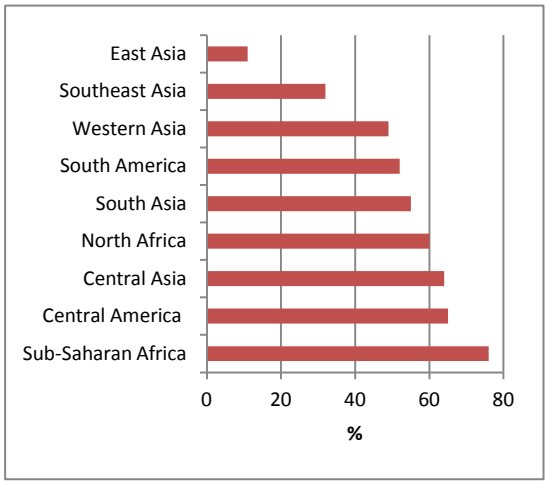
Yields and the inverse relationship between productivity and farm size

From the early 1950s to the late 1970s, the Green Revolution in Asia succeeded in raising significantly the productivity of smallholder farmers. Its aim was to increase food production at a rate faster than that of population growth and reverse the Malthusian argument. And this success came by a combination of technological advances, significant public investments and policy support. The introduction of a package of modern inputs, irrigation, fertilizer, pesticides and improved seeds, resulted in small farmers increasing production fast and to an unprecedented level. Between 1963 and 1983, the main Green Revolution period, developing countries' total production of paddy rice, wheat and maize rose by 3.1, 5.1 and 3.8 percent per year respectively.

Today, smallholders produce most of the food consumed in the developing world but their productivity growth has slowed down and is generally lagging. Lower productivity in some developing countries, and in small family farms in particular, raise specific concerns. The gap between small farmers' yields and technical potential yields – the ones achieved with latest varieties and under the best conditions – reflects the largely suboptimal use of inputs and insufficient adoption of most productive technologies. In 2005, across the developing world, yield gaps were estimated to range from 11 percent in East Asia to 76 percent in Sub-Saharan Africa (Figure 2.7).[11] Such gaps can be partly reflected by the different levels and trends between
the yields in major exporting countries and regions and in developing countries in which production is predominantly based on small-scale agriculture and access to markets and technologies is limited (Figure 2.8).

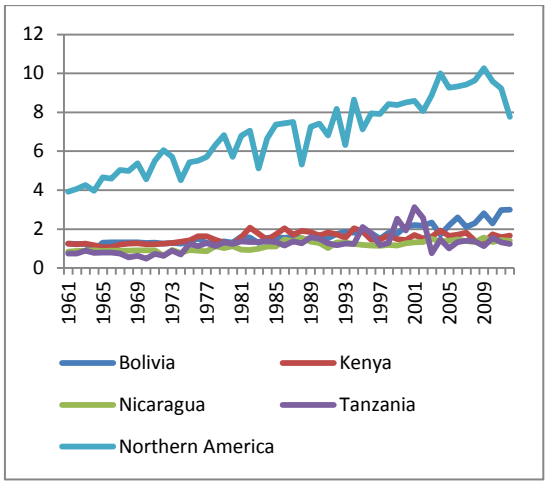
In spite of the slow-down in productivity growth in the developing world, within their countries smallholder farmers achieve higher yields than their larger counterparts. Numerous studies report evidence of an inverse relationship between farm size and productivity.

Figure 2.7 Yields gap



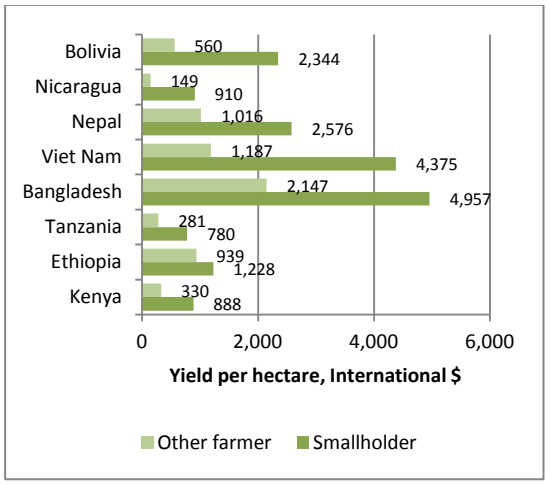
Source: FAO (2011).

Figure 2.8 Maize yields, 1961-2012



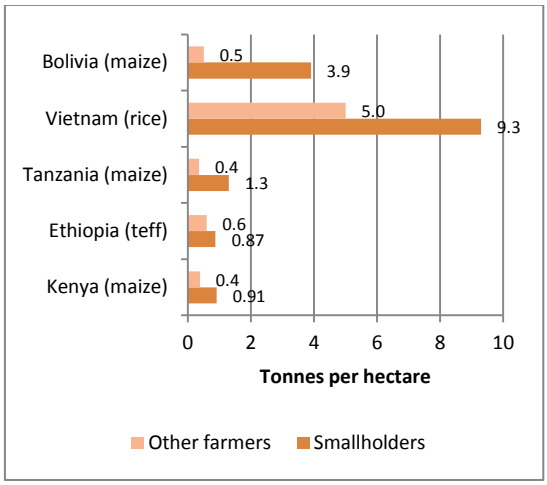
Source: FAOSTAT.

Figure 2.9 Food yields per hectare (I$)



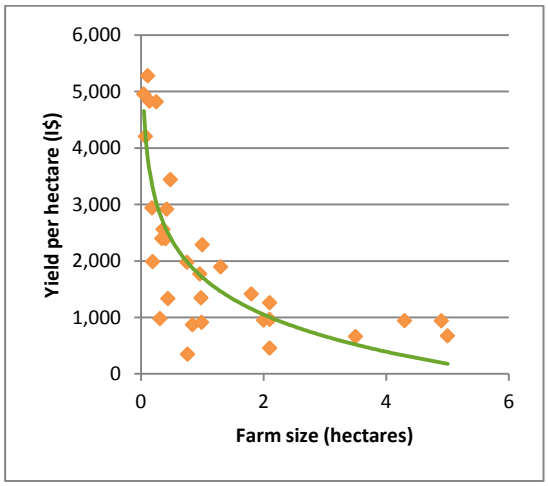
Source: Smallholder Farmers' DataPortrait.

Figure 2.10 Food yields per hectare (tonnes)



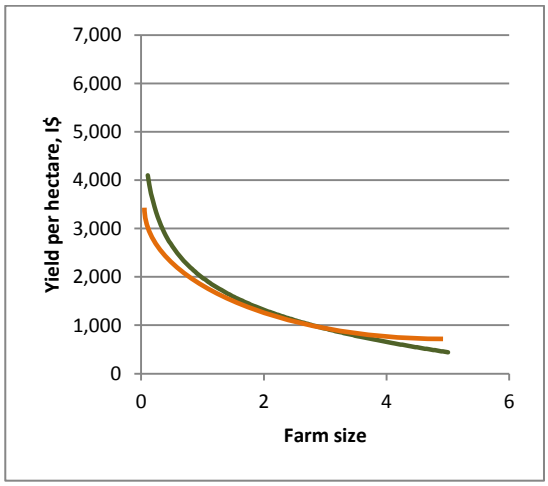
Source: Smallholder Farmers' DataPortrait.

Figure 2.11 Inverse relationship between farm size and yield



Source: Smallholder Farmers' DataPortrait.

Figure 2.12 Simulated impact of a weakening inverse relationship



Source: Author's calculations.

Should smallholders be more efficient in producing food as compared with larger farms, policies should target them to increase productivity and enhance food security – this is the cornerstone of the agricultural development policy thinking and the reason for the focus on smallholders.

Our dataset also shows that across the developing countries we examine, food crop yields per hectare (measured in international dollars) in small farms are substantially higher than those of larger farms (Figure 2.9). A smallholder in the United Republic of Tanzania, farming on average 0.9 hectares produces food worth $780 per hectare, as compared to an amount of $281 per hectare generated by a larger farmer cultivating 4.1 hectares.[12]

In Nepal, a smallholder generates more than two times as much as other farmers in terms of revenue per hectare (I$2 576, as compared with I$1 016). In Nicaragua, where farming is more extensive, a smallholder with 5.2 hectares, produces food worth I$910 per hectare, while other farmers, who in their majority are large and cultivate up to 282 hectares, generate about I$149 per hectare.

These figures reflect an aggregate yield of all food crops produced in the farm and, given the crop diversification of small farmers, they may overstate their productivity. A small farmer may allocate her land in both higher- and low-value crops, while a larger farmer may produce only low-value grains.

The data suggest that often this is not the case: smallholders in Ethiopia produce 0.87 tonnes of teff per hectare – the country's staple food – while larger farmers achieve yields of 0.59 tonnes (Figure 2.10). In Kenya and the United Republic of Tanzania, smallholders produce significantly more maize per hectare as compared with the yields attained in other farms. Rice yields in Viet Nam convey a similar story.

The differences in the value of yields per hectare across regions and countries are also significant. For example, a smallholder in Kenya achieves $888 per hectare of land, as compared to a yield revenue of $4 957 in Bangladesh. Even in mountainous Nepal, yields are higher than those in the African countries we examine. These differences reflect not only diverse agro-climatic conditions, but also differences in cropping intensity and crop-mix, input use, capital and access to markets and knowledge, and more importantly lags in the adoption of modern technologies.

But differences across countries aside, the inverse relationship between farm size and productivity is almost universally observed (Figure 2.11) and is also the subject of a heated debate between development economists.[13] Analysts of small scale agriculture study 'technical efficiency' – the maximum amount of output that is produced by a given bundle of inputs. Many studies of technical efficiency reach the same conclusion: smallholders are indeed more efficient and produce amounts closer to the maximum output, as compared to larger holders.

There are several reasons that can give rise to this puzzling inverse relationship. First, it may be that smallholders appear to be more productive, as they usually farm better quality land. Omission or imprecise measurement of land quality can give rise to an inverse relationship between productivity and farm size which may be only a statistical artifact. Although measurement problems bedevil empirical work, many authors suggest that differences in land quality explain just a small part of the inverse relationship.[14] The second reason is related to labour. Typically, smallholders use more inputs per hectare. They also engage more workers per hectare and smaller farm size allows for easier supervision. These workers, being family, are motivated to work and this gives them a productivity advantage over larger farms. This important issue is analyzed in the next section which focuses on labour and capital in small farms.

Nevertheless, there are signals that this productivity advantage enjoyed by small farmers is being eroded mainly due to the transformation of the food supply chains. In today's modern markets, sales through

sophisticated channels, such as supermarkets, require greater managerial skills and an ability to provide continuity of supply and meet food safety, certification and quality requirements. Agricultural research is becoming increasingly private, focusing on technologies which are knowledge intensive, being developed for larger commercial farms. This renders technology adoption by small farmers difficult. Smaller farms face considerable difficulties in accessing credit, as banks are often reluctant to lend to them due to poor collateral and lack of information.

As markets change, economies of scale in skills and technology, finance and access to capital and the organization and logistics of trading, marketing and storage, make smallholders unprofitable thus outweighing the advantages of small farms in productivity per hectare. Some research suggests exactly this: the inverse relationship between productivity per hectare and farm size may weaken with time. Although production efficiency increases for both smallholders and larger farmers, the productivity differences between them may be fading away over time.

Using household data from Mexico for 2002 and 2007, the analysis suggests that within a period of five years, the relationship between farm size and productivity lost about 25 percent of its strength. Over time the productivity of smallholders increases slower than that of other farmers.[15] Figure 2.12 shows such an impact graphically: over time the inverse relationship curve rotates anti-clockwise, depicting the possible and gradual loss of productivity advantage of small farmers. If this trend is due to the transformation of the food chain, smallholder farms will become increasingly more isolated from the economic environment, turning into unviable economic units. Nevertheless, more research is necessary to substantiate these initial findings.

3 Labour, land and other capital

In their entirety, small farms are family farms. Most of labour is provided by family members, although hired labour is also used. Across countries, family labour in small scale agriculture is substantial. In Ethiopia, from a family of more than five persons, four family members work daily in the farm; in the Plurinational State of Bolivia, families of four provide more than two people per day to work in the holding.

The number of family workers does not tell the whole story. Smallholders typically exploit very low capital to labour ratios – they use more labour than capital to produce food. Our dataset shows that in Kenya, two family members work in one hectare of their farm every day and another family member joins them for half the time (Figure 3.1). In Nepal, there is more family labour per hectare: nearly five family members work in the household farm. In the Plurinational State of Bolivia, family labour per hectare amounts to 2.5 persons per day, and in Albania, with a more developed agricultural sector, the number is 3.2. In all countries we examine, farms other than smallholdings utilize less family labour with the large ones facing lower capital transaction costs, spreading capital over large areas and choosing higher capital to labour ratios.

Smallholders do hire workers, often on a seasonal basis. However, the contribution of hired labour is small. On average, in Kenya the smallholder family provides twenty times more labour than hired workers (Figure 3.2). Even in Nicaragua, where small farms can be between 0.18 and 35 hectares, the ratio of family to hired labour is over 11. Other farms, larger than smallholdings, hire more workers - in Nicaragua, in larger farms the ratio of family to hired labour fall to just over 4 – for four family members working in the farm, there is one employed worker.

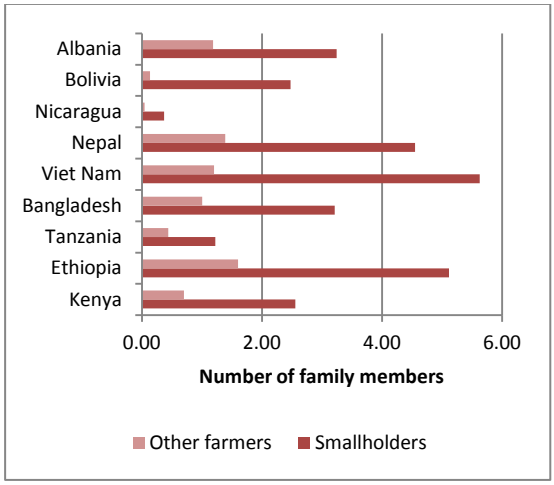
Just the use of family labour at such proportions explains the productivity advantage of smallholders. The more family members work in the farm, the higher production per hectare (Figure 3.3). Do small farms use more family labour than they should? The answer is yes; they *over-use* family labour, meaning that they use it more than a level that would be consistent with profit-maximization. But it is not that smallholders are not profit-maximizers. It is that their choices are limited. Lack of well-paid opportunities in the rural areas – which can also be associated to low education levels – result in farm households assessing the returns to labour as being very low. And faced with such a low rural 'wage', small family farm households over-use their labour; the smaller the farm, the greater the labour intensity. Our research suggests that in Kenya, if all smallholder family members of working age had more opportunities and were paid the national average wage, rural income would double.[16]

Such labour market imperfections are crucial in shaping the family farm sector. While family labour is over-used in small farms, in larger farms farming over a large area requires a lot of hired labour; and hired labour requires supervision. As supervision costs are high, families tend to farm smaller plots of land and indeed the concepts underpinning the definitions of smallholders and family farms coincide.

Women provide substantial labour in smallholder farms. In four out of the nine countries examined in this report, women provide more labour on the farm than men (Figure 3.4). For example in Nepal, there are 1.4 females working on the household farm each day as compared with one man. In Albania, each day women supply 60 percent of labour on the farm. And in other countries, where men provide more on-farm labour, women work nearly much as their male relatives. In Ethiopia, where families are large, there are on average 2.2 women for 2.4 men working per hectare each day.

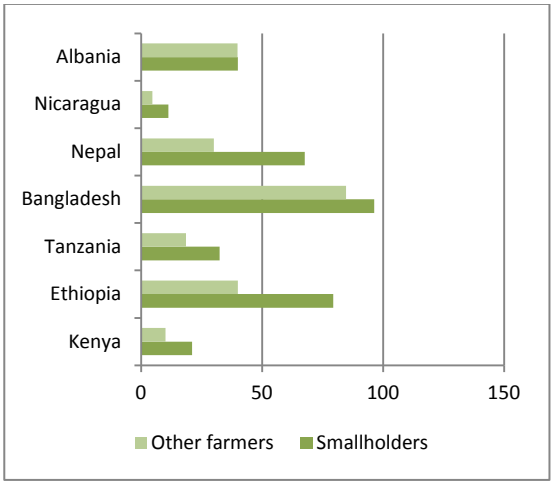
Women do different jobs on the farm, together with the unpaid household work.

Figure 3.1 Family labour per day per hectare



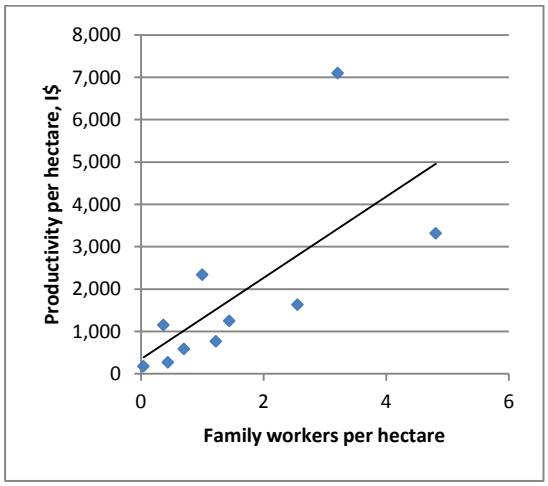
Source: Smallholder Farmers' DataPortrait.

Figure 3.2 Ratio of family to hired labour



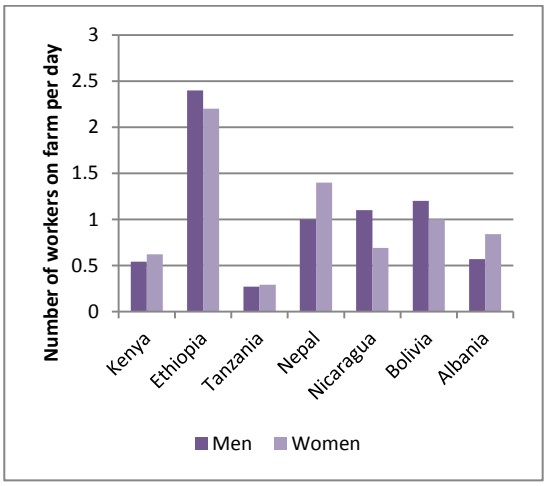
Source: Smallholder Farmers' DataPortrait.

Figure 3.3 Relationship between productivity and family workers



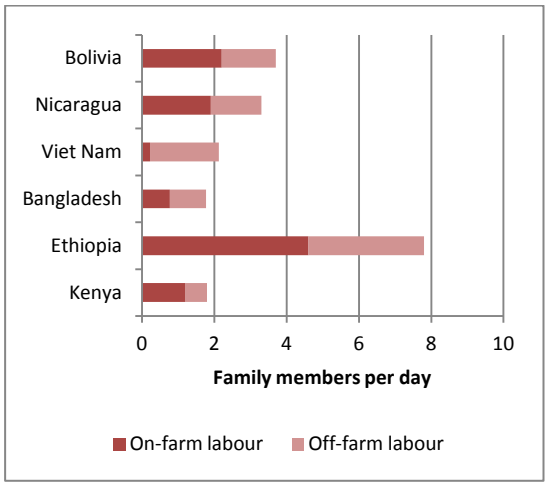
Source: Smallholder Farmers' DataPortrait.

Figure 3.4 Family labour in smallholder farms



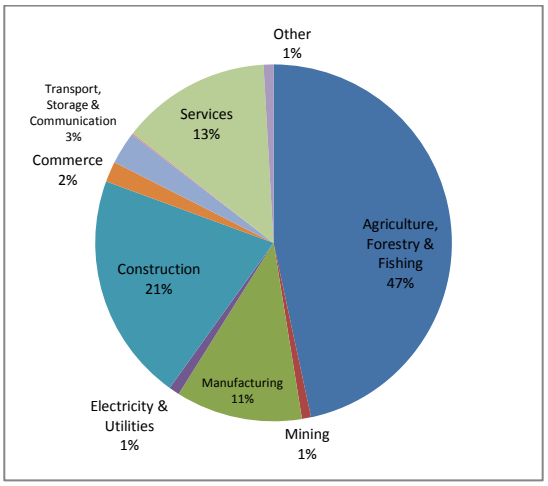
Source: Smallholder Farmers' DataPortrait.

Figure 3.5 Smallholder family labour on-, and off-farm



Source: Smallholder Farmers' DataPortrait.

Figure 3.6 Nepal: Off-farm labour



Source: Smallholder Farmers' DataPortrait.

They collect fuel and water, and are involved in low-value and small-scale trading. In Sub Saharan Africa, women tend to engage in the production of maize, fruits and vegetables and they also rear small animals. In Asia, women are heavily involved in rice production, and in Latin America they tend to manage small plots on the farm, cultivating food crops and raising poultry and small livestock.[17]

Although, they spend quite a lot of time on their land, many smallholder women and men also work off-farm. Their labour is an important income earner and they try to make good use of the limited opportunities rural areas offer. Indeed, the time they spend working away from their farms is considerable, and our data suggests that many smallholder families have members with off-farm jobs.

Off-farm employment, in addition to complementing farm income and contributing towards food security and poverty alleviation, provides an important risk management tool by diversifying income sources. In times of negative shocks that affect agriculture, such as droughts, families can rely on off-farm income to maintain their livelihoods.

In Kenya, one member of the smallholder family spends about half of his (her) day working off-farm, and in Ethiopia about three people, out of large families of eight, work outside the farm household (Figure 3.5). In the Asian countries, Bangladesh and Viet Nam, there are more non-farm workers in the smallholder family. And in both Latin American countries examined in this report, non-farm labour is significant with more than one third of the family having a job outside the farm. It is difficult to extract detailed information from household surveys, but these jobs are often found in the informal sector and can take any form, temporary, seasonal or permanent.

In Nepal out of 2.7 million smallholder households, 2.25 million report off-farm activities. Many, about 47 percent, work in the agricultural sector as hired workers on other farms mostly on a seasonal basis and either as wage or exchange labour (Figure 3.6). About 21 percent of households report that family members work in construction, 13 percent in services and 11 percent in manufacturing. Essentially, these jobs are often low-paid and do not require specific skills. In Nepal, semi-skilled jobs in construction can include carpentry and brick laying. In the manufacturing sector, smallholders often work in blacksmithing and electrical repairs. Many engage in self-employment activities, as retailers, wholesalers, rice mill owners, bus operators, and private entrepreneurs.[18]

In the United Republic of Tanzania, people from over half of the smallholder households provide labour to other farms - ploughing, planting, weeding, harvesting and transporting produce (Figure 3.7). Some work in construction (about 9 percent) and services (13 percent) which could be fetching or selling firewood or charcoal. In any case, working off-farm helps build social capital. Loans are often requested from employers, and having several employers to turn to for cash or food can be advantageous.[19]

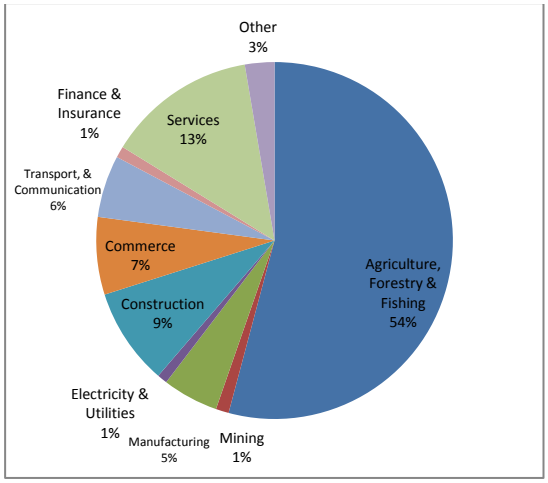
Other capital

Back on their farms, smallholders combine their labour with, apart from land, other capital assets such as irrigation, tractors and other machines and livestock.

Irrigation is considered one of the most important productive assets, leading to significant increases in yields. Access to water and irrigation is a major determinant of land productivity – irrigated land is twice as productive as rain-fed land. Together with population density and infrastructure – which determine the creation of markets and link them together – irrigation was a crucial condition for the success of the Green Revolution.

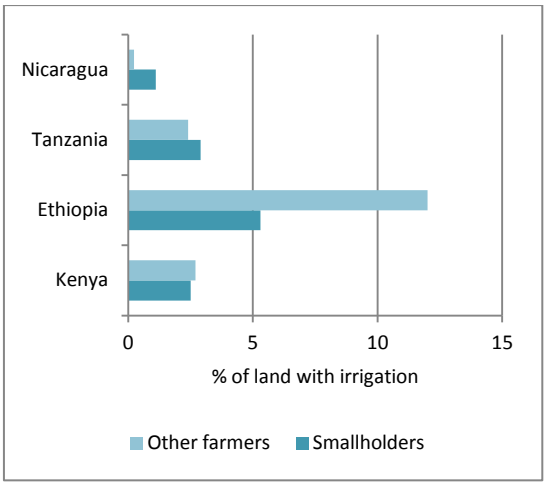
Micro evidence from Asia suggests that irrigation results not only in higher yields and income, but also in reduced risk of crop failure and in higher and year-round farm and non-farm employment. It also enables smallholders to adopt more diversified cropping patterns and to switch from low-value subsistence production

Figure 3.7 United Republic of Tanzania: off farm labour



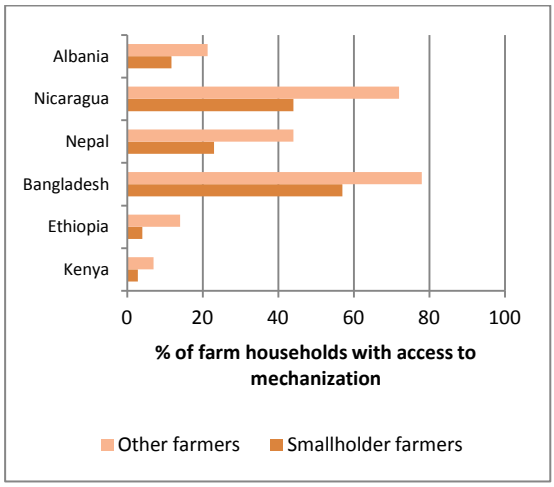
Source: Smallholder Farmers' DataPortrait.

Figure 3.8 Percent of land with irrigation



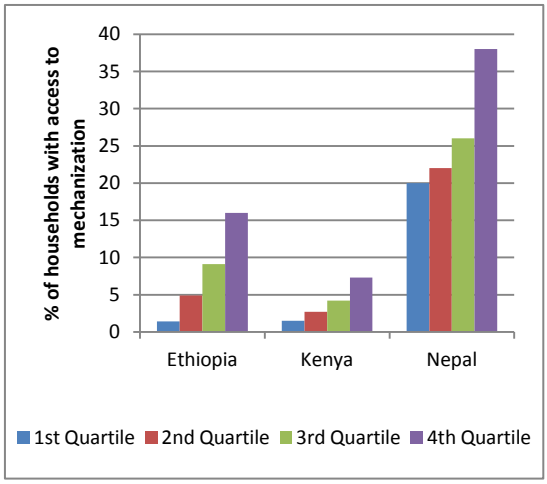
Source: Smallholder Farmers' DataPortrait.

Figure 3.9 Farm households with access to mechanization



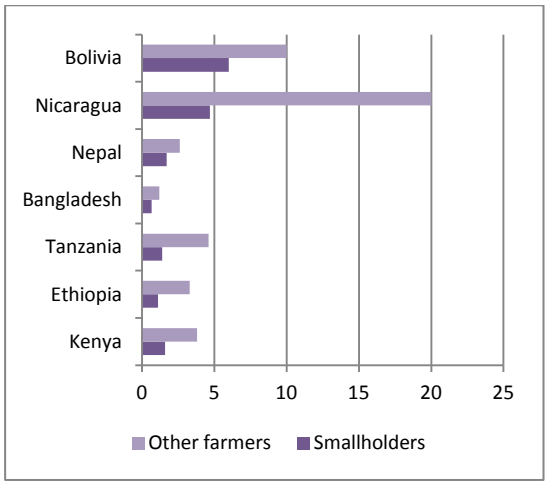
Source: Smallholder Farmers' DataPortrait.

Figure 3.10 Farm households with access to mechanization according to farm size quartiles



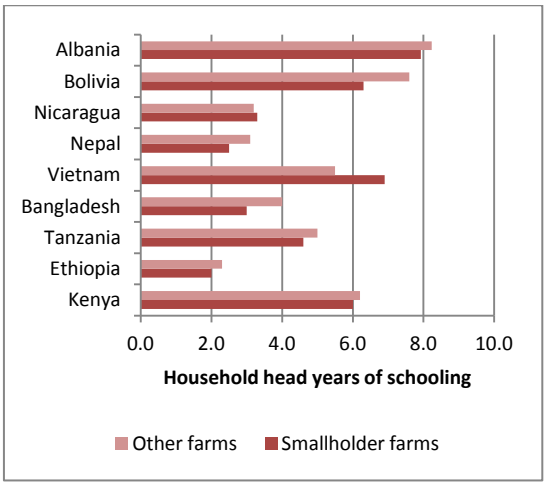
Source: Smallholder Farmers' DataPortrait..

Figure 3.11 Livestock Tropical Livestock Units owned



Source: Smallholder Farmers' DataPortrait.

Figure 3.12 Human capital



Source: Smallholder Farmers' DataPortrait.

to high-value market-oriented production.[20] The relatively high smallholder yields in the Asian countries we examined in section 2, are also the result of irrigation. Although no data on irrigation is available in the household surveys of Bangladesh and Viet Nam, in Nepal our data shows that 67 percent of smallholders' land is irrigated as compared with 94 percent of land farmed by other farmers.

In Africa, a very small part of land is irrigated – only in Ethiopia some 5 percent of smallholder farms have access to irrigation (Figure 3.8). In Ethiopia, the overall average income gain due to access to irrigation ranges from 4 000 birr to 4 500 birr per household per year ($919 to $1 034 measured in constant 2009 international dollars), which means that the average income of non-irrigating households is less than that of the irrigating households by about 50 percent.[21] Although the cost of developing public irrigation systems is high, small irrigation projects in this region can make the difference. For instance, a small-scale community managed irrigation project in the United Republic of Tanzania achieved a rate of return of 22 percent and increased farm incomes by 86 percent.[22]

Across the developing regions, larger farmers can finance expensive and lumpy capital and use them over more land or larger quantities of produce. Mechanically-powered technologies, such as tractors, harrows, threshing or shelling machines, seeders and irrigation equipment can contribute significantly towards increased production. But even owning a plough is not common for smallholders in many developing countries. Having a tractor or renting it is even rarer.

Our data shows that in Africa, smallholders do not have access to mechanization – they produce by combining more labour and less capital per hectare (Figure 3.9). In Nicaragua, where relatively larger farms allow the use of machines, about 44 percent of smallholders either own or rent tractors, trucks and other machinery. Many smallholders in Bangladesh have access to mechanization, mainly in the form of threshers, husking and ginning machines. Smallholder mixed-crop farming systems, where crops are planted in narrow spaces on a small farm do not allow the use of large machines, such as tractors. Also, small farms have limited access to complementary inputs, such as fuel and electricity to run machines.

Economics can also help explain why smallholdings are not as mechanized compared with larger farms. For smallholders, wages – the ones they perceive for their own family labour and those for hired workers – are low relative to the costs of mechanization. Draught animal costs are also low, and combining more hand labour with animal power is more cost effective than investing in machinery. Increases in the rural wage rate will result in more mechanization. For example, the average agricultural wage rate in Nicaragua is $6 per day, while that in Ethiopia amounts to $2.7. Higher wages, a result of economic development and growth, will initiate a process of substitution of machinery for labour, making progressively the use of machinery part of the least-cost production technology.

Nevertheless, even small increases in farm size bring up more mechanization. We observe this pattern in most of the countries examined in this report. Although access to machinery starts from a very low point, mechanization increases fast with farm size. For example in Ethiopia, about 1.4 percent of the smallest farms (the first farm size quartile with an average farm size of 0.34 hectares) have access to mechanization. But as farm size grows so does access to mechanization (Figure 3.10). About 16 percent of the largest farms in Ethiopia (the top quarter of the farm size distribution with an average size of 4.3 hectares) use mechanically-powered technologies. Capital requirements increase steeply with farm size also in Kenya, where farm sizes are small – the largest farms have 2.1 hectares of land – but also in Nepal, of which agriculture is also characterized by small farms. Although machinery can include small equipment, for example a water pump, a seed planter or a hydraulic pressing machine, the data suggests that as farm size increases, even to one or two hectares, some

labour constraints set in fast, favouring mechanization.

Livestock is another important capital asset. It does not only provide food and animal protein – meat, milk and eggs for sale or home consumption – it also yields wool and manure for use as fertilizer. Oxen provide draught power for tillage, and animals can be fed crop by-products and other plant material. In addition, livestock are assets that can be sold in emergencies to provide essential cash. These complementary relationships between crop production and livestock are important for smallholders.

Smallholders are more likely to keep poultry and pigs, sheep and goats, or other small animals. Larger animals, such as cattle, are more costly to buy and maintain. Smaller animals are more convenient to sell quickly when in need; they also breed faster and can often thrive on harsher terrain. For many smallholders "backyard" poultry production is the least costly and offers the highest return on investment.[23]

In the countries we examine in this report, most of the animals are kept by smallholders. In Kenya, smallholders keep 55 percent of total livestock in the country and in Ethiopia 57 percent. In Bangladesh and Nepal the share of the livestock owned by small farmers is 69 and 76 percent respectively. Nevertheless larger farmers keep more or bigger animals, or both, in terms of tropical livestock units (TLU).[24] For example, in Nicaragua, larger farms and a grassland-based ruminant livestock production system allow significantly larger stock, as compared with Bangladesh, where farms are significantly smaller and depend on a mixed crop-livestock production system. A small farmer in Nicaragua keeps about 4.7 TLUs and in Bangladesh, smallholders own about 0.69 TLUs in farms of 0.24 hectares (Figure 3.11).

Human capital – farmers' knowledge, skills, health or values – directly influences agricultural productivity. Knowledge and skills shape the way in which inputs are used and combined by farmers. They also help into acquiring and assimilating information and technology, and affect farmers' ability to adapt their practices to a particular situation or to changing needs. Often economists assess human capital through the number of years in the school (a form of human capital stock), or expenditures on education and health (investments in human capital).

Our data allows us to examine the average period smallholding household heads have spent at school (Figure 3.12). In Ethiopia the head of the average smallholding has attained 2 years of education. In the United Republic of Tanzania, where just 9.7 percent of the population completes their primary school education,[25] the smallholder farm head attains 4.6 years of school. A similar picture emerges in other countries too. In Nicaragua and Bangladesh the average years of schooling of the smallholder family head is about 3 years. Literacy and numeracy bring significant benefits to farm productivity. Increased literacy is found to enhance nutrient management and technology adoption, and education in general explains the greater part of total factor productivity - the residual growth in output after controlling for the growth in input use.[26] Agriculture is increasingly becoming science-led, while modern markets present significant challenges for smallholders. Investments in rural education can bring very high returns.

4 Income and consumption

Most of the world's poor live in rural areas – rural poverty is acute in sub-Saharan Africa and South Asia. Landless, subsistence farmers, or herders struggle to fulfill their basic needs. Our data shows that in most of the countries we examine, poverty among small farmers is widespread and in most countries much higher than the national poverty headcount rate – the percentage of population that lies below the national poverty threshold.

In the Plurinational State of Bolivia up to 83 percent of smallholders are poor as compared with a national poverty average of about 61 percent (Figure 4.1). In Ethiopia, where 30 percent of the entire population lives under the national poverty threshold, the poverty headcount ratio of smallholders is 48 percent, and in Viet Nam more than half of the smallholders are poor when in the country as a whole about 20 percent of the population lives in poverty.

Smallholders, with their work on their land and a multiplicity of jobs off-farm, earn a diversified income. An average smallholding family in Kenya generates gross income of about $2 527 per year (measured in 2009 prices).[27] With a family size of five persons – women, men and children – this amounts to about $1.4 per day per person (Figure 4.2). With this little money the family should meet a range of expenses - from buying food, inputs and clothes to paying for housing, education and health services.

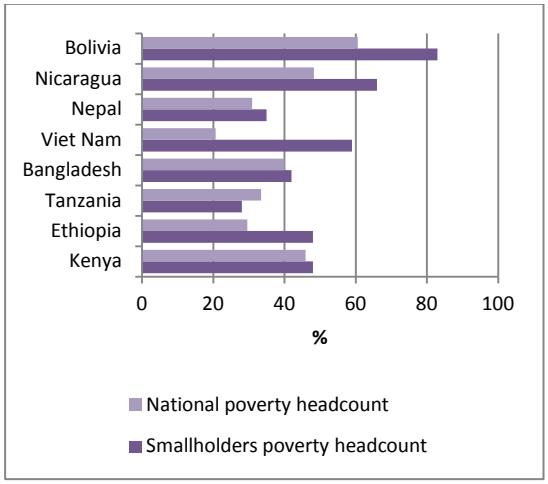
In other countries, smallholders' income is also low, but in the United Republic of Tanzania and Ethiopia – both arid- or semi-arid Sub Saharan countries – small farmers generate meager amounts as compared with countries in Asia and Latin America. In Ethiopia, smallholder families with a farm of about 0.9 hectares generate income amounting to about $0.8 per person per day. But larger farmers – cultivating 3.5 hectares on average – although they make about twice as much ($2.1 per person per day) are not well-off either. In the more productive farm sectors of Asia, smallholders earn more than their African counterparts but differences in farm sizes may reflect proportionately smaller differences in income. A smallholding family in Bangladesh farming 0.24 hectares, generates about $2.9 per person per day. In a larger farm of about one hectare, which is also home to a larger family, daily income per person amounts to $3.4.

Differences in smallholder and other farmers' income reflect differences in capital assets, such as land or livestock, but also differences in the skills-mix which give rise to diverse sets of opportunities in the rural non-farm sector. Within the context of the rural economy, the livelihoods of smallholders depend on their choices on how to allocate their labour and few assets across farm and non-farm activities and generate the highest income possible given the constraints they face.

The conventional belief that identifies smallholders with farming is not entirely accurate. The set of activities a smallholder household engages is diverse, generating a diversified income. Our data allows distinguishing four broad sources of income: crop and livestock production;[28] off-farm agricultural labour; labour in the non-farm sector; and, transfers and remittances. Off-farm agricultural labour requires no specific skills, but employment in the non-farm sector can include unskilled jobs, like street-vending and collecting firewood, and semi-skilled ones in construction or manufacturing (see also section 3 for more details in non-farm sector labour).

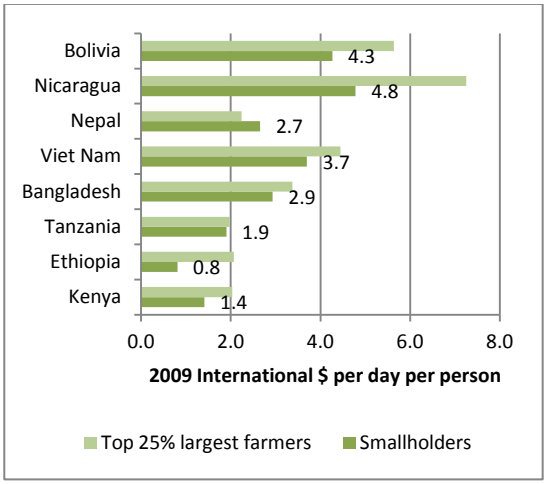
Indeed, in many countries wage labour or self-employment in the non-farm rural sector contributes more than farming towards smallholder household income. In Bangladesh 35 percent of total income is generated by working in sectors other than agriculture (Figure 4.3). Farming makes up for 32 percent of income and off-farm agricultural wage labour for about 13 percent. A large proportion of the household's income is made up by employment in the non-farm sector.

Figure 4.1 Poverty headcount ratio at national poverty line



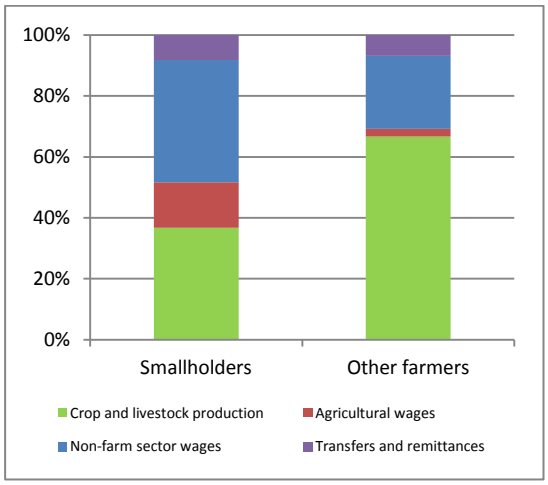
Source: Smallholder Farmers' DataPortrait.

Figure 4.2 Income, $ per person per day



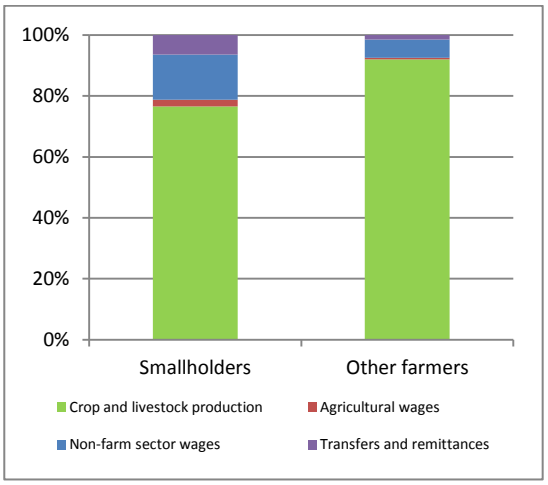
Source: Smallholder Farmers' DataPortrait.

Figure 4.3 Bangladesh: Income diversification patterns



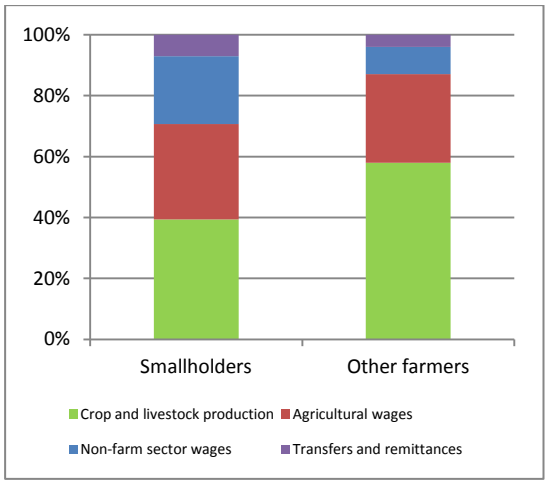
Source: Smallholder Farmers' DataPortrait.

Figure 4.4 Ethiopia: Income diversification patterns



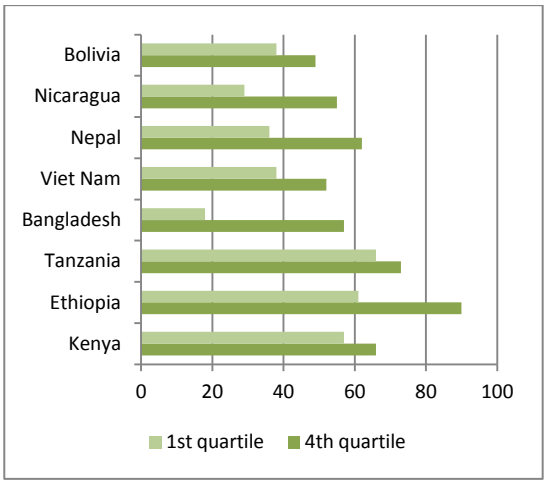
Source: Smallholder Farmers' DataPortrait.

Figure 4.5. Nicaragua: Income diversification patterns



Source: Smallholder Farmers' DataPortrait.

Figure 4.6. Share of crop and livestock production in total income



Source: Smallholder Farmers' DataPortrait.

In Ethiopia, income diversification patterns are different – smallholders rely more on crop and livestock income rather than on off-farm labour (Figure 4.4). An Ethiopian smallholding household generates the bulk of its income from its own crop and livestock production (72 percent) and about 14 percent from non-farm sector labour. Transfers and remittances make up 6.1 percent and off-farm agricultural labour a negligible 2 percent. Given the low productivity of Ethiopian smallholders (see Figure 2.9), it would make sense that they should pursue non-farm employment opportunities more actively. And they do – about three family members work off-farm per day, in an economic environment characterized by the lack of markets and opportunities (see Figure 3.5). The jobs they do pay little. The average daily non-farm sector employment returns in Ethiopia amount to $1.30 as compared with $3.20 in Bangladesh.

In Nicaragua, smallholder income is well diversified but as farms in the country are larger, off-farm agricultural labour is quite an important component of farm income (31 percent). Crop and livestock production and non-farm activities contribute 39 and 22 percent respectively (Figure 4.5). In the relatively more developed rural areas of the country, non-farm work or self-employment are attractive options given the low yields and higher remuneration (about $8.70 per day).

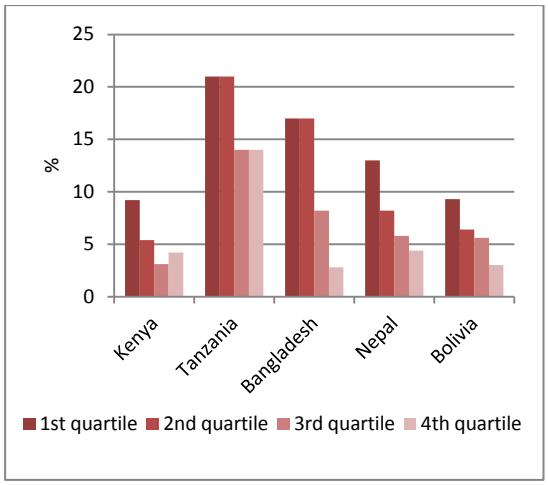
Why do smallholders diversify their income? The prevalent explanation is that with income diversification, smallholders reduce their exposure to risk. The possibility of adverse shocks, such as droughts, makes smallholder families to seek employment outside the agricultural sector to hedge against climatic and other market risks. Nevertheless, for many, income from crop and livestock production only is not enough to cover the basic needs of the family. Meager productive assets – land and livestock – are insufficient to support livelihoods and drive smallholders, who often have no education or specific skills, to supply their labour for low returns in the unskilled labour market.

Across all countries we examine in this report, smallholders rely less on crop and livestock production for their income as compared with other farmers (Figure 4.6). Households in the highest quarter of the farm size distribution (the 25 percent of farmers with the larger farms in our data or the 4th quartile) derive a higher share of their income from crop and livestock production than those at the bottom quarter of the farm size distribution (the 1st quartile). In some countries, such as in Kenya and the United Republic of Tanzania, where rural markets are not functioning well, the difference in the share of income from crop and livestock production between small and larger farmers is small, but not insignificant. For example, in Tanzania, smallholders in the bottom quarter of the farm size distribution – those who cultivate on average 0.3 hectares and keep 0.8 Tropical Livestock Units – generate about 66 percent of their total income from crops and livestock. The top quarter of farmers – in terms of farm size – rely on land which is as large as 3.5 hectares, as well as on their 4 Tropical Livestock Units, for 73 percent of their total income.

In Bangladesh, the smallest farm households (in the bottom quarter of the farm size distribution) source only 18 percent of their income from crop and livestock production. With meagre capital in the form of less than 0.1 hectares and 0.6 Tropical Livestock Units, the smallest farmers have to work off the farm in order to support their livelihoods. For larger farmers – those at the top of the farm size distribution with 1 hectare and 1.2 Tropical Livestock Units – crop and livestock production contribute towards 57 percent of total income.

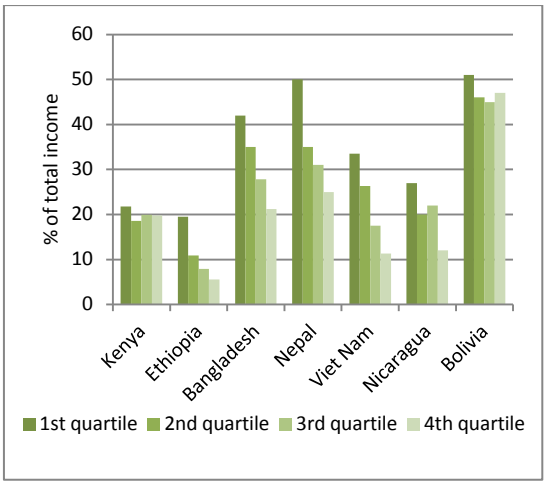
In all countries we examine, we observe a similar relationship between capital – farm size and livestock numbers – and the crop and livestock income share. The more the productive assets a household owns, the higher the share of agricultural production in total income. In many countries, smallholders source less than 40 percent of their income from agriculture. In terms of policy formulation, this relationship suggests that those policies which support food prices are

Figure 4.7 Share of off-farm agricultural wage labour in total income



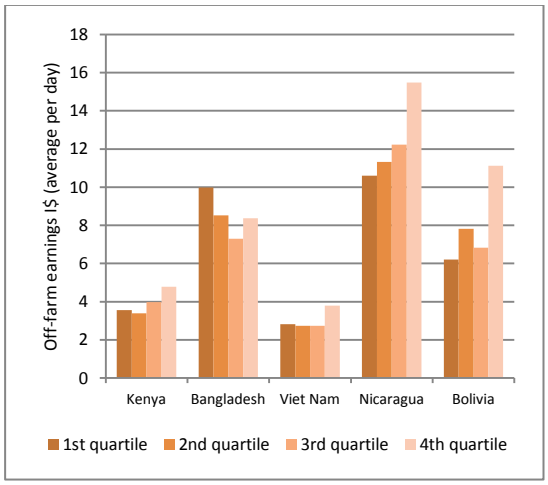
Source: Smallholder Farmers' DataPortrait.

Figure 4.8 Share of non-farm activities in total household income



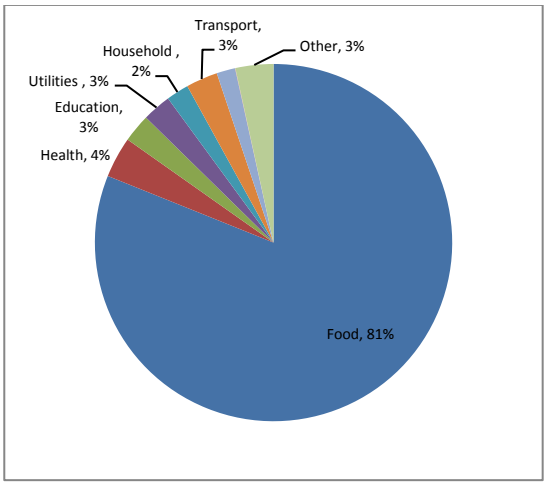
Source: Smallholder Farmers' DataPortrait.

Figure 4.9 Off-farm earnings per day



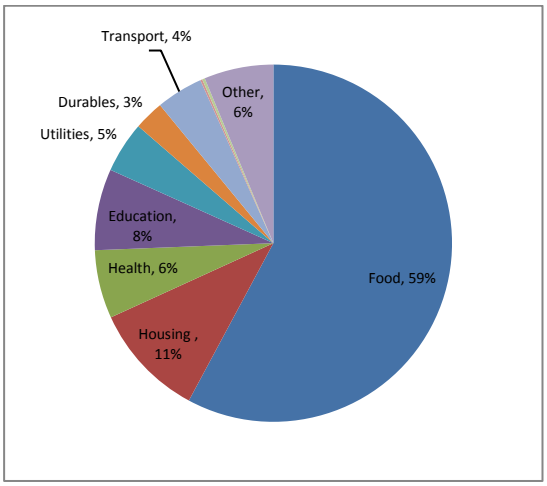
Source: Smallholder Farmers' DataPortrait.

Figure 4.10 Tanzania: Shares of small farm household expenditure



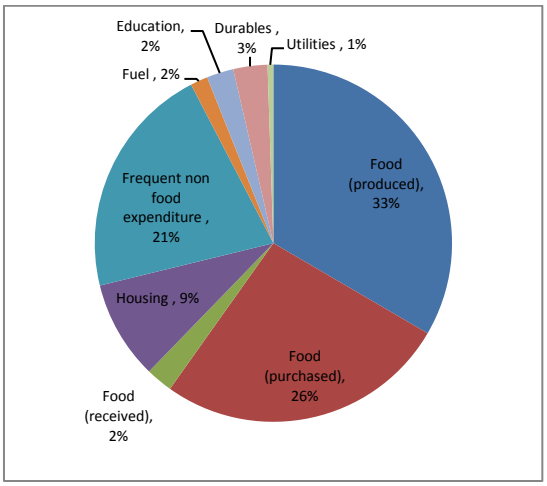
Source: Smallholder Farmers' DataPortrait.

Figure 4.11 Nicaragua: Shares of small farm household expenditure



Source: Smallholder Farmers' DataPortrait.

Figure 4.12 Nepal: Shares of small farm household expenditure



Source: Smallholder Farmers' DataPortrait.

not progressive, as they will benefit larger farmers more than those with little capital.

For smallholders who face significant cash constraints, off-farm income sources become crucial, and employment in other farms is an option that does not require any specific skills.

With little productive capital, small farmers depend on off-farm unskilled agricultural labour far more than the larger ones. In all the countries we examine, the smaller the farm is, the higher the share of agricultural labour in household income. Low labour productivity and low population density in Kenya make off-farm agricultural labour a relatively minor source of income, but the pattern of agricultural labour earnings becoming an increasingly smaller part of total income as farm size rises is evident (Figure 4.7).

In the more productive sectors of Asian countries, the demand for agricultural labour results in considerable shares of agricultural labour earnings in total income. In Bangladesh, smaller farmers (the bottom quarter of the size distribution) depend on agricultural labour for 17 percent of their income. The top quarter of the farm size distribution earns just 2.8 percent of their income by working in others' farms.

This is not a well-paid activity. In Sub Saharan Africa, smallholders and their families will work for as little as just over one dollar (the average wage for agricultural labour amounts to $1.3 a day in Ethiopia and $1.6 in the United Republic of Tanzania). Across countries, the differences in agricultural labour wages reflect differences in labour productivity. In the Plurinational State of Bolivia farm workers are paid $4 per day and in Nepal about $4.6 – wages higher than those prevailing in the African countries we examine.

Non-farm activities are an important source of smallholders' total income, exceeding by a large amount the income shares of agricultural labour and remittances from migrants. In some countries, non-farm income constitutes nearly half of smallholders' total household income. In Bangladesh, smallholders generate about 35 percent of their income from non-farm sector employment. The share in Vietnam is 25 percent. In Latin America, smallholding households integrate agriculture with non-farm sector employment – in Nicaragua more than 20 percent of the total income of a smallholding is sourced from the rural non-farm sector (Figure 4.5) and in the Plurinational State of Bolivia the share is 46 percent. Non-farm employment is both widespread and important for the livelihoods of smallholders.

As for agricultural wage labour, the importance of income from non-farm work or self-employment declines with farm size (Figure 4.8). Households with little land – falling in the 1st quartile of the farm size distribution – depend heavily on non-farm employment for their livelihoods. For example in Viet Nam, a smallholder with less than 0.5 hectares of land – at the bottom quarter of the farm size distribution – sources 37 percent of her income from non-farm employment. At the top quarter of the distribution, for a larger farmer with 1.8 hectares the income share of non-farm labour is 13 percent. Again, lack of productive capital drive smallholders to seek employment to the rural non-farm sector to add to their chronically insufficient farm income and safeguard their food security.

Although larger farmers depend less on the non-farm rural sector for their livelihoods, the data suggest that they can make more money. In absolute terms, larger farmers can generate more off-farm employment income per person, as compared with smaller farmers (Figure 4.9). Family members from larger farms in the top quarter of the distribution, who normally work in the rural non-farm sector, can gain between 35 and 80 percent more than smallholders in the bottom quarter of the farm size distribution.

This suggests that there are non-trivial barriers to entry in the non-farm rural sector, where jobs and self-employment is relatively more rewarding. Smallholders move into low-cost and low-return activities, such as agricultural labour, petty commerce in weekly markets, bicycle repair and farm equipment

maintenance. Higher return activities may require investments, as for example operating a store which smallholders, being cash constrained, are not able to make. Larger farmers can enter such higher return niches in spite of the entry costs, as they are likely not to be limited by liquidity constraints, poor education or low skills. Differences in the access of more lucrative non-farm activities do exacerbate income inequality in the rural areas of developing countries.

Consumption

A large part of smallholders' income is allocated to food. Being poor means that a large proportion of the budget is spent on food. In the United Republic of Tanzania, an average smallholder family of five persons - living on $1.9 a day each - spends 81 percent of this budget on food (Figure 4.10). In Nicaragua, an average smallholding allocates nearly 60 percent of its budget to food (Figure 4.11). And in general, a large part of this food is produced and consumed by the family in the farm, and is not sold in the market

In Nepal, more than half of the food consumed by the average smallholder family is produced in the family farm (Figure 4.12). This food, being valued at market prices, makes up about 33 percent of the entire family budget. Often, smallholders are net consumers – in Nepal the average small family farm allocates 26 percent of the budget to food purchases.

Spending more than half of the budget on food, means that there is not a lot to allocate on other goods and services. Some money is spent on housing and utilities – electricity, access to safe water, sanitation and maintenance (also see Figures 1.5 and 1.6). For example in Nicaragua and Nepal, smallholders spend 16 and 10 percent of their budget on housing and utilities, while in the United Republic of Tanzania expenses related to house and utilities are very low (about 5 percent of total expenditure). Expenditure on durable goods is also low. Smallholders spend little on goods such as radios, televisions, phones or fridges. The data suggest that in Nicaragua and Nepal, smallholder families allocate about 3 percent of their budget to durable goods (Figures 4.11 and 4.12).

Low incomes mean that small farmers spend less on education and health. Books and fees are the most important items of household expenditure on education. In the United Republic of Tanzania and Nepal, smallholder families allocate 2-3 percent of their budget to education.

In Nicaragua, where the average income of smallholders amounts to nearly $5 per family member every day, the share of both education and health expenses in total expenditure is significantly higher – 8 and 6 percent respectively (Figure 4.12). Nevertheless, apart from household income, there are other determinants of education and health expenditures, such as differences in the educational systems across countries, the proximity of school to the household, educational level of the head of the household, the size of the household, religion and others.

5 Markets and innovation

Freer trade and the globalization of markets have been a crucial factor in shaping the global food system. Although food trade has doubled since the early 1980s, due to trade liberalization and improvements in transport, a deeper change has been brought by the transformation of the agrifood industry in developing countries. [29]

Urbanization and the globalization in food processing have resulted in increased private investments, both domestic and foreign, in the agrifood industries of developing countries. Procurement methods for agricultural products have also changed, and markets have become more competitive. Modern procurement systems are increasingly characterized by a shift from traditional wholesale markets towards vertically coordinated supply chains. In line with this shift, transactions are increasingly based on stringent private standards. [30]

Within this progressively transformed market environment, many smallholders remain marginalized having access to food markets which function poorly or only very locally. Our data shows that most small farmers sell only a part of their production and this part is often small. In Kenya and Ethiopia, smallholders sell less than a quarter of their production, retaining most of it for in-household consumption (Figure 5.1). In Viet Nam, smallholders participate in agricultural markets selling about 38 percent of their production and in Bangladesh the proportion is 23 percent. In landlocked Nepal, small farmers sell just 12 percent of their production in the market.

Selling just a small part of their production contributes towards smallholders' livelihoods, but significantly less than most people think. In Kenya and Ethiopia, sales revenue amounts to $404 and $262 per year respectively, when the respective smallholder annual household incomes are $2 527 and $1 657 (Figure 5.2).

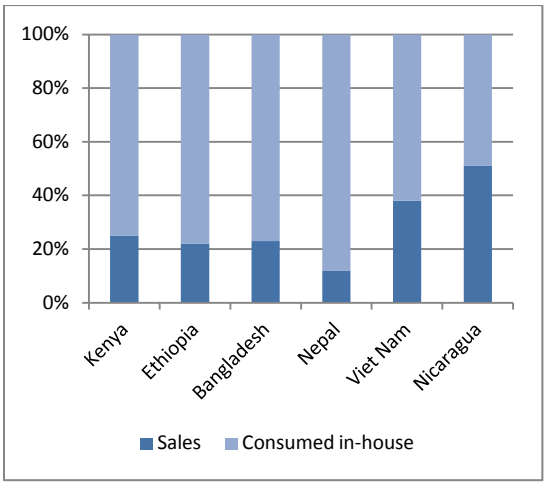
In the more commercialized farm sectors of Asia, such as in Bangladesh, selling agricultural products in the market generates revenue of $1 131 per year for smallholder households which have an average annual income of $ 353. In Nepal, where road infrastructure limits the access to markets, the amount of money smallholders make by selling their produce is $256 per year – just 5 percent of average annual income.

In all cases, selling in the market does not contribute much – if one will deduct the cost of inputs from the sales' revenue, the contribution of commercial sales towards smallholders' income should be very small. And what is perceived as one of the main activities of smallholders –selling food in the market – actually generates little money and does not add much to the household's liquidity which is crucial to lift smallholders out of subsistence.

Well-functioning markets are not only a mechanism to generate incomes but also one that allows choice – buying and selling are transactions that can shape livelihoods and make them thrive. For example, households which want to consume a bundle of goods can either produce it and consume it or specialize in the production of specific goods (for which they have a comparative advantage) and trade the surplus for other goods and services. Smallholders choose the former option. They produce food to mainly consume it in-house, and their production patterns resemble their consumption preferences: they produce a wide range of foods (see Figures 2.2 to 2.4).

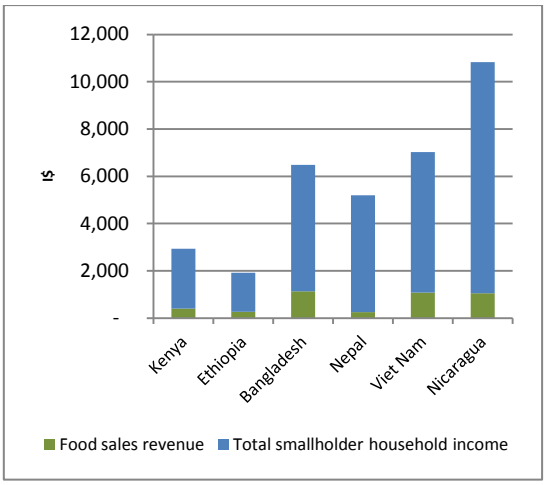
Why do smallholders choose not to participate in the markets? The answer is to be found in the costs of participation – the underlying transaction costs. For example, many smallholders may have limited opportunities to participate in markets due to high transport costs. As they are geographically dispersed and their supply is both small and inconsistent, private traders either do not source from them or require high margins to cover their costs.

Figure 5.1 Smallholder agricultural production sold in markets and consumed in-house



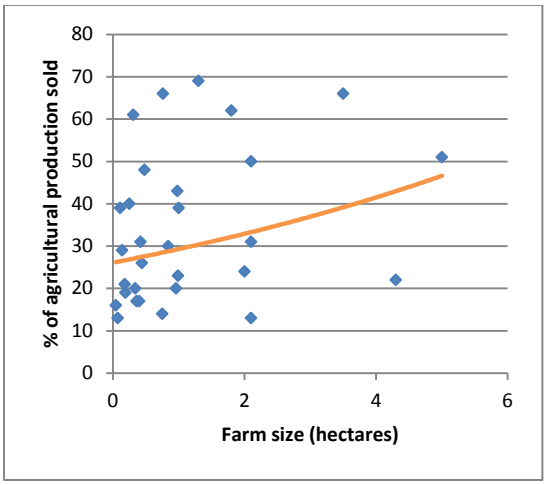
Source: Smallholder Farmers' DataPortrait.

Figure 5.2 Smallholders' annual sales revenue and total income



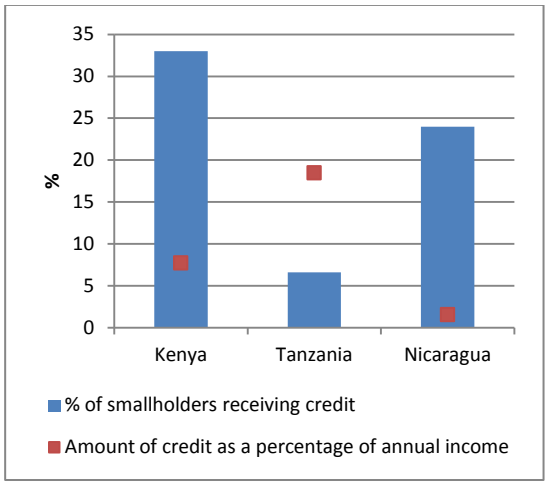
Source: Smallholder Farmers' DataPortrait.

Figure 5.3 Farm size and proportion of agricultural production sold in markets



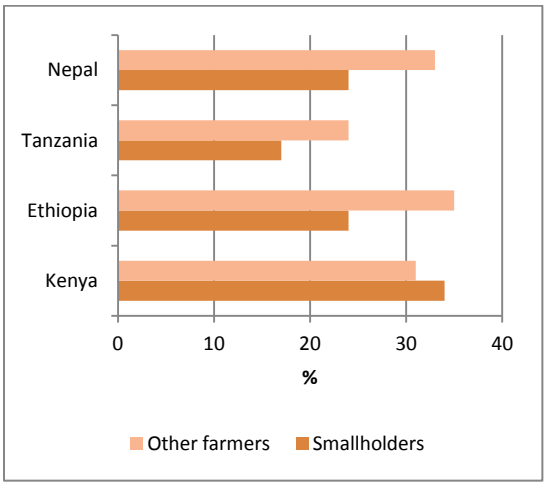
Source: Smallholder Farmers DataPortrait.

Figure 5.4 Credit markets



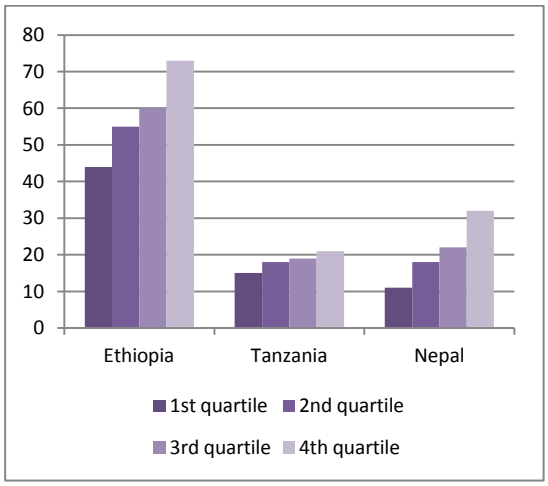
Source: Smallholder Farmers DataPortrait.

Figure 5.5 Access to improved seed varieties



Source: Smallholder Farmers' DataPortrait.

Figure 5.6 Access agricultural extension services



Source: Smallholder Farmers' DataPortrait.

It is not surprising that in Nepal, where a smallholder household finds itself some eleven minutes away from a road, small farmers sell on average 5 of their production. For them, there are no markets.

There are also other constraints which bar smallholders completely from markets. Sales through more sophisticated channels, such as supermarkets, require from farmers greater managerial and logistics skills and an ability to provide continuity of supply and to meet demanding food safety and quality requirements. Unfortunately our datasets have no information on the specific markets smallholders can access. However, analysts agree that it is very difficult for individual small farmers to supply supermarkets.[31] These quantity, quality and food safety requirements and timing conditions favour large-scale farms, which are generally more able to accommodate them.

Participation in markets does depend on the household's endowment in productive assets, which in turn shapes the household's production, sales and consumption. Entering markets can also require start-up costs, such as investing on a grains' drying machine. Our data suggests that productive assets, such as farm size, are important in determining market participation. The larger the farm, the larger the proportion of production sold in the markets (Figure 5.3). This is because larger volumes mean lower transaction costs. A large part of these costs – especially those that relate to transport and marketing – can be fixed, and thus increases in scale reduce per unit costs. For this reason, smallholders often aggregate their output by means of cooperatives or informal groups. Forming cooperatives to collectively increase the scale of farm operations can help smallholders enter these markets, but in many cases collective action struggles to assume the role of entrepreneur effectively.[32]

Across households, different capital asset endowments but also different transaction costs give rise to a wide range of market participation patterns. Smallholders make decisions on what to cultivate, what inputs to use, when to harvest and how much to sell or keep for in-house consumption, how much to store or purchase, in line with their productive capacity and the transaction costs they face. These decisions are constrained because markets are missing or do not function well. The most important implication is that decisions at household level are not *separable*. For example, when food markets do not function, the decision of what and how much to produce cannot be separated from the decision of what and how much to consume. Smallholders produce food in order to consume most of it, as food markets are missing or the costs of market participation are high.

Decisions of how to allocate labour also depend on markets and smallholders tend to over-use their labour on-farm, as opportunities in the rural sector are limited and labour markets do not often function (see also section 3). Decisions on how to meet social objectives are not separable from market behaviour either. In Sub Saharan Africa, smallholders often are obliged to sell part of their production immediately after harvest, when prices are at their lowest level. Harvest season coincides with the beginning of the school year, and farmers decide to sell in order to pay for their children school fees, books and uniforms. They do so because they do not have access to credit, or credit markets are missing.

Smaller farms face considerable difficulties in accessing credit, as banks are often reluctant to lend to them due to poor collateral and lack of information. Women farmers face even greater disadvantages than their male counterparts – they have less access to assets, social capital and market information.

Our data show that about 33 percent of smallholder households have access to credit in Kenya, and the amount they borrow – $195, or approximately 8 percent of their annual income – can be used for financing capital investment (Figure 5.4). In the United Republic of Tanzania, few smallholders are reported to receive credit (17 percent). However, the amount borrowed is, on average, significant for investments.

Innovation

Well-functioning markets can shape livelihoods through many avenues. Participation in markets results in the exchange not only of goods but of information and ideas. Market participation can facilitate technology adoption. There is considerable potential to improve smallholder productivity with existing technology and practices. Nevertheless, the levels of adoption of improved technologies by small farmers are quite low.

Household survey data sets are not rich in information on innovation and technology adoption. Our data shows that the proportion of small farmers using improved seeds is low. In the United Republic of Tanzania about 17 percent of smallholders have access to improved seed varieties (Figure 5.5). Kenya has one of the more developed seed systems in Africa, and better access to credit facilitates the adoption of better technologies, such as improved seeds (about 34 percent of small farmers in our sample have access to improved seed). In Nepal, only about one fifth of the 2.7 million smallholder farms use improved seed varieties. And these smallholders use such improved technology only for a part of their production. Larger farmers, in general, have better access to new technologies such as improved seed, probably because they are better integrated in markets.

Missing markets can result in a lack of awareness about technology. Small farmers who do not trade may not understand the costs and benefits of technologies. Income risk also hinders the adoption of more productive technologies and good farm practices, in spite of their long term benefits for the individual farmer and for overall productivity growth. Smallholders may choose low-return production options over technology- intensive ones, as they prefer greater stability. The threat of shocks, either general such as droughts or household-specific such as the death of a family member, increases their financial risks and makes smallholders reluctant to access credit markets due to the consequences of an inability to repay.

Where access to inputs is constrained by lack of information or risk perceptions, measures to facilitate technology adoption can contribute to increased output, food security and commercialization. Well-designed extension services and input starter-packs programmes can facilitate technology adoption by smallholders without distorting markets.

In the context of sustainable agricultural productivity growth, agricultural extension has a crucial role to play. Information on access to extension services is scarce – only few country household surveys include data on extension services. When available, the data show that smallholders have less access to extension services than larger farmers (Figure 5.6). In Ethiopia, the United Republic of Tanzania and Nepal, the relationship between farm size and access to extension is positive. For example in Nepal, only 11 percent of the very small farmers – those falling in the bottom quarter of the farm size distribution – have access to extension services. About three times as many larger farmers – at the top of the farm size distribution – receive extension services.

Governments can provide significant support to smallholder development by strengthening and targeting agricultural extension services. Although the scope of these services should remain on transferring appropriate agricultural technologies and good farming practices, there is need to go beyond this and support smallholders in adopting a more market-oriented approach, prioritizing marketing, food safety, and the linkages with agrifood industries.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6 The future of smallholders

We discussed the economic lives of smallholders looking closely at the data and combining our conclusions with those of the literature. A number of key points come out of this analysis – although one ought to be conscious that no matter how rich is the data, they cannot reflect all aspects of the lives of smallholders.

Across the developing world, smallholders farm in diverse agro-climatic systems which together with their assets and skills, shape their economic lives. Markets and the extent to which they are functioning well, also play a determining role. Differences in endowments and markets give rise to disparities among farmers in terms of their integration in the economy. But in spite of this, they have many things in common. Smallholders choose how to live their lives. But these choices are both constrained and inter-dependent.

First, smallholders are entrepreneurs in a broad sense. They run their farms but are also involved in many other activities away from them, trying to make the best they can.

Second, they tend to farm intensively. They diversify their production according to their diet requirements, and keep most of the food they produce for in-house consumption as food markets do not function well. They use more fertilizer and seed per hectare than other farmers and rely heavily on family labour. In fact, family labour makes a difference: in developing countries, small farms are more productive than larger farms on a per hectare basis. But their productivity lags behind that of farmers in the developed world. It is the lack of well-paid employment opportunities in the rural areas in conjunction with the need to produce food for their families that makes smallholders work on their farms more intensively than profit-maximization suggests. And this is hard physical work especially for women who, in many countries, provide more labour on the farm than men.

Third, most smallholders are poor and by seeking wage- or self-employment in the rural non-farm sector, they try to both supplement and diversify their income sources to reduce risks. The jobs they choose are low skilled – smallholders have very low education levels. In many countries, what they bring home from working away from their farms is little, and often it is as much as what they gain from farming their land. But the high poverty incidence suggests that non-farm activities could reflect income diversification strategies to cope with risk, rather than well-paid non-farm employment. The experience from the Green Revolution in Asia supports this line of reasoning. Although Asian smallholders diversified their income sources, poverty in the region was reduced only by agricultural productivity increases brought about by encouraging farmers to adopt modern technologies.

Finally, only some smallholders use innovative technologies. The rest, either they have no access to them or they perceive them as risky. For many, even decisions on educating their children can shape their choices on when to sell their produce. And they sell when prices are at their lowest level – just after harvest which coincides with the beginning of the school year – in order to meet the cost of schooling.

These are important behavioural features which are common to smallholders in many countries. And it is on them that policy makers ought to focus. Often, the rhetoric on the heterogeneity of smallholders brings about a paralysis of political will which by its nature is broad-brush.

We cannot project the future of small-scale agriculture. Its path will not be determined by its current status only – governments can shape its evolution. The choices smallholders make are non-separable and inter-dependent but are essentially of a private-sector nature. At the same time, they are dependent on the economic environment which is crucial in transforming agriculture and can be shaped by government interventions. Providing the enabling environment to improve the investment climate and integrate smallholders

into markets is a standard and passive policy prescription. Would this be enough to help smallholders meet the challenges of the future?

With agricultural productivity growth slowing down and a growing population in many developing countries, smallholder agriculture faces again the challenges of increasing food production to meet growing demand and generating adequate jobs at reasonable wages to contribute to economic growth. A third challenge, that of conserving and enhancing natural resources poses sometimes conflicting goals which have to be resolved.

Global population is projected to reach 9.3 billion in 2050. Virtually all the increase is expected to be in developing countries. Countries with large and growing rural populations will depend even more on agriculture, not only for food, but for employment and income. Population growth and rising incomes mean that food consumption will increase. It is estimated that total world consumption of all agricultural products will grow by 1.1 percent per year from 2005/07 to 2050. This means that global production in 2050 should be 60 percent higher than that of 2005/07. [33]

In developing countries, smallholders produce between 60 and 80 percent of the food consumed and generate approximately between 40 and 60 percent of total rural income. Can they achieve production increases to meet the demand for food and be at the heart of the solution? The Green Revolution – driven by technology improvements targeting small farms – more than doubled food production. It also provided significant employment opportunities for rural people, as farmers spent their increased incomes on rural goods and services.

Today, it will be more difficult than in the past. About 70 percent of growth should come from yields. But the growth rate of the yields of the main staples has slowed down considerably, and fears are expressed that the trend may not reverse.[34] This will not only have an impact on the availability of food but will also slow down productivity per capita, affecting employment and wages.

Helping smallholders to close the yield gap is crucial. Labour- and input-intensive farm practices can increase production per hectare significantly. But what is needed to promote both food production and employment is significant increases in labour productivity. This will strengthen the demand for labour and raise the rural wage, benefiting the landless poor and setting the conditions for growth.

In today's reality, closing the gap will be more difficult than before. There are signals that the productivity advantage smallholders enjoy is being eroded. Although more research is necessary, recent analyses discussed in this report suggest that smallholder productivity increases over time but at a rate slower than that of larger farmers.

This productivity slow-down may be due to changes in the global food supply chains brought about by freer trade and globalization. Although trade in food has doubled since the early 1980s, a deeper change has been brought by the transformation of the agrifood industry in developing countries. In today's modern markets, sales through sophisticated channels, such as supermarkets, require greater managerial skills and an ability to provide continuity in the supply of larger volumes and meet food safety, certification and quality requirements.[35]

Such modern marketing systems present a new range of conditions and challenges for smallholders. And as markets change, farm size may matter more and more. Larger farms can enjoy cost advantages in skills and technology, finance and access to capital, and the organization and logistics of trading, marketing and storage. These economies of scale can outweigh the advantages of smallholders in productivity. There are many positive experiences of cooperatives, which by aggregating smallholders' dispersed and small quantities of produce have been successful in increasing the scale of operations and entering markets. Nevertheless most struggle

to focus on providing business services to their members. Part of the problem has been that such bodies have had to play multiple roles, social, political and economic ones, instead of focusing on their entrepreneurial objectives.

If their productivity is slowing down due to the transformation of the food chains, smallholders may become even more isolated from the economic environment, instead being part of the solution and driving the growth process. With population in the rural areas of several developing countries increasing, farm sizes become smaller and smaller, and with such meagre capital, smallholders run the risk of being completely marginalized, turning into unviable economic units. Policy thinking should take this trend seriously and assess interventions that facilitate the structural transformation of agriculture, containing the decrease in the average farm size of smallholder households.

Land and water resources are now much more stressed than in the past and are becoming scarcer. Together with productivity increases, the Green Revolution has caused environmental damage. Excessive and inappropriate use of fertilizers and pesticides has polluted waterways. Irrigation practices have reduced groundwater levels, and the focus on staples has led to soil degradation and loss of biodiversity. There is no room for high-input solutions. The third challenge – that of conserving and enhancing natural resources – gives rise to potential conflicts between the multiple objectives of sustainable agricultural development.

There are a wide range of practices and technologies, such as conservation agriculture, that preserve the natural resources base and add to it. Adopting such technologies generates long-term benefits to farm households not only in terms of increasing yields but also in reducing yield variability and making production and livelihoods more resilient to climate change. These practices can be labour-saving on larger farms. In Brazil, adoption of conservation agriculture resulted in up to 60 percent decline in labour requirements – a significant cost saving.[36] On small farms, where scarce cash limits the use of chemicals, weeding by hand increases labour intensity.

However, these practices require specific knowledge, greater management skills and entail significant costs, particularly for smallholders in the short-term. The full benefits of higher productivity and less variable yields are not realized immediately but in a period of four years or more, and start-up costs can be prohibitive for small farmers with no access to credit. [37] Although larger farmers can absorb these losses by reducing labour costs, smallholders will need appropriate incentives to adopt such sustainable and resilient productivity growth practices. Building innovative financing mechanisms to link climate adaptation and mitigation financing with agricultural development and food security funds can be a solution.

The evolution of the small farm is intrinsically linked to economic growth but smallholder gains from globalization appear to be limited. Underlying the triple challenge of producing more food, generating jobs and enhancing the natural resource base, is the process of structural transformation. And this process is initiated by increases in the productivity of labour in agriculture, followed by increases in rural income and at a later stage a declining share of agriculture in GDP and employment. Such a process is sustained by overall economic development. No matter which economic sector – agriculture, industry, or services – grows faster, increasing agricultural labour productivity in countries with large small-scale agricultural sectors and growing populations is crucial in the transformation process.[38] Farmers become more competitive and their income increases. With well-functioning rural labour markets, productivity growth allows wages to rise, and rural household members diversify their income sources by obtaining better-paid off-farm work. Some people leave agriculture for other economic opportunities. Poverty declines.

Along this transformation, a lot depends not only on the functioning of labour markets, but

also on the evolution of land distribution.[39] Farm size can also increase and this becomes more important as food markets change.

In today's food market realities, small farm size may hinder the ability of agriculture to adopt technologies for sustainable productivity growth and to commercialize. In several countries of the developing world, as farms become progressively smaller, there is an escalating threat of them becoming both detached from the market and increasingly characterized by lower incomes per capita and subsistence. This may result in significant increases in poverty and food insecurity, but also in a dramatic rise in unrestrained migration which can stretch the ability of the cities both in terms of infrastructure and in terms of job creation.

To feed 9.3 billion people, there is need for competitive and productive farms. The structural transformation of agriculture is the process by which these farms will emerge, and the only sustainable path towards food security and development. In many developing countries, weak property rights, hinder this process and shape a structure where farms are small. In other countries, such as Ethiopia, land transactions are prohibited and land is allocated by local administration according to social and demographic criteria, such as household size. In the past, most direct government interventions on the farm structure included measures such as imposing ceilings on farm size, as in India, Indonesia, the Philippines and many other countries.[40] Governments in order to promote equity, or facing difficult dilemmas over how to deal with urbanization pressures, restrict rural-to-urban migration and instead, put pressure on farm sizes to decline.

In many developing countries, weak transport infrastructure gives rise to high transport costs. Being costly to move people and goods, results in a misallocation of resources between the farm and the non-farm sectors. Rural areas remain under-developed offering limited opportunities for decent work, while the barriers to the mobility of labour result in small farm sizes.

But it is not only social considerations or neglect of land markets and transport infrastructure which hold back the structural transformation of agriculture. Measures, such as regulation, subsidies, taxes and investments do affect the average farm size and the structure of the sector. Such interventions are often not assessed for their impact on structural transformation and on the farm structure.

Many governments, in their efforts to support smallholder development shape conditions which can lead to declining farm sizes in the longer run. For example, subsidies which are targeted to smallholders, either for inputs or output, result in a decline of the average farm size as they increase the demand for land more than normal.

Although these policies are well-meant and are in place to tackle market failures – such as limited market integration, cash constraints and technology adoption problems – they are politically difficult to remove and in the long run the result is to keep more and more people farming. Building more roads to increase access to markets, supporting credit services to ease liquidity constrains and implementing input starter packs programmes to increase technology adoption would be the first-best policies to address such market failures, without affecting farm size in such a negative way.

In many developing countries, small-scale agriculture is better placed to initiate growth. Its strong and positive linkages with the non-farm sector have historically played an important role in economic development. Today, in order to tackle the triple challenge of producing more food, creating more jobs and enhancing the resource base, small farms require continuous introduction of better and more sustainably productive technology.

Indeed, public research and development should respond effectively and efficiently to the challenge of improving labour productivity in small-scale agriculture. First-best policies and novel funding mechanisms – such as pull-mechanisms that reward successful innovations ex post, and push-mechanisms which fund potential innovations ex ante –

should exploit the edge in private research by making their engagement in smallholder-specific technologies profitable.

Apart from focusing on technology and the enabling environment for investment and market integration, policies should also focus on health and education. Promoting health, education and skills in rural areas is crucial in facilitating structural transformation. Better nutrition, health and higher levels of education increase labour productivity but also enhance non-farm employment opportunities for smallholders.

Policies that promote productivity growth and investment need to go hand-in-hand with social protection interventions targeting nutrition, health and education. Social protection can help subsistence smallholders to escape poverty traps and enter into a virtuous cycle of higher productivity and income generation.

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The economic lives of smallholder farmers

An analysis based on household data from nine countries

Based on an innovative smallholder-specific dataset, this report illustrates the lives of smallholder farmers in nine developing and emerging countries, using economics to analyze data from rural household surveys. It examines different dimensions of smallholders' lives: their farm and families; their production and the inputs they use for it; their work both on- and off-farm; their income and how it is made up; their consumption; and, their participation in markets. Smallholders choose how to live their lives. But these choices are both constrained and inter-dependent. The report synthesizes the information from the data together with those from the literature to focus on what smallholders choose and why.

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