

Smallholder commercialization: Processes, determinants and impact

Moti Jaleta,¹ Berhanu Gebremedhin¹ and Dirk Hoekstra²

1. Markets Theme and Improving Productivity and Market Success of Ethiopian Framers (IPMS) project
2. Improving Productivity and Market Success of Ethiopian Framers (IPMS), International Livestock Research Institute (ILRI), Addis Ababa, Ethiopia

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Summary

This paper reviews the literature on smallholder commercialization. It explores the conceptual developments in smallholder commercialization, methodological advancements in measuring the degree of agricultural commercialization at household level, and the impacts of commercialization on different socio-economic groups. The paper also investigates policy recommendations made by different authors aimed at facilitating the smooth process of transforming smallholder agriculture from subsistence system to a fully commercialized farming. Based on the review, the paper throws light on conceptual and methodological gaps in relation to smallholder commercialization, and finally, draws general conclusions and directions for future research.

1 Introduction

Commercializing smallholder agriculture is an indispensable pathway towards economic growth and development for most developing countries relying on the agricultural sector (von Braun 1995; Pingali and Rosegrant 1995; Timmer 1997). In the long-run, subsistence agriculture may not be a viable activity to ensure sustainable household food security and welfare (Pingali 1997). The welfare gains from market-oriented production arise from specialization that builds on and creates comparative advantages, potential for large-scale production, and from dynamic technological, organizational and institutional change effects that arise through the flow of ideas due to exchange-based interactions (Romer 1993, 1994).

Smallholder commercialization also typically leads to an increased diversity of marketed commodities at a national level and increased specialization at regional and farm levels (Pingali and Rosegrant 1995; Timmer 1997; Kurosaki 2003). Moreover, commercialization has a linking power between input and output sides of a market. Demand for modern technologies promotes the input side of production and facilitates the development and advancement of technological innovations. In turn, the use of modern technologies can result in higher productivity and production entering markets.

Agricultural commercialization usually takes a long transformation process from subsistence to semi-commercial and then to a fully commercialized agriculture (Pingali and Rosegrant 1995). In subsistence production, the farmer's objective is food self-sufficiency by using mainly non-traded and household generated inputs. The objective and the input sources change in semi-commercial farms into generating surplus agricultural outputs and using both traded and non-traded farm inputs. In a fully commercialized agriculture, however, inputs are predominantly obtained from markets and profit maximization becomes the farm household's driving objective (Pingali and Rosegrant 1995).¹

Although the net welfare gain from agricultural commercialization at the household level is universally accepted, there is no common standard for measuring the degree of household commercialization. Some literature has considered a dichotomy between food and cash crops² and examined the household resource allocation decisions to these crops as a proxy to the level of a smallholder commercialization (de Janvry et al. 1991; Fafchamps 1992). Others use different types of ratios such as marketed outputs or inputs to the total value of agricultural production or total household income (von Braun et al. 1994; Strasberg et al. 1999). In the dichotomy between food and cash crops, food crops are assumed to be used only for home consumption whereas households are considered as net sellers in the cash crop output markets and net buyers in the input markets for cash crops. However, some studies reveal that these situations are far from reality as food crops are also marketed and households could also take any position in their food crop

1. The detail of changes in household production objectives, input sources, income etc. at the different stages in the commercialization process is given in Annex 1.

2. The distinction between food and cash crops differ from literature to literature. Some authors make the distinction based on the nature of commodities (food and non-food commodities); others define based on the purpose of production (whether a commodity is basically produced for market or home consumption) or based on its use pattern (whether the major proportion of that commodity is marketed or consumed at home).

output market participation (Gabre-Madhin et al. 2007; Pender and Alemu 2007). Therefore, the level of surplus production available for marketing and the household, location, and commodity specific transaction costs are often more important than the crop type in determining the position of a household in the output markets.

Moreover, to what extent agricultural production is commercialized at a household level is subject to risk and household's attitude towards risk (Fafchamps 1992; Dercon 1996). The more risky the marketing environment a household is engaged in (high variation in market prices and strong correlation between marketed commodity prices and household income) the less a household will be involved in agricultural practices that support market orientation (Fafchamps 1992; von Braun et al. 1994). Works of Finkelshtain and Chalfant (1991) and Fafchamps (1992) also clearly showed that a household's decision to commercialize depends on the sum of consumption and income effects of market shocks.

The concept of agricultural commercialization can be complex, and has contributed to varying definitions and emphases given in the literature. According to Pingali (1997), agricultural commercialization is more than marketing agricultural outputs. Pingali argued that agricultural commercialization is attained when household product choice and input use decisions are made based on the principles of profit maximization. Moreover, according to von Braun et al. (1994), commercialization implies increased market transactions to capture the benefits from specialization. Increased market transactions are more easily attained when there are favourable policies and institutional arrangements that promote open domestic and international trade environment, and the development of market infrastructure and support services that facilitate access to existing markets and the opening up of new market opportunities under a secured legal system.

There is largely a consensus that commercialization has differential impacts on different socio-economic groups (wealthy and poor, land owners and landless farm households, women, and children) under different socio-economic, institutional and policy environments, although the net impacts are not necessarily or universally positive. However, there are only a few, if any, who contend the need for commercialization to promote social development and economic growth. With all the merits and demerits of agricultural commercialization to different clusters of the society and under different socio-economic and policy situations, this paper tries to investigate major findings and advancements in literature on this issue. Moreover, it tries to look for potential gaps that warrant further research both in conceptual and methodological aspects related to agricultural commercialization.

The paper is organized as follows. Section 2 examines definitions of commercialization and how different authors specified commercialization indices. Section 3 looks at the processes of smallholder commercialization. Impacts of smallholder commercialization on household welfare, health, and nutrition are discussed in Section 4. Section 4 also presents different arguments regarding the impacts of smallholder commercialization on value chain actors, the environment and the overall economy. Taking the perspective of smallholder commercialization, Section 5 synthesises arguments by different authors on the synergies between food and cash

crops at a household level. The roles of interlocked transactions and interlinked markets in the commercialization of subsistence agriculture are discussed in Section 6. Section 7 deals with determinants of agricultural commercialization and policies recommended to facilitate the commercialization process. Methodological and conceptual gaps in the smallholder commercialization literature are discussed in Section 8. Finally, Section 9 gives general conclusions of the review and directions for future research.

2 Measuring the level of commercialization

The relevance of measuring the level of smallholder commercialization arises from the interest to make comparisons of households according to their degree of commercialization (Randolph 1992). In addition, it also helps to gauge to what extent a given farm household is commercialized in its overall production, marketing and consumption decisions, and to analyse the determinants of commercialization. However, there are diverse methods or indicators used for measuring the level of commercialization. As these diverse indicators are emanating from how authors perceived the concept of commercialization, it is important to discuss the underlying definitions of smallholder commercialization.

In a broad sense, smallholder commercialization could be seen as the strength of the linkage between farm households and markets at a given point in time. This household-to-market linkage could relate to output or input markets either in selling, buying or both. Alternatively, smallholder commercialization could also be seen as a dynamic process: at what speed the proportion of outputs sold and inputs purchased are changing over time at household level. Considering household-market linkages in their static form, this section examines how smallholder commercialization has been perceived by different authors and what different indices are currently available to measure the level of commercialization at household level.

2.1 Definition

In most literature, a farm household is assumed to be commercialized if it is producing a significant amount of cash commodities, allocating a proportion of its resources to marketable commodities, or selling a considerable proportion of its agricultural outputs (Immink and Alarcon 1993; Strasberg et al. 1999). However, the meaning of commercialization goes beyond supplying surplus products to markets (von Braun et al. 1994; Pingali 1997). According to these authors, it has to consider both the input and output sides of production, and the decision-making behaviour of farm households in production and marketing simultaneously. Moreover, commercialization is not restricted only to cash crops as traditional food crops are also frequently marketed to a considerable extent (von Braun et al. 1994; Gabre-Madhin et al. 2007). Commodities traditionally considered as food crops may increasingly be marketed during the transformation process as households specialize. The commonly accepted concept of commercialization is, therefore, that commercialized households are targeting markets in their production decisions, rather than being related simply to the amount of product they would likely sell due to surplus production (Pingali and Rosegrant 1995). In other words, production decisions of commercialized farmers are based on market signals and comparative advantages, whereas those of subsistence farmers are based on production feasibility and subsistence requirements, and selling only whatever surplus product is left after household consumption requirements are met.

2.2 Indices in measuring commercialization

Focusing on commercialization in its static form, various authors have used different yardsticks in measuring the level of agricultural commercialization at household level. von Braun et al.

(1994) specified three types of commercialization indices at household level: output and input side commercialization, commercialization of the rural economy, and degree of a household's integration into the cash economy. For each type, the authors formulated indices measuring the extent of household commercialization. The first index measures proportion of agricultural output sold to the market and input acquired from market to the total value of agricultural production. In the second type, commercialization of the rural economy is defined as the ratio of the value of goods and services acquired through market transactions to total household income. Here, there is an assumption that some transactions may take place in-kind such as payments with food commodities for land use. Thirdly, the degree of household integration to the cash economy is measured as the ratio of the value of goods and services acquired by cash transaction to the total household income (von Braun et al. 1994).

In measuring household-specific level of commercialization, Govereh et al. (1999) and Strasberg et al. (1999) used a household commercialization index (HCI), which is a ratio of the gross value of all crop sales per household per year to the gross value of all crop production. This ratio does not incorporate the livestock subsector, which could be more important than crops in some farming systems.

Recently, Gabre-Madhin et al. (2007) used four approaches to measure the level of household commercialization: sales-to-output and sales-to-income ratios, net and absolute market positions (either as a net buyer, net seller or autarkic/self-sufficient household), and income diversification or level of specialization in agricultural production. According to Gabre-Madhin et al. (2007), the sales-to-output ratio measures the gross value of all agricultural sales by a household as a percentage of the total gross value of its agricultural production. This ratio is similar to what has been developed earlier by different authors (Abercrombie 1961; Cleave 1974; Ruthenburg 1980 as cited in Randolph 1992; von Braun et al. 1994) as the percentage of agricultural output sold to total agricultural production. The total sales-to-income ratio is the ratio of the gross value of total sales to total income from crop production. In this index, income from crop production is assumed as a proxy to total household income, ignoring income from livestock, and off- and non-farm sources. The market position of a household is evaluated using the ratio of volume of sales and volume of purchases to the total volume of stock: the sum of storage from the previous production year and production in the current year. The specialization index tries to capture to what extent farm households are specialized in their production to capture the benefits from comparative advantages: producing what they can efficiently produce and buying what they cannot. This index measures the proportion of the value of purchased agricultural products not produced by households to the gross value of agricultural production. Numeric specifications of all the indices discussed above are given in Annexes 2–5.

In most literature, the issue of commercialization is based on the proportion of resources allocated to either cash or food crops. However, under the existence of favourable market environment and infrastructure, food crops could also have the potential to be commercial crops (Fafchamps 1992). Moreover, cash crops are not necessarily supplied to the market. A good example is the case of groundnuts in West Africa where large proportion of groundnuts produced are consumed at home though it is considered as market-oriented commodity (von Braun 1994). Therefore, categorizing

crops broadly into food and cash crops to analyse the extent of household commercialization lacks a strong footing and requires looking at the purpose for which a crop is grown rather than looking at the nature/type of crop itself. Based on this review, it appears that the common approach to measuring the degree of smallholder commercialization is based on the proportion of the value of agricultural produce sold or the value of agricultural inputs bought to the total household agricultural income (Randolph 1992; von Braun et al. 1994).

Although there is relatively rich body of literature analysing the extent of commercialization for crop production, the commercialization process in the livestock subsector have received little attention. With the aim to identify the position of a farm household in livestock market participation, Negassa and Jabbar (2008) formulated a gross and net (market) livestock off-take rates at the household level.³ The gross off-take rate measures the overall rate of inventory changes of livestock in a household. It categorizes births, gifts received, and purchases as incoming animals whereas deaths, sales, gifts, and slaughters are considered as outgoing ones. The gross off-take rate is then defined as the ratio of the difference of the two to the average inventory of a given period (usually one year). The net (market) off-take rate, which is more relevant in measuring the level of smallholder commercialization, considers only the sales and purchases of livestock per household per a specific period. Net off-take rate is then computed as the ratio of the difference of the two to the average inventory of the period.

3. The formula for both gross and net (market) off-take rates are given in Annex 5.

3 Processes in smallholder commercialization

Smallholder commercialization is part of an agricultural transformation process in which individual farms shift from a highly subsistence-oriented production towards more specialized production targeting markets both for their input procurement and output supply. In a broader sense, one could also see smallholder commercialization as a pathway to the overall economy's structural transformation in which larger proportions of economic output and employment are generated by the non-agricultural sectors. To attain this essential goal of structural transformation through a smooth process of smallholder agricultural commercialization, policy and strategy interventions to improve the functioning of input and output marketing, improvements in service provision, and the development of infrastructure stand out prominent. Policymakers may also need to target the types of agricultural commodities to be promoted and which markets to focus on.

3.1 Which commodities and markets to target?

There is an ongoing debate about targeting the process of smallholder commercialization. One issue of debate is whether smallholder commercialization should aim at increasing the productivity and marketed surplus of staple food crops or, alternatively, to focus on a newly introduced high-value crops. The second issue is, given the targeted commodity types for commercialization, whether to produce these commodities for domestic or export markets. The following subsections briefly discuss arguments in the literature on these issues.

3.1.1 Staple or high-value cash commodities

In addition to the underlying socio-economic circumstances under which smallholders operate, the argument on which commodities to target in the process of smallholder commercialization emanates from the agro-ecological circumstances, technical know-how of smallholders, and their risk bearing capacity and attitude towards risk. Since staple food crops have been produced for a longer period under the subsistence system, it is believed that smallholders have the technical know-how and experience in the production of these commodities. Thus, new yield-enhancing technologies for these crops could help in generating more surpluses to the market, increasing household income at a lower risk and improving national-level food security. On the other hand, different modes of production targeting high-value non-traditional commodities could help farm households generate more income per unit of resources used on the farm but at a higher production and market risk. In the latter case, out-grower schemes or contract farming are usually considered major risk-sharing strategies and means to link smallholders to the export markets (Dolan and Humphrey 2000).

Although agricultural commercialization is believed to put increased emphasis on specialization, it is not confined to the production of high-value commodities. Pingali et al. (2005) argued that, for many farmers, the transition from subsistence to commercial staple crop production is far more pertinent than a complete shift to specialized high-value commodities. Similarly, Gebre-ab (2006) stated that the production of marketable surplus of staple food over what is needed for own consumption is initially the most common form of commercialization in a peasant agriculture.

Through time, as the level of smallholder commercial orientation increases, however, one observes mixed staple and cash crop production systems giving way to specialized production units for the production of high-value crop and livestock products (Pingali et al. 2005; Gebre-ab 2006).

Apparently, the potential gains from high-value agricultural commodities tend on average to be higher than those for staples even though production of high-value commodities can be accompanied by greater uncertainty and risk. A critical issue to be answered by smallholders specializing in high-value outputs is whether their size, be it land or other resources, can profitably support such activities in the long term (Lerman 2004; Pingali et al. 2005). In addition, to a large extent, crop choice is determined a priori by the land potential available to small farmers. So, while high-value crop production may promise higher rewards, that option is not open to all small farmers. For some small farmers, at best, commercialization can offer the possibility of some diversification into non-staples, but not a total specialization (Pingali et al. 2005). In conclusion, smallholders can commercialize in staple food commodities, in non-traditional high-value cash commodities, or combine the two types of commodities depending on the agro-ecological circumstances, levels of production and price risks, and market conditions. However, one can certainly argue that smallholders will move towards more specialization in the process of commercial transformation in the long run.

3.1.2 Domestic or export market

The choice of targeting either domestic or export markets in the process of smallholder commercialization is basically linked to the nature of the targeted commodities. For countries with large population size, domestic markets could also be a major market target due to higher domestic demand for both staples and high-value commodities. However, high-value non-traditional commodities are usually produced for the export market.

In targeting the export market for the process of smallholder commercialization, the issue of product quality, sanitary and phytosanitary standards, timely and regular supply, and volume need to be given emphasis in enabling the small-scale farmers to be part of the game (Henson et al. 1999). Despite the national interest in foreign currency earnings from export markets, these and other regulatory issues put smallholders at a higher income risk which might have an adverse consequence on the overall commercialization process. Such constraints can be overcome by vertically coordinated supply value chains that use smallholders as out-growers (Dolan and Humphrey 2000).

Apart from the intercontinental export markets for high-value cash crops, there is a considerable potential demand for staple commodities in the domestic and intraregional food markets of developing countries (Diao and Hazell 2004; Diao et al. 2007). A study by Diao and Hazell (2004) showed that Africa's domestic demand for staple food was about USD 50 billion in 2000 and expected to double by 2015.

3.2 Role of risk in the commercialization process

The role of risk in a smallholder commercialization process can be seen from two perspectives: before and after shifting from subsistence to semi-commercial production system. First, perceived risks in labour and food markets compel subsistence farmers to stick to the self-sufficiency objectives both in their production and consumption decisions. Second, unreliable and costly food markets and fluctuations in market prices put the relatively market-oriented resource-allocation decisions of semi-subsistence households at stake due to less reliability of food markets to guarantee household food security (von Braun et al. 1994; Govereh et al. 1999). Reserving the discussions on the overall impact of risk on household resource allocation decisions for Section 7, this subsection briefly discusses why risks are higher under commercialized agriculture and what implication this has on the overall commercialization process.

Agricultural commercialization leads to a more specialized pattern of production at a household level (Timmer 1997). A specialized production by its nature is highly susceptible to the risks of fluctuating prices and yields which results in fluctuating household income. To continue the commercialization process under unforeseen income shocks, either credit markets have to be easily accessible or semi-commercial households have to put some of their good-year income in a form of quasi-liquid assets for consumption smoothing in a bad year. To mitigate risks related to smallholder commercialization and keep households in the move towards a fully commercialized agriculture, Timmer (1997) stressed that governments have to play a crucial role in designing and implementing the necessary policy measures that could help smallholders in designing their own risk-management and risk-sharing strategies.

4 Impacts of commercialization⁴

Smallholder commercialization is assumed to lead towards more specialized production systems based on comparative advantages in resource use. In turn, specialized production leads to higher productivity through greater learning by doing, scale economies, exposure to new ideas through trade (better knowledge diffusion through exchange), and also better incentives in the form of higher income.

Impacts of commercialization can be categorized into first, second and third orders. The first-order are mainly income and employment effects that are directly reflected in household welfare. The second-order effects include health and nutrition aspects usually contingent on the level of income attained through the existing level of commercialization. The third-order (or usually known as higher order) effects are the macro-economic and environmental effects that go beyond household level.

The International Food Policy Research Institute (IFPRI) conducted several case studies to investigate the impacts of smallholder commercialization on production, income, nutrition and other social and economic dimensions of farm households. These studies cover several developing countries including Kenya, the Gambia, Rwanda, the Philippines and Guatemala. In most of the cases, the impacts of commercialization are highly specific to location and policy environments (von Braun and Kennedy 1994; Strasberg et al. 1999). However, one can generally conclude that the positive impacts of agricultural commercialization are likely to outweigh the adverse consequences from the process. With this understanding, the impacts of smallholder commercialization on household welfare (including income and employment), health and nutrition aspects with special emphasis to women and preschool children, on value chain actors and the overall macro-economic environment will be discussed in the next subsections.⁵

4.1 Smallholder welfare effects

Agricultural commercialization tends to generate more household income due to its comparative advantages over subsistence production (Kennedy and Cogill 1987; Dorsey 1999). However, unless rural markets are well-integrated and risks are low to influence household decision behaviour, the shift from subsistence to commercial crop production may have an adverse consequence by exposing households to volatile food market prices and food insecurity. This subsection discusses the welfare effects of smallholder commercialization in relation to income and employment dimensions (first-order effects) and also the indirect effects on nutrition and health aspects (second-order effects) through the income-consumption linkage.

4.1.1 Income

Different case studies in Africa demonstrate that household income increases as farm resources are reallocated from subsistence to commercial crops (von Braun et al. 1994). Using empirical evidence

4. In addition to what has been discussed in this section, country-specific summary of case studies on the impacts of smallholder commercialization are presented in Annex 7.

5. It is worth noting that most of the impact studies reviewed have their own limitations. In most cases, they are one shot studies and also do not give the cause-effect relationships in wider perspectives.

from coffee growers in Central Kenya, Dorsey (1999) showed that households who followed a commercial specialization scheme earned significantly higher annual net income than others. Similarly, farm households who shifted their production from maize/corn to a sugarcane out-growers scheme earned higher income in South Nyanza District of Kenya (Kennedy and Cogill 1987) and in Bukidnon Province on the southern island of Mindanao in the Philippines (Bouis and Haddad 1990). However, compared to the smaller but more continuous flow of income in the form of cash and food under semi-subsistence production system, higher income from cash crops in lump-sum payments is usually spent within a short time and more on non-food commodities (von Braun 1994). This problem is exacerbated in the absence of well-integrated financial systems that promote savings from cash-crop income.

4.1.2 Employment

In some cases, commercialization may be planned, but in most cases it is likely to be spontaneous. Whether a smallholder commercialization process creates more employment opportunities in rural areas is subject to the nature of commodities produced, technologies used in the production process, and whether agricultural processing is involved in the scheme (von Braun et al. 1994). Usually it is believed that high-value cash crops are labour intensive in their production and targeting these crops in the commercialization process helps to absorb surplus family labour. Moreover, commodities that require further processing at a village level before marketing (e.g. commodities like soybean, cassava and tobacco in the uplands of Java) could create employment opportunities for farmers and their family members and also promote income distribution among village members beyond the producing household and particularly to the poorest class of people in a community (Kawagoe 1994). On the other hand, smallholder commercialization that favours labour-saving technologies like mechanization may have an adverse effect on employment of the agricultural labour force in the family.

4.1.3 Health and nutrition effects

In smallholder commercialization, it is assumed that resources are being diverted from food crops to cash crop production which results in lower food availability from own production and more dependence on local food markets (Immink and Alarcon 1993). In support of this view, there are studies that witness the adverse effects of smallholder commercialization on nutritional status of households, particularly preschool children. A study by Dewey (1981) in rural Mexico provided evidence that dietary diversity, dietary quality, and nutritional status of preschool children can be negatively associated with lower crop diversity and increased dependence on purchased foods. Randolph (1992) also found that agricultural commercialization in Malawi exerted a negative influence on child nutrition, especially during the nutritional stress seasons. In addition, based on a case study from sugarcane-producing households in the Philippines, Bouis and Haddad (1990) also argued that raising household incomes appears to be a necessary but not a sufficient condition for substantially improving preschooler nutrition. This is noted due to the fact that higher-income households preferred to spend more of their cash crop income on non-food items.

On the other hand, there are arguments in favour of smallholder commercialization as a means to improve household health and nutrition status. These arguments generally follow two directions.

First, commercialization is assumed to enhance household income which helps to purchase a diversified mix of goods and services (like health care, better housing etc.), or increase the current market basket (Kennedy 1994a). Second, through the income–food–consumption linkage, commercialization is assumed to increase the food intake of household members, which could improve their nutritional and health status (Kennedy 1994a).

However, whether the income from commercialization is directly linked to household food consumption and whether all household members (particularly, women and children) also have equitable access to these gains appears to be an empirical issue. A common debate on the linkage between commercialization and nutrition is that income from commercial (cash) crops is under the control of men (Kennedy and Cogill 1987; Immink and Alarcon 1993; Tinker 1979 cited in Kennedy 1994a) and used more for non-food expenditures (Kennedy and Cogill 1987). Kennedy and Cogill (1987) showed that income control by women correlates with improved child nutritional status, suggesting that women are more likely to spend on food and health care. According to these authors, a 1% increase in sugarcane income in South Nyanza District in Kenya results in an increase in energy intake of 24 kilocalories per household per day. On average, sugarcane production increased household income by 15% which increased household energy intake by 360 kilocalories per day, or approximately 33 kilocalories per day per person in the household (Kennedy and Cogill 1987).

Analysing the child health and morbidity rates in several countries including the Gambia, Rwanda, Kenya, Malawi, Philippines and Guatemala, Kennedy (1994a) concluded that there is no clear evidence that agricultural commercialization has an adverse effect on child nutrition. Another point of argument on health impacts of commercialization refers to the higher labour demand of commercial crops as reducing the household time spent on child care, particularly by women (Kennedy and Cogill 1987). Generally, the food security status of commercialized farm households is influenced by both household-level technological changes that permit increased food crop production on limited resources, and the meso- and macro-level environment consisting of marketing conditions, market prices, rural infrastructure, and access to credit (Immink and Alarcon 1993). The macro-level factors influence the level of income a commercialized household can earn and market prices that influence the household income–consumption linkage, whereas household-level technological changes could help to secure food self-sufficiency under a risky food-market environment.

4.1.4 HIV/AIDS

Smallholder commercialization by itself may not have a direct impact in increasing the prevalence of HIV/AIDS but the process of commercialization will strengthen the interactions and linkages between rural and urban populations. Newly emerging trade opportunities due to the commercialization process may also contribute to population movement and relocation. This dynamics may increase the transmission of HIV/AIDS to the rural community. On the other hand, HIV/AIDS has a direct and adverse effect on smallholder commercialization through the loss of active labour that would have been engaged in agricultural activities. However, it must be noted that the literature on commercialization is very scanty on the relationship between commercialization and the prevalence of HIV/AIDS.

4.2 Effects of commercialization on value chain actors

Through increasing household market participation, commercialization of smallholder agriculture has a direct and usually positive impact on value chain actors such as input suppliers, output traders, transporters, processors, financiers and others. The positive impacts could be due to economies of scale created from increased demand and supply that tend to decrease average cost per unit of operation.

Some of the marketing and processing activities done by value chain actors can be handled by farmers and their families as a side job to agriculture. Findings by Kowagoe (1994) in upland Java, Indonesia, suggested that a high contribution of marketing and processing to rural household income and employment is expected when commercialized farm products are processed in the village and then marketed. Kowagoe (1994) argued that the processing and marketing of commercial products at a village level contributed up to 70% of total household labour income and employment. Commercialization, in general, creates a variety of opportunities for value-chain actors who add different forms of value to commodities on their way from the point of production to final consumption. Actors may change the forms of products via processing, storing or transporting from one point to another based on market demands.

4.3 Environmental effects

Both negative and positive environmental effects of smallholder commercialization could be observed when the commercialization process is targeting high-value commercial commodities. Negative effects could arise due to the fact that these commodities usually demand higher use of external inputs such as pesticides and herbicides that could have an adverse effect on the environment.

Based on the Asian experience, Pingali (2001) argued that agricultural commercialization has both positive and negative impacts on the natural resource base. Higher economic growth results in higher opportunity cost of labour, leading to the excessive use of herbicides and pesticides in agriculture. Increased use of agricultural chemicals, in turn, could lead to higher environmental and human health risks (Pingali 2001). On the other hand, favourable macro and micro-level economic policy reforms that potentially dissolve input subsidies and output support programs could result in sustainable management of the agricultural resource base by allowing the actual opportunity costs of resources to be better reflected in market prices. However, Pingali was cautious in judging the net effect of agricultural commercialization on the environment due to the fact that the effect could vary depending on the specific circumstances under which the commercialization process takes place (Pingali 2001).

If the commercialization process is linked to irrigation schemes, improper use of water resources may have serious consequence both on surface and subsurface water bodies. Water-logging and salinity are some of the major problems related to irrigation development. Moreover, the problem of downstream degradation of water quality by salts and toxic agrochemicals is a serious environmental problem. Government policies that establish secured property rights to land and

water resources and regulate chemical use can be important in addressing these problems (Pingali and Rosegrant 1995).

4.4 Macroeconomic effects

When smallholders commercialize, developing countries with large population shares in the agricultural sector can generate more income, thus economic growth. Increased income in the agricultural sector raises demand for manufactured goods and services in the other sectors of the economy, thus stimulating further growth. Moreover, possible linkage of smallholder commercialization to the export market could enhance foreign currency earnings and improve the balance of payments. Commercialization may also increase employment, especially when labour-demanding high-value commodities are targeted.

4.5 Gender

The impact of smallholder commercialization on the gender dimension depends on a commodity's gender-specific labour demand and on who controls the income generated. The shift from staple maize to sugarcane production in Kenya and the Philippines was associated with a significant reduction in the percentage of women's labour use in agricultural activities, from 50.5% to 1.2% in Kenya and from 9.1% to 2.5% in the Philippines (von Braun 1994). In this case, one could say that sugarcane is a 'men's crop'. However, in Guatemala, the shift from maize to vegetable production increased the proportion of women's labour use from 6.1% to 21.5% (von Braun 1994). Whatever proportion of female labour is involved in cash crop production, income from these crops is usually controlled by men.

5 Synergies between cash and food crops

In the agricultural transformation process, semi-commercial agriculture is an intermediate step coming between subsistence and commercialized agriculture (von Braun et al. 1994; Timmer 1997). One of the main features of semi-commercial agriculture is that farm households are producing both for home consumption and markets using both traded and non-traded agricultural inputs (von Braun et al. 1994). Under such circumstances, smallholders have to decide whether to allocate their scarce resources (usually land and labour) to cash or food crop production, and to what extent. Apart from competition for resources at a household level, cash and food crops may also have complementary effects in household resource allocation decisions. These features are discussed in the following subsections.

5.1 Competition on resources

Conventionally, it is well known that cash and food crop productions are competing for farm household resources. This competition is fierce particularly under missing or imperfect food markets in which households prefer to produce their own food crops to secure household consumption at the expense of higher returns from cash crop production (de Janvry et al. 1991; Jayne 1994). However, some food and cash crops may require labour or draught inputs at different periods (Jayne 1994). This argument is conditional on the nature of crops and sources of moisture available for production, such as in cases when food crops could be grown during rainy season and cash crops grown on irrigated plots during the dry season.

5.2 Complementarities

The complementary nature of food and cash crop production decisions at a household level bases itself on the income and financial linkages between the two types of crops. Income from cash crops might be used either to purchase food crops from a market, which permits allocating most household resources to cash crop production, or to purchase external inputs for the production of food crops that enhance food crop productivity. In doing so, fewer resources are required to produce adequate food for the household consumption and the remaining resources can be shifted to the production of cash crops.

In support of this view, a study conducted by Govereh and Jayne (2003) at Gokwe North District in Zimbabwe revealed that households who intensively produce cotton obtained higher grain yields. In addition, the same authors found evidence of regional spill-over effects whereby commercialization schemes induce second-round investments in a particular area that provide benefits to all farmers in that region, regardless of whether they were engaged in the scheme (Govereh et al. 1999). Equally important, the cash-crop out-grower scheme had positive spill-over effects for smallholder food production through the adoption of fertilizer on food crops. This was made possible through the cash crop input delivery channels, and increased availability of farm credit through cash crop schemes to promote hiring additional labour and finance investments in productive assets such as draught oxen and traction equipments (Strasberg et al. 1999).

6 Interlocked transactions, interlinked markets and commercialization

Smallholder commercialization demands not only well functioning output markets to sell marketable commodities, but also efficient and low-cost factor markets that reflect the true opportunity cost of farm inputs. In some cases, smallholders may not be able to obtain purchased farm inputs like seeds, fertilizer and other chemicals due to shortage of liquidity or higher transaction costs associated with these input markets. Moreover, they may not be able to have access to output markets due to similar or other problems. Under such circumstances, different institutional arrangements are considered to solve or at least mitigate these problems and promote smallholder market participation, contributing to higher farm household income. One such category of institutional arrangements involves interlinked markets, also known as interlocked transactions.

Interlocked transaction is an institutional arrangement meant to reduce transaction costs through tying agricultural credit and input supply to the delivery of product at harvest (Govere et al. 1999). In other words, interlocked transactions tie input transactions with output marketing. Such an arrangement has a double advantage in agricultural commercialization. First, small-scale farmers could get agricultural inputs like seed, fertilizer and other chemicals on credit basis, which is a means to overcome farm household cash constraints. Secondly, farmers are ensured of the marketability of their produce, sometimes even directly at farm-gate (Jayne et al. 2004). Experience from Kenya reveals that there is a direct and indirect positive impact of interlinked cash-cropping schemes on the intensification of input use in food-crop production. Smallholders engaged in interlocked credit/input/output marketing arrangements for cash crops used more fertilizer per acre both on cash crop and food crop production in Kenya (Jayne et al. 2004).

However, Govere et al. (1999) raised the concern of diversionary sales (side-marketing outputs) to other buyers as a major problem in such arrangements. According to Govere et al. (1999), unlike the perishable and industrially processed high-value cash crops, food crops potentially suffer from this disadvantage as staple food crops can be processed and stored on the farm for longer periods. This nature of food crops poses greater difficulties and costs for lending firms to ensure delivery due to moral hazard. Moreover, the non-existing or weakly performing formal legal system in rural setups aggravates the problem through lack of strong contract enforcement mechanisms (Jabbar et al. 2008).

7 Determinants of commercializing subsistence agriculture⁶

There are a number of determinants in commercializing smallholder agriculture. These determinants are broadly categorized as external and internal factors.⁷ The external ones are factors beyond the smallholder's control like population growth and demographic change, technological change and introduction of new commodities, development of infrastructure and market institutions, development of the non-farm sector and the broader economy, rising labour opportunity costs, macroeconomic, trade and sectoral policies affecting prices and other driving forces (von Braun et al. 1991; Pingali and Rosegrant 1995). In addition, development of input and output markets, institutions like property rights and land tenure, market regulations, cultural and social factors affecting consumption preferences, production and market opportunities and constraints, agro-climatic conditions, and production and market related risks are other external factors that could affect the commercialization process (Pender et al. 2006). On the other hand, factors like smallholder resource endowments including land and other natural capital, labour, physical capital, human capital etc. are household specific and considered to be internal determinants. Some of these factors are briefly discussed in the next subsections.

7.1 Population growth and demographic change

Population growth and demographic change are considered as demand-side driving forces for smallholder commercialization resulting from the urbanization effect of economic growth (von Braun et al. 1994). Urbanization and higher income from economic growth increases demand for marketed agricultural products which will tend to increase commodity prices and stimulate agricultural production for the market. However, by creating pressure on farmland, population growth may retard the commercialization process as food self-sufficiency on smaller plots becomes a priority over producing for markets. Moreover, population pressures may result in land degradation and lower productivity. Therefore, the direction of the influence of population growth on commercialization can be ambiguous.

7.2 Technologies

The importance of resource-saving and yield-enhancing technological innovations and their adoption by the ultimate users are unquestionable in the smallholder commercialization process (von Braun et al. 1994). Adopting a temporal perspective, von Braun et al. (1994) argued that, in the short-run, increased commercialization could occur without change in agricultural technologies, but the inverse would be less likely due to the indispensable demand-side pull for technological innovation.

Moreover, technological innovations should not be focusing on cash crops alone. Fafchamps (1992) and Jayne (1994) argued that, under loosely integrated food markets, focusing on technologies

6. Apart from what has been discussed in this section, experiences of three south Asian countries (Bangladesh, India and Nepal) on the diversification of smallholder agriculture towards high-value commodities are summarized and presented in Annex 8.

7. A diagrammatic scheme adopted from von Braun et al. (1991) is illustrated in Annex 6 in order to show how the 'exogenous' and 'endogenous' factors are influencing smallholder commercialization. In von Braun et al. (1991), exogenous and endogenous factors were considered as equivalent to external and internal factors, respectively, from a household's point of view.

biased to cash crops may not bring the intended boost in cash crop production as poor households are still using a significant share of their resources for food crops. Thus, in addition to the improvements in cash crop technologies, there has to be resource-saving innovations in food crops that could guarantee higher food production using fewer resources. According to these authors, productivity increases in both cash and food crops are crucial even if a country's objective is to increase cash crop production alone.

7.3 Institutions

North (1990) defined institutions as 'rules of the game' comprising of both formal rules (laws, constitutions, property rights etc.) and informal constraints such as norms, conventions, and codes of conduct that provide the structure for human interactions. Through their influence on human behaviour, institutions influence economic performance, growth, and development (Kharellah and Kristen 2001).

To better understand the role of institutions in smallholder commercialization, it is important to disentangle and briefly discuss institutional environments and institutional arrangements. Institutional environments refer to the fundamental political, social, and legal ground rules that establish the basis for production, exchange, and distribution. For instance, rules governing property rights and the right to contract are under this category. On the other hand, institutional arrangements refer to relations between economic units that define how these units can cooperate or compete (Williamson 2000). A good example is market arrangements such as contracts, auctions, exchanges, co-operatives etc. (Omamo 2006).

According to Glover (1994), the distributional benefits of agricultural commercialization, access to commercialization opportunities, and sharing of commercialization risks are functions of institutional arrangements. The following subsections discuss the roles of both formal and informal institutions in the overall smallholder commercialization process.

7.3.1 Formal institutions

Formal institutions like laws, constitutions, rules, regulations, contracts, property rights, and legal frameworks facilitate the playing ground for economic actors (North 1991; Kharellah and Kristen 2001). In one way or another, these institutions contribute to the overall smallholder commercialization process. For instance, experiences from grain markets in Ethiopia (Gabre-Madhin 2001) and Madagascar (Fafchamps and Minten 2001) showed how the scope of spatial and temporal arbitrages in grain marketing is limited due to a weak legal system for contract enforcement and the demand for personal inspections for grades and quality standards of each grain delivery. Such poor institutional arrangements result in higher transaction costs of trade that must be paid by producers and consumers, which, in turn, results in a wide spread between farm-gate and retailer prices.

Clearly defined property rights on land and other resources also play a key role in overall economic performance and agricultural modernization. For instance, comparing two institutional

arrangements (communal and less communal field systems) in Europe during late medieval and early modern Europe, Hopcroft (1999) argued that agricultural modernization came later in a communal field system due to lack of clear property rights and less developed markets with communal fields.

Jayne (1994) argued that poor seed delivery systems are one of the major constraints that kept up to 90% of crop land for food grains in semi-arid areas of Africa. The development of agricultural support services such as agricultural extension linking smallholder farmers with new farm practices, and institutional arrangements such as agricultural marketing and service cooperatives, are designed to help link smallholders with input and output markets (Lerman 2004). These institutions can facilitate technology dissemination and access to market information. Institutional arrangements like sharecropping, interlocked contracts between labour and credit and land lease are adopted by smallholder farmers to solve problems related to market failure and asymmetric information, consistent with a principal-agent model approach. Rural financial institutions are also relevant in facilitating access to long-term credits for fixed assets and short-term credits for working capital. Agricultural credit plays a vital role in the process of commercialization by allowing smallholder farmers to assume risks associated with commercial crop production (Immink and Alarcon 1993; Lerman 2004).

Contract farming is a risk-sharing institutional arrangement and is expected to promote the production of cash crops by smallholders (Glover 1994). Contracting can also serve as an institution to overcome barriers to entry, although certain measures need to be taken to ensure contract enforcement and to reduce transaction costs. One important point in this regard is whether contract agreements could be flexible or adjustable within a given limit when unanticipated external shocks occur.

7.3.2 Informal institutions

Although it is relatively more difficult to study the extent of constraints imposed by informal institutions on economic performance (North 1990), these institutions are as important as the formal ones, if not more, in facilitating or hindering a smallholder commercialization process. Values, norms, sanctions, taboos, cultures, traditions etc. have strong influences on smallholder production and marketing decisions, including those related to input use. Socio-cultural and religious factors determine consumption preferences of households, which can be a motivating or demotivating factor for household commercialization (Pender et al. 2006). These authors noted the case of teff in Ethiopian highlands and 'matooke' in central Uganda as examples demonstrating the impact of culture-influenced consumption preferences on a smallholder agricultural production system. In addition, Pender et al. (2006) argued that the prevalence of religious fasting periods in Ethiopia, during which individuals do not consume meat or dairy products, greatly limits the prospects for commercial livestock production for the domestic market.

The role of informal institutions in governing market exchange is paramount particularly when formal institutions are missing. A case in point is the set of informal institutions used in setting grades and standards for commodities in the Ethiopian grain markets through the use of brokers and other market intermediaries (Gabre-Madhin 2001).

7.4 Risks

When production is market related, risk has a direct impact on farm household decision-making behaviour (Chavas and Holt 1990; Finkelshtain and Chalfant 1991). While production risks are assumed to be the same both for subsistence and marketed goods, major risks to smallholder commercialization usually arise from market and policy failures (von Braun et al. 1994). In most rural economies, land, labour, financial, and insurance markets are either non-existent or imperfect (de Janvry et al. 1991). Under such circumstances, risk-averse semi-subsistence households tend to produce more of the market-risky subsistence goods (consumption commodities). This situation holds particularly when the effects of shocks are triggering changes in household consumption more than in income (Finkelshtain and Chalfant 1991; Fafchamps 1992; von Braun et al. 1994).

According to von Braun et al. (1994), the degree of change in household consumption due to shocks depends on the share of risky crops in total consumption, the income elasticity of demand for risky crops, risk preferences of the household and the covariance between consumption prices of risky crops and the revenue they generate. The higher the share of risky crops in the household's total consumption, the more is household consumption influenced by market shocks. Under such circumstances, households tend to allocate fewer resources to commercial commodities in favour of more resources towards food production for home consumption. If the demand for home-consumed risky crops is largely affected by changes in household income due to market shocks, then households prefer to be self-sufficient in production and consumption of risky crops rather than allocating resources to cash crops.

7.5 Markets and their integration

The existence of low-cost, well-integrated and efficient rural markets is a key element in agricultural commercialization. Using a crop portfolio choice under income and consumption price risk model, Fafchamps (1992) showed that the crop portfolio of households consists of more cash crops when agricultural productivity is increased and rural markets are well integrated. de Janvry et al. (1991) also showed that resource allocation to cash crops substantially diminishes in the absence of food markets since the aim of food self-sufficiency at a household level takes prominence.

In explaining the importance of well-integrated markets for household market participation and better returns from technology adoption, Barrett (2008) argued that well-integrated markets transmit excess supply to distant locations, and because of this, the returns to increased output due to technology adoption diminish less quickly in well-integrated markets than in segmented or poorly integrated markets. According to Barrett (2008), the potential for adverse welfare effects on non-adopters due to a fall in output prices is also lower in well-integrated markets.⁸

8. The concept of a fall in output prices due to technology adoption and its adverse effect on non-adopters is an old but strong idea of Cochrane (1958). This concept is well known as the 'Technology treadmill'. For further readings, see Gabre-Madhin et al. (2003) and Barrett (2007).

7.6 Transaction costs

Participation in market exchange is a core element in smallholder commercialization. However, transactions in markets are not frictionless and without cost. There are physical marketing costs like transport and storage costs and, also importantly, transaction costs related to searching and processing information, negotiating contracts, monitoring agents, and enforcing contracts (Gabre-Madhin 2001; Jabbar et al. 2008). The role of transaction costs in completely hindering or limiting the level of smallholder market participation has been examined by several authors (de Janvry et al. 1991; Sadoulet and de Janvry 1995; Key et al. 2000; Gabre-Madhin 2001; Pender and Alemu 2007; Alene 2008; Barret 2008), among others.

Transaction costs can be classified into two types: fixed and proportional transaction costs (Key et al. 2000). Searching, monitoring, screening etc. are some of the fixed transaction costs. This category of transaction cost is highly household or commodity-specific, non-variant with the volume of transaction, and basically deters smallholder participation in markets. Proportional transaction costs, as the name indicates, are proportional to the volume under transaction (Key et al. 2000). Using empirical evidence, Renkow et al. (2004) showed that fixed transaction costs in maize-producing semi-subsistence households is one of the major deterrents to market participation. According to these authors, fixed transaction costs were estimated to be 15.5% of the price band in maize market prices.

Apart from its direct impact in deterring or limiting household participation in cash crop markets, the prevalence of higher market transaction costs also limits household involvement in cash crop production by discouraging participation in food markets and prompting them to give priority to subsistence food production (Fafchamps 1992; Omamo 1998b; Key et al. 2000; Govereh and Jayne 2003; Pingali et al. 2005). As a result, agricultural resources are diverted away from their potential use in cash crop production that would generate higher household income. A good example is the study conducted by Jayne (1994) in five regions of Zimbabwe where food marketing costs are high. Controlling for asset and locational differences among households, the study showed that grain surplus households cultivate 48% more oilseeds (as a cash crop) for market than their grain deficit neighbours.

Since the specific types and levels of transaction costs vary by households, locations, and commodities transacted (Pingali et al. 2005), there is no single public or private innovation or intervention that can reduce them. Therefore, it is essential to focus on a variety of integrated arrangements that fit into the existing realities on the ground. Among others, these arrangements could include contract farming (Glover 1994) and development of smallholder organizations aimed at reducing marketing costs (Govereh et al. 1999; Alene et al. 2008) and costs of inter-market commerce (Barrett 2008), achieving continuous and reliable supply of marketed commodities produced by smallholders (Dolan and Humphrey 2000), and facilitating market information provision via improved telecommunications (Pingali et al. 2005).

7.7 Food habits

Combined with small farm sizes and unreliable food markets that characterize smallholders and the rural markets they operate in, food habits could also be a reason for farmers not to commercialize

(von Braun 1994; Pender et al. 2006). Even if markets may exist for some of the food commodities, preferences to consume own production is sometimes observed as a reason for self-sufficiency objectives.

7.8 Asset holdings

Household asset holdings, both in terms of capital and as a buffer to mitigate any production and market related shocks, are relevant in a smallholder commercialization process. The principal argument for household asset holding as a determining factor in smallholder commercialization assumes a consumption-side perspective by highlighting its role in mitigating unexpected shocks in the commercialization process. Reductions in yields or unfavourable market prices may affect household income and consumption adversely. Under such circumstances and in the absence of credit markets for consumption, asset liquidation may be the only option available to households to smooth their consumption. On the other hand, the importance of assets for smallholder commercialization can be seen from the production side. Assets like land, oxen, farm implements, and human capital are essential for marketable surplus production at a smallholder level. Larger farm holdings enable households to exercise economies of scale by adopting modern technologies (von Braun and Immink 1994). These and other assets for surplus production become critical especially when markets for land and oxen power are completely missing or less functional. When factor markets are imperfect, resource ownership matters for efficiency (Sadoulet and de Janvry 1995).

In addition, household asset holding in the form of human capital is one of the crucial elements in commercializing smallholder agriculture (World Bank 2007). Human capital comprises education, experience, skills, capabilities etc. of the household members engaged in pursuing new opportunities that could change the household's overall living standards.

7.9 Policy aspects

Smallholder commercialization cannot be left to the market alone (von Braun et al. 1994). Pingali and Rosegrant (1995) emphasized the importance of appropriate government policies to facilitate the smooth transition from subsistence to commercialized agriculture. According to these authors, priority areas where a government should take actions are investments in the development of rural markets, transportation and communication infrastructure, crop management, research and extension, secured property rights to land and water, development of a liberalized capital market, and provision of support services such as market information, credit services, extension services, health, sanitation and nutrition to rural households (Pingali and Rosegrant 1995; Pingali 1997).

Pingali (2006) generalized that governments ought to help in creating enabling policy environments for smallholder commercialization through investing in rural infrastructure and undertaking institutional reforms that could encourage the private sector to participate in the development of the rural economy. Moreover, the role of government is crucial in specifying property rights and enforcing contracts to promote specialization and reduce the costs of market exchange (North 2000).

8 Gaps in commercialization concepts and methodologies

Though the issue of smallholder commercialization has been debated and researched for a long time now, especially since the 1980s, there still are gaps that warrant further investigation to sharpen the concepts and methodologies used in measuring the level of smallholder commercialization. Gaps also exist in the analysis of the determinants of smallholder commercialization and the effect of commercialization on households, the environment and the macro-economy. Major identified gaps in the literature based on this review are discussed below.

8.1 Conceptualization of a smallholder commercialization

The level of commercialization need to be measured in order to analyse the determinants of commercialization. There are a number of different ratios developed to measure the degree of household commercialization. These different indicators usually emanate from the way commercialization is conceptualized. Some authors use econometric models derived from the conventional non-separable agricultural household models to evaluate their resource allocation decisions for producing commodities consumed at home (food crops) vs. those supplied to markets (cash crops). Others use simple indices (ratios) to look at the proportions of resources or income derived from the market. In some cases, these indices are focusing on either input or output side commercialization, whereas in others, they combine the two and look at overall market transactions of a farm household. Nevertheless, there is no well accepted and comprehensive definition that could give a multidimensional view to the smallholder commercialization concept so that one can easily judge to what extent a given farm household is commercialized in its overall production, marketing and consumption decisions.

8.2 Methodologies in examining the degree of commercialization

As indicated earlier, one method of evaluating household commercialization is econometric analysis. von Braun et al. (1994) stated that allocation decisions could be estimated econometrically by using reduced form equations with an extended list of exogenous explanatory variables that affect many structural relations. However, this was not addressed in their edited book claiming data limitations and the difficulty of identifying the underlying structural coefficients from reduced form estimates, and drawing conclusions about the specific impact of crucial variables in the system at each particular link.

Considering several earlier studies cited in Randolph (1992) and the literature reviewed in this work, it appears that the most common approach used in measuring the degree of commercialization at a household level has been using the proportion of sales from the total value of agricultural production (von Braun 1994). This is actually the revealed marketing decision of a household, particularly for commodities that are potentially used for sale and home consumption (Randolph 1992). However, some households may sell commodities that are not intentionally produced for markets. In this case, considering the proportion of sale as an indicator for the degree of commercialization may lead to a wrong conclusion. Therefore, in addition to the revealed marketing decisions, future studies on commercialization should also try to incorporate indicators

that can capture household's production decisions whether a given commodity is mainly produced for home consumption or sale.

Although there are a number of studies on the impacts of physical marketing costs (especially transport costs) in deterring or limiting smallholder market participation (Omamo 1998a; Renkow et al. 2004), attempts are limited to empirically test the role of both formal and informal institutions and institutional arrangements in reducing transaction costs and thus enhancing commercialization. Thus, future studies on smallholder commercialization should explicitly incorporate the role of institutions on the level of household's commercialization and the overall commercialization process.

Most studies examining the determinants and impacts of commercialization have used cross-sectional data. For example, in analysing the impacts of smallholder commercialization on the nutritional status of preschool children in Guatemala, Immink and Alarcon (1993) used a 24-hour recall method to collect data on household consumption patterns. Analysis of cross-sectional data obtained through such a method is highly time and context specific and may not sufficiently reflect the situation over time. Thus, conducting more studies using panel data on household production, marketing and consumption patterns over a longer period are essential to get a more realistic picture of the determinants of commercialization and its impacts.

8.3 Bias towards crop production

Much of the research on smallholder commercialization has focused on crop production and largely ignored livestock activities. Nevertheless, livestock and livestock products account for a major proportion of household cash income both in sedentary mixed crop–livestock systems and in pastoral and agro-pastoral systems. Due to this fact, analysis of smallholder commercialization should also pay attention to the livestock subsector as well.

8.4 Human capital

Human capital elements such as education, experience, skills, capabilities and talents of family members are essential in commercializing smallholder agriculture. Even if a farming community is exposed to a favourable environment that facilitates smallholder commercialization, all community members may not commercialize their production system to the same level. There are some individuals who inherently have better skills and capabilities to do the implicit cost–benefit analyses required and apply their talents to quickly adapt to and exploit new opportunities while others are either adapting slowly or not at all. The contributions of human factors in the overall commercialization process have generally been given little attention. Though difficult to quantify some of these human capital elements, commercialization studies in the future should try to account for the effects of these elements on the degree of smallholder commercialization.

9 Conclusion

Since the 1980s, smallholder commercialization has received greater attention as part of the agricultural transformation process and as a consequence of urbanization and economic growth (Pingali 2001). Various authors have discussed a range of issues regarding smallholder commercialization, including the strategies to be followed in moving smallholder resource allocation decisions towards markets and the consequences of commercialization on smallholder welfare including income, employment, consumption, health, and nutrition. Based on issues reviewed in the above sections, a number of general conclusions can be drawn.

First, the concept of smallholder commercialization goes beyond the marketing of surplus staple products. It is very broad in the sense that it comprises household input use decisions, major objectives of production, household participation in input and output markets, degree of specialization in production and dependence on markets for income and consumption. This calls for the need to consider these dimensions when examining the level of smallholder commercialization.

Secondly, given the existing circumstances under which smallholders operate, smallholder commercialization could take place either in staple food crops or high-value commodities produced for domestic or export market, or combinations of the two. Several authors including Pingali and Rosegrant (1995) and Pingali et al. (2005) agreed that commercialization leads to more specialization both at a regional and household level, and at the same time to more diversification at national level.

Third, though there is a fear that smallholder commercialization may exacerbate food insecurity for poor households as more resources are allocated to cash crops, there are findings from case studies in different developing countries showing that smallholder commercialization may enhance the level of household consumption and nutritional status. Such positive impacts are, however, attained under the presence of well functioning food markets and fair intra-household distribution of cash crop income.

Fourth, during the process of commercializing smallholder agriculture, there is a stage at which both staple food crops and high-value cash crops are produced by the same household. Research findings show that the production of cash crops improves opportunities for increased input use in staple crop production, contributing to higher agricultural productivity so that household consumption demand from own production can be satisfied using fewer resources, allowing additional resources to be shifted to cash crop production.

Fifth, markets and their integration play a crucial role in sending signals for households to allocate resources to their best use. However, the prevalence of high transaction costs make markets either completely non-existent or imperfect. Such phenomenon usually impede smallholder participation in factor and/or product markets or at least limit their level of participation so that the potential gain from commercialization tends to be minimal. In this regard, several authors recommended public investments in infrastructural development and government policies that influence institutions and

institutional arrangements as crucial elements in encouraging the private sector to play an overall facilitation role in the smallholder commercialization process.

Sixth, there are still gaps in the literature particularly in comprehensively conceptualizing the level of commercialization at a household level and in modelling and estimating the determinants and impacts of commercialization. The effect of different social, cultural, institutional, economic and human factors influencing the level of household commercialization warrants better attention. The use of panel data in commercialization studies has been limited, with most existing studies based on cross-sectional data sets. Use of panel data may better reveal the dynamics of commercialization.

In general, studies conducted so far on the impacts and determinants of smallholder commercialization focus on specific dimensions of commercialization rather than on comprehensive analyses that incorporate all or most of its possible dimensions. Focus on specific dimensions is usually less capable in providing a realistic and comprehensive picture of the commercialization process. Analysis of commercialization also needs to consider the impact of commercialization at different levels in the economy. Hence, multidimensional, longitudinal, and comprehensive analysis on the determinants and impacts of smallholder commercialization is warranted.

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Annex 1: Processes in agricultural commercialization

Characteristics of food production systems with increasing commercialization

Level of market orientation	Farmers objective	Source of inputs	Product mix	Household income source	Human nutrition	Soil fertility
Subsistence system	Food self-sufficiency	Household generated (non-traded)	Wide range	Pre-dominantly agriculture	Predominantly home produced	Farm yard manure (FYM)
Semi-commercial system	Surplus generation	Mix of traded and non-traded inputs	Moderately specialized	Agricultural and non-agricultural	Home produced and purchased	FYM and chemical fertilizers
Commercial system	Profit maximization	Predominantly traded inputs	Highly specialized	Pre-dominantly non-agricultural	Predominantly purchased	Chemical fertilizers

Source: Pingali (2001, 485).

Annex 2: Indices of agricultural commercialization (von Braun et al. 1994)

$$\text{Commercialization of agriculture (output side)} = \frac{\text{Value of agricultural sales in markets}}{\text{agricultural product value}}$$

$$\text{Commercialization of agriculture (input side)} = \frac{\text{Value of inputs acquired from market}}{\text{agricultural product value}}$$

$$\text{Commercialization of rural economy} = \frac{\text{Value of goods and services acquired through market transactions}}{\text{Total income}}$$

$$\text{Degree of integration into the cash economy} = \frac{\text{Value of goods and services acquired by cash transactions}}{\text{Total income}}$$

Annex 3: Household Commercialization Index (HCI) (Govere et al. 1999; Strasberg et al. 1999)

$$HCI_i = \left[\frac{\text{Gross value of crop sales}_{hh i, \text{ year } j}}{\text{Gross value of all crop production}_{hh i, \text{ year } j}} \right] * 100$$

Annex 4: Four aspects of commercialization (Gabre-Madhin et al. 2007)

i.
$$\text{Sales-to-Output Ratio} = \left[\frac{\text{Gross value of all agricultural sales}_{HHi}}{\text{Gross value of all agricultural production}_{HHi}} \right] * 100$$

ii.
$$\text{Total Sales-to-Income Ratio} = \left[\frac{\text{Gross value of total sales}_{HHi}}{\text{Gross value of all crop production}_{HHi}} \right] * 100$$

iii. The net-market position:

$$\% \text{ of sale} = \left[\frac{\text{Sales}}{V_{\text{stored at the beginning}} + V_{\text{produced during season}}} \right] * 100$$

$$\% \text{ of sale} = \left[\frac{\text{Purchase}}{V_{\text{stored at the beginning}} + V_{\text{produced during season}}} \right] * 100$$

where V refers to volume of commodities

iv. Specialization Index (SI)

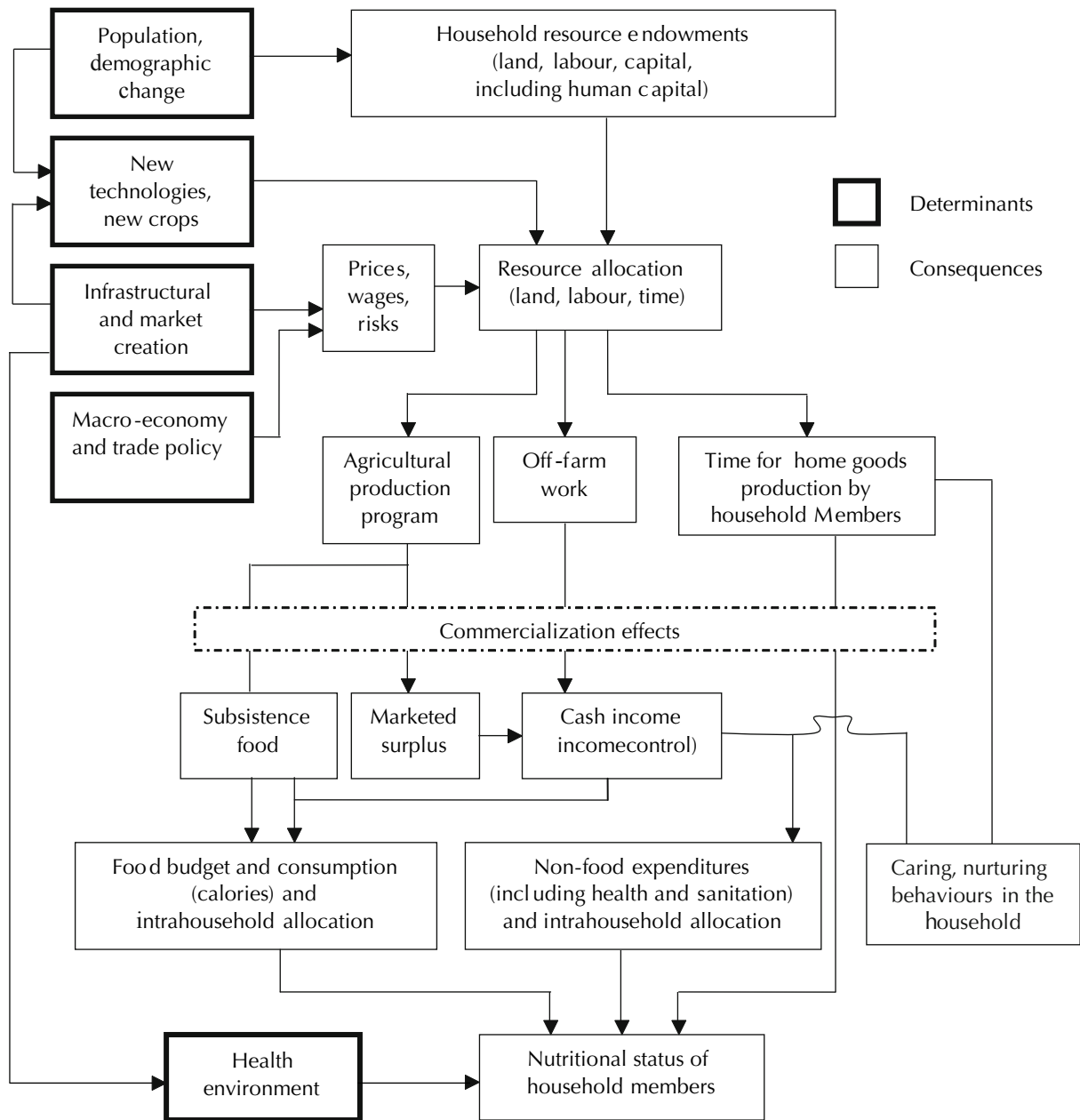
$$SI_{HHi} = \left[\frac{\text{Value of purchased agricultural products not produced by household}_{HHi}}{\text{Gross value of agricultural production}_{HHi}} \right] * 100$$

Annex 5: Livestock gross and net (market) off-take rates (Negassa and Jabbar 2008)

$$\text{Gross off-take rate} = \left(\frac{\text{Outgoing} - \text{Incoming}}{0.5(\text{Opening balance} + \text{Ending balance})} \right) * 100$$

$$\text{Market off-take rate} = \left(\frac{\text{Sales} - \text{Purchases}}{0.5(\text{Opening balance} + \text{Ending balance})} \right) * 100$$

Annex 6: Diagrammatic scheme of determinants and consequences of smallholder commercialization



Source: Adapted from von Braun et al. (1991).

Annex 7: Country specific case studies on smallholder commercialization and its impacts

Annex 7.1 Kenya: Commodity specific institutional support for smallholder commercialization (Thorpe et al. 2000; Gitu 2006)

Kenyan government had been taking commodity specific institutional supports that could help to link smallholders with markets. Some of these institutional supports were provided through the Kenyan Tea Development Authority (KTDA), Horticultural Crop Development Authority (HCDA), and Kenyan Dairy Cooperatives.

- *Tea development:* In 2000, Kenya produced about 16% of the world's black tea. It ranked second after Sri Lanka in tea exports and third after India and Sri Lanka in production. There had been rapid growth both in acreage and production, with the major expansion coming from the smallholder sector whose share of total output rose from a mere 2% in 1963 to 62% in 2000. Favourable investment policy, institutional support by Kenyan Tea Development Authority (KTDA), attractive world-market prices, and the land redistribution policy adopted by the government at independence were the major contributors towards the success in Kenyan tea development.
- *Horticulture development:* About 16% of the Kenyan agricultural export income in 2000 came from horticulture. It was a major source of income and employment in the rural areas, and the smallholder sector accounts for 60% of horticultural exports. Horticultural Crop Development Authority (HCDA) facilitated the private sector development through a broad range of institutional and marketing arrangements, which included a wide use of contract farming, in which traders provided funding, price information and overall marketing services to farmers. In recent years, Horticultural Crop Development Authority (HCDA) noticeably restricted its role to the provision of advisory and regulatory support.
- *Dairy development:* With an annual output of 3 million tonnes, 80% of which is accounted for by smallholders, total national milk production is twice that of any other country in the continent. A range of government policies contributed towards the development of dairy sector in Kenya. The liberalization of milk marketing in 1992 was the major policy change in favour of smallholder milk producers. This policy had an impact on a rapid growth of private sectors providing input and output services, and stimulated increased small-scale trading in fresh milk (Thorpe et al. 2000).

Generally, smallholder tea, horticulture and dairy developments in Kenya have been supported by:

- The legal and policy frameworks like land reform, regulatory frameworks, and contractual arrangements.
- Institutional support through initially public-funded authorities that provided services to producers, and sometimes used for channelling subsidies (inputs), but which are gradually transferred to producer associations or the private sector.
- Investment in public infrastructure.

Annex 7.2 Western Kenya: Commercialization of rice and its impact on nutrition (Niemeijer and Hoorweg 1994)

In 1980s, the Kenyan National Irrigation Board implemented irrigation schemes in which smallholder farmers (commonly known in this scheme as tenants) are obliged to grow only marketable commodities recommended by the management of these schemes. The schemes were centrally managed and the products were centrally purchased. For instance, at the Ahero Irrigation Scheme, in Nyanza province, Western Kenya, nearly all irrigated farmland was used for paddy production. On average, tenants under this scheme had 5.1 acres of cropped area of which about 78% was covered by rice production. The study was conducted to test the hypothesis that households under this scheme eat only rice and therefore had malnutrition problem.

Study design:

- *Site:* Ahero and West Kano Irrigation Schemes in Nyanza Province, Western Kenya.
- *Data collection method:* A single visit survey conducted during March to April 1984. Food consumption was recorded using the 24-hour recall method. The months March to April were selected for this survey purposively since this period was the time when food stocks are usually at their lowest level and nutrition problems are most common in that area.
- *Sample size:* A total of 335 sample households from four groups of farmers that differ in their degree of participation and dependence on irrigated rice production:
 - Non-rice growers (134 sample households)
 - Three categories of rice growers with different production characteristics particularly in their source of income and type of tenancy (201 sample households).

Major finding: The authors reported that tenants on the irrigation scheme had higher income per capita than any other farm groups. However, these tenants were getting their income from less diversified sources, mainly rice production. Comparing the average household food consumption per head of different farm groups, it was identified that resident tenants with specialized income sources consumed 2494 kcal/day per head. This figure was the lowest of all the four farm groups. Moreover, it is also lower than the recommended daily calorie intake per adult consumption unit, which is 2600 kcal. From this, the authors concluded that income composition appeared to be more important than the level of income for a household nutrition.

Annex 7.3 Southern Kenya: Effects of sugarcane production on income and nutrition (Kennedy 1994b)

Objective: To assess the impact of shifting production from maize to sugarcane on household food security situation and preschool children and women's nutrition status.

Site: Southern Nyanza, Western Kenya.

Data and sample size: 504 households were surveyed during June 1984–March 1985 and a follow-up survey on 462 households from the earlier samples during December 1985–1987. The sample households were both agricultural and non-agricultural households in the same community.

Major findings:

- *Income*: sugarcane producers got more income than non-producers, mainly due to the difference in the value of marketed agricultural income. There was a difference in income of KSh 1129 between the two groups. By disaggregating this difference, it had been shown that 41% of the difference in income is from commercial agricultural income, 38% from subsistence income, and the remaining 21% from higher non-farm income.
- *Nutrition*: there was a difference in the daily per capita calorie intake between sugarcane producers (2848 kcal) and non-growers (2641 kcal).
- *Income-nutrition linkage*: Based on household consumption function, the researcher found that non-farm income decreases household consumption but women's income contributes positively. Thus, the researcher concluded that it was not the amount of income but the source of income and who controls the income that matters in household food security.

Annex 7.4 Philippines: Nutritional effects of shifting from corn to sugarcane (Bouis and Haddad 1990, 1994)

Background:

- In Philippines, corn is the major staple crop but its productivity is very low due to poor soil fertility (on average, 0.9 tonnes/ha during the main season and 25% of this amount during the other season, which makes a total of 1.125 tonnes/ha per year from two-time harvest per year)
- In 1977, sugar mill was established in the study area.
- In early 1980s, households started to supply sugarcane to the established mills.
- Gross margin on corn was 1023 pesos/ha per year whereas it was 4570 pesos/ha per year for sugarcane.

Study area: Bukidnon province on the southern island of Mindanao, Southern Philippines.

Sample size: 510 corn and sugarcane producing households were surveyed four times at four-month intervals during 1984 and 1985.

Sample composition: smallholder landowners, tenants, and landless labourer households.

Major findings:

- *Land tenure*: The introduction of sugarcane changed the land tenure system. Landowners became reluctant to rent out for corn production as the opportunity cost of renting land was becoming higher. Thus, several former corn tenant households had lost access to land as landlords decided to grow sugarcane and chose to hire labour for the new crop rather than rent out their land.
- *Income*: smallholders that shifted their production towards sugar (whether it is on own or rented land) made substantially higher profits per hectare than their corn producing households, at an average of USD 225/ha per year for sugar compared with USD 100 for corn.

- *Specialization*: Despite the higher profit from sugarcane production compared to corn, all sugarcane producing households with access to land continued to allocate some share of their land for corn production to avoid food security problem that might be caused due to risky food-market environment.
- *Women's labour*: The introduction of sugarcane production reduced the contribution of women's and family labour use in the total production. The average women's labour contributed in sugarcane production was only 2.7 days/ha per year compared to 12.4 days/ha per year in corn production. Thus, the introduction of sugarcane production helped to release women's labour from agriculture to other home activities including childcare. Generally, corn and sugarcane demanded similar amount of labour per ha per year (approximately 109 days/ha per year). However, two-third of labour used in corn production was reported as family labour whereas the remaining was hired labour. This situation was the reverse in sugarcane production and created more employment opportunity to the rural labour.
- *Food expenditure and calorie intakes*: Food budget shares declined but household calorie consumption increased with income. The authors emphasized that calories purchased per peso declined with increasing income due to the fact that higher income households seek more variety in whatever they consume unlike the low income households that spend more income on staples with higher calorie content. In other words, higher income households spend on meat and other more expensive food products.
- *Nutrition*: In this study, surprisingly, sugarcane producers provided 72% of preschooler's calorie requirements whereas the corn producers provided 76% of their preschooler children's calorie requirement. From this, the authors concluded that household income could be a necessary but not a sufficient condition to substantially improve preschooler nutrition.

Losers and winners due to the introduction of sugarcane in the province

Losers:

- Households that lost access to land due to the shift in the interest of landlords to grow sugarcane than renting out land for corn producers.
- About half of the small-scale sugarcane producers that had no contracts with the processing mills. They had to negotiate with other farmers who had contracts, which reduces their income from sugarcane production and sale.
- Children of the households that lost access to land due to the introduction of sugarcane production.

Winners:

- Land owners that shifted from corn to sugarcane production. These households usually had larger farm size, the capacity to bear more risk, better access to credit, better education and know-how, access to important political and social institutions to take advantage of new agricultural production technologies when they become available.

Annex 7.5 Vietnam: Commercialization process and policies (rice as a cash crop) (Goletti and Minot 1997; Nguyen 2003)

Background: Vietnam is a densely populated country with 0.15 ha of land per capita. Compared to neighbouring country in Southeast Asia, the availability of land is too low to generate a sufficient amount of income, hence marketed surplus from agricultural sector. Land expansion is limited though the State had invested considerably on land reclamation and irrigation system. In addition, agricultural population grows so fast that the increase in land supply could not compensate to maintain the amount of land per capita. During the 1990s, cultivated area increased 1.5% annually, while agricultural population grew at 2% per year on average. Therefore, land per capita in agricultural sector was reduced from 0.154 to 0.149 ha (Goletti and Minot 1997).

With this limited availability of land, the acceleration of agricultural labour productivity, income and marketed surplus depends largely on the pattern of land use. In Vietnam, 70% of cultivated land was used for food production. On top of Resolution No. 10 in 1988 that recognized the farm household as the central economic unit responsible for its production decisions, Resolution No. 5 in 1993 further moved in the direction of rural development and recognized land use rights of households (Goletti and Minot 1997).

Rice: Rice exports from Vietnam are often cited as the success story of agricultural policy reforms (Goletti and Minot 1997). The success starts from the abolishment of cooperative system in 1988 that caused the reallocation of land to peasant households which greatly increased land productivity (Nguyen 2003). The most important achievement was food export from 1989 though Vietnam had got to import annually 0.5 to 1 million tonnes of food up to 1988 (Nguyen 2003). Vietnam's average paddy sale per annum went up to 64% of the production (Goletti and Minot 1997) and mostly purchased by private traders (96%). Goletti and Minot (1997) indicated that Vietnam is one of the leading rice exporters next to Thailand and US.

Annex 7.6 Guatemala: Diversification towards exportable high-value vegetable crops and its impact on household food security (von Braun and Immink 1994)

Background:

- Traditional export crops in Guatemala were coffee, cotton, sugar, bananas and beef that constitute more than 70% of the agricultural export commodities around late 1980s.
- Most economic gain from the agricultural sector was coming from large-scale modern agriculture.
- The government of Guatemala took a policy action towards crop diversification and expansion of export income through non-traditional commodities, specially, exportable high-value vegetable crops.
- This program was designed to incorporate smallholder producers organized in cooperatives.

Objective of the study: The study was aimed at analysing the impact of this smallholder commercialization on household resource use (land and labour), income, expenditure, food security, and other outcomes.

Context and data:

- *Location of the study:* At Cuatro Pinos, 35 km west of Guatemala City. The area has good infrastructure and market integration.
- *Land coverage:* In 1970s, about 90% of the cultivated land was covered by maize and beans which were staple crops. The remaining 10% was covered by vegetables (cash crop).
- *Production characteristics:* In early 1980s, the Cuatro Pinos Cooperative members entered into a contract growing arrangement for export vegetables. Net return (in gross margin per unit of land) from the exportable vegetables was 15 times more than the net gain from maize production. However, the authors confirmed that these export commodities demanded 13 times more input costs than maize on the same plot. The associated production and market risks were also higher for vegetables.
- *Data:* Obtained from two round surveys in 1983 and 1985 in six villages of the Cuatro Pinos cooperative.
- *Sample size:* 195 cooperative members and 204 non-members.

Major findings:

- *Adoption of the high-value vegetables for export:* less traditional farmers with larger farm size, better access to rural infrastructure but without access to secure off-farm employment were the ones who adopted these export crops.
- *Production and land use:* There was a difference in land allocation between cooperative members and non-members. Seventy-eight per cent of the non-members' farmland was covered with the traditional staple crops (maize and beans) whereas it was only 52% for cooperative members. Surprisingly, cooperative members who owned less than 0.25 ha of farmland allocated 45% of their land to export and only 38% to maize and beans while non-cooperative members with similar farm size allocated 81% of their land to maize and beans.
- *Complete specialization:* There was no complete specialization in vegetable crops. More than 90% of the export crop growers produced some amount of maize for home consumption due to their preference for food security.
- *Synergy:* maize and beans yields were, on average, 30% higher for export crop producers because of their labour intensive cropping practices and higher levels of fertilizer applications.
- *Labour:* due to the introduction of new exportable vegetable commodities, employment in the six villages of the cooperatives increased by 21%. The introduction of exportable vegetable crops also increased the contribution of women's labour. On average, women contributed 9% of the total labour in maize, 25% in traditional vegetable and 31% in the new export vegetable crops.
- *Income:* Overall, household income increased by 38% above the average nominal income before the introduction of export commodity. Specifically, households who participated in the production of export crops earned 60% above the non-participants.

- *Expenditure:* As the income increased, less percentage of the additional income is spent on food. Generally, the amount of income spent on food from the same additional income was higher for women than men.
- *Food availability and nutrition:* There was higher calorie intake by the export crop producers. However, as the income level of households increased due to the export crop production, the share of maize and beans in the food composition decreased whereas the share of meat, eggs, and other foods showed increment. Generally, additional income increased calorie consumption but at a decreasing rate. For instance, the elasticity of calorie consumption with respect to income was 0.31 at the total sample mean of the study.

Annex 8: South Asian experience in agricultural diversification towards high-value commodities

General background: In the recent years, South Asian countries have faced a declining per capita consumption of cereals while that of high-value agricultural commodities like milk, fruits, vegetables, meat, eggs, and fish have been rapidly rising and creating a profound impact on agricultural production, marketing, processing and retailing environment (Joshi et al. 2007). These changes in consumption patterns are due to the rising income and fast growing urbanization due to economic growth. This opens an immense opportunity for smallholder farmers in the region to diversify their agricultural production towards these high-value commodities.

Joshi et al. (2007) argued that the diversification process towards high-value agricultural commodities is affected by roads and other infrastructure, technology, availability of family labour, access to credit etc. For instance, the share of high value commodities in the total value of agricultural output is more than 50% in the urban and peri-urban areas of India whereas it is about 40% in the hinterlands. Similarly, the area under vegetables has increased around Dhaka in Bangladesh, the Katmandu Valley in Nepal; and Lahore, Karachi and Peshawar in Pakistan. All these areas are with good road networks and better infrastructure.

Based on the literature, the following subsections describe experiences from three South Asian countries (viz. Bangladesh, India and Nepal) in diversifying agricultural production from cereal based towards high-value market oriented commodities.

Annex 8.1 Bangladesh: Agricultural diversification towards high-value agricultural commodities (Alam 2007)

In Bangladesh, the area and production of non-cereal crops had been declining before 1990 due to more attention given to the food grain crops, particularly rice. However, Bangladesh launched a diversification project called Crop Diversification Programme (CDP) in 1990, with the aim of import substitution and decline in the production of non-cereal grains like tubers, pulses, and oilseeds. This program was believed to provide a new direction to the agricultural diversification in the country.

There have been various measures taken by the Bangladesh government for the development of livestock sector as well. Some of these measures are: grants of 20–25 per cent subsidy to dairy farms, imports of poultry and livestock feed without tariff, liberal bank credits, transport subsidy for the import of improved breeds of cow and supply of improved varieties of cattle and poultry vaccines.

Another important lesson from Bangladesh is its experience in vertical integration of markets in the dairy sector. Two practical examples are the following. First, the Milk Vita and Bangladesh Relief Action Committee (BRAC) Dairy use both contract farming and cooperatives for the supply of raw materials and also maintain farms. Second, the Bangladesh Milk Producers' Cooperative Union Ltd. (BMPCUL) practices considerable degrees of vertical integration and also developed both backward and forward linkages in the dairy sector. This milk producers' cooperative had 65,000

farmer-members that were grouped into 568 village milk producers' cooperative societies. Overall, this cooperative played a role in creating job opportunity for 4000 people in the rural area and 750 people in the processing plants. Apart from the dairy sector, there is also vertical integration in the fisheries sector. This has been seen most often between the private shrimp processing and exporting firms and the fisheries.

On the other hand, there are a number of constraints faced in promoting the diversification of high-value commodities. The following were reported by Alam (2007): household food-security requirements, small size of farm holdings, lack of knowledge about new technologies and technical know-how, lack of financial resources, risk in marketing agricultural products, meeting export standards, and others.

Some of the interventions undertaken to facilitate the diversification include: introduction of minor crop production in seasonally fallow lands, introducing crop rotation programs, diversification of cropping patterns towards the production of high-value crops, development of high yielding varieties (HYVs) and the use of hybrid technology and genetic upgrading of non-cereal crops.

Annex 8.2 India: Agricultural diversification towards high-value agricultural commodities (Joshi et al. 2007)

Referring to the estimates of the National Sample Survey Organization (NSSO) in India, the researchers indicated that the per capita consumption of cereals for the people below poverty line declined by 10% over the period 1983 to 2000. However, their consumption of milk, vegetable and meat increased by 30, 50 and 30%, respectively. According to the researchers, this change in the consumption pattern of the poor indicated that there was a silent revolution underway.

It is also believed that changes in the demand patterns and higher exports of the high-value agricultural commodities call for the institutional innovations to meet the changing consumer preferences. Several authors also agree that the change towards high-value commodities is not only due to the rising income but also the change in relative prices between cereals and high-value commodities (due to technology impact and changing demand pressure), increasing urbanization, infrastructure, and more open trade policies.

In search of higher income by smallholders, non-food grain crops like oilseeds, fruits, vegetables, spices and sugarcane have mainly substituted for coarse cereals. The remarkable success of India in the oilseeds sector was the result of Technology Mission on Oilseeds (TMO) launched by the government of India in 1986 to meet the domestic demand and have control over the import of edible oils. It is a mix of improved technologies and favourable policies to augment oilseed production in the country. Still there is a need to push up technical efficiencies at production and processing level to be competitive in the oilseeds export market.

The study identified rapid technological change in agricultural production, improved rural infrastructure, and diversification in food demand patterns as determinants of crop diversification towards high-value commodities. Based on econometric estimation results, the study concluded

that markets and good road networks could stimulate agricultural diversification in favour of high-value crops, particularly horticulture. Encouraging appropriate institutional arrangements for better markets through cooperatives or contract farming would go along with strengthening the farm–firm linkages.

India's experiences in market integration

- *Dairy marketing cooperatives:* In 1970, India implemented 'Operation Flood Programme' through the National Dairy Development Board (NDDB) to develop the dairy sector. The program developed a cooperative model for procuring and marketing of milk and milk products. About 170 milk cooperative unions were established under this program. These cooperative unions are operating in over 285 districts and covering nearly 96,000 village level societies in different states by making nearly 10.7 million farmers their members until 1999–2000.
 - The national dairy development board also diversified the portfolio of its commodities by including fruits, vegetables, oilseeds and plantation crops to meet the growing demand for fruits and vegetables of Delhi Metropolitan area. During the study period, there were 150 associations with members of 188,000 growers throughout the country. This model has most benefited the smallholders in remote areas where markets were absent for fruits and vegetables.
 - *Contract farming:* In 2000, the Netsle India Limited, a private sector multinational company collected up to 650,000 kg of milk per day from about 90,000 farmers in about 1600 villages in Punjab province. The success is due to the forward and backward linkages, i.e. the company provides free veterinary service and extension, breeding services, fodder production techniques etc. for quality milk production.
- *Poultry subsector:* Saguna Hatcheries Limited (SHL) and Venkateshwara Hatcheries Limited (VHL) are the leading ones in the Indian poultry sector in having a model of contract farming for production, marketing, processing and export of eggs and broilers.

Annex 8.3 Nepal: Agricultural diversification towards high-value agricultural commodities (Pokharel 2007)

In Nepal's economy, agriculture contributes about 38% of GDP in 2001 and 81% of the population is engaged in agriculture. Subsistence farming is a common practice. About 70% of the farmers are smallholders with average landholding of less than one hectare. Crop, livestock and horticulture is a typical farm characteristic in Nepal.

Agricultural diversification towards high-value commodities is a recent phenomenon in Nepal. The share of horticulture and other cash crops increased from 20% in 1985 to 27% in 2001, while the share of food grains declined from 37% to 34% during the same period.

The key issue in agricultural diversification towards high-value commodity is market integration that links farm production to the processors and then to the consumer market. The following are mentioned by the researcher as constraints to diversify Nepal's agriculture towards high-value commodities.

- Traditional orientation of farming and smallholdings
- Weak institutional base for contract farming
- Weak research and extension system, and low public expenditure on this system
- Low risk bearing capacity of the smallholders and absence of well-knitted insurance management
- Lack of essential infrastructure like irrigation, rural roads, rural electrification, price information
- Poor linkages between industry and commodities produced by farmers
- Lack of adequate credit.

Nepal's Government policy and programs on diversifying agriculture towards high-value commodities: With the intention to reduce rural poverty through increased income and employment, the Government of Nepal emphasized the need for agricultural diversification in its Eighth Five-Year Plan (1992–97) and the 20-year Agricultural Perspective Plan (APP) prepared in 1995 and executed since 1997. The plan targeted an annual growth of 5% in agriculture through promotion of high-value crops, agro-ecology related commodity development, and the development of rural infrastructure.

The agro-ecology related commodity development focuses on cereal crops for Terai region; high-value commodities like citrus, off-season vegetables, vegetable seeds, beekeeping, and the livestock raising in the hills; and the high-value crops such as apple, herbs, and yak cheese in the mountain regions. In support of the diversification process towards high-value commodities, there were interventions taken by the government of Nepal, including abolishment of agricultural subsidy since 1990, lowering import and export taxes on agricultural products, exempting agricultural income from tax, privatization of the public farms and companies.