

## Impact of rural poverty reduction strategies. The case of smallholders in Sierra Leone

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### Abstract

*The present analysis, which exploits one of the first empirical data collected from smallholders in Sierra Leone since the end of the civil war, compares the impact of two poverty reduction strategies targeting smallholders in Sierra Leone: support to rice production is compared with support to coffee and cocoa production in terms of sustainable income generation and contributing to macroeconomic stability and growth. Supporting rice production is intended to help the country regain self-sufficiency in its traditional principle staple. This will help towards improving food security and reducing dependency on volatile world market prices which, for example, with respect to the recent global spike has had dramatic effects on the lowest incomes.*

*Support to cocoa and coffee production on the other hand aims to create and increase income by producing exportable commodities with higher value added. This research addresses strategic options most successful in improving food security and accelerating economic development. Additionally, bottlenecks in terms of inputs, infrastructure and social and economic factors are identified and analysed in order to isolate those which once improved will impact most on productivity.*

*The results are discussed within a broader economic and socio-economic context in particular with respect to enhanced targeting and impact of Official Development Assistance.*

JEL-Classification: O1, Q1

Keywords: Agriculture, Poverty, Official Development Assistance, Sierra Leone

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## I. Introduction

Following the collapse of Sierra Leone's society and the economy during the 1991-2002 civil war, the country continues to suffer the consequences in particular with respect to poor institutions, markets, infrastructure and basic health care hampering development and poverty reduction. Furthermore, Sierra Leone being traditionally an agrarian society particularly suffered from the conflict through displacement from rural areas converging to the capital. Sierra Leone is now dependent on importations of its main commodity and exposed to high price volatility of world markets, which further exerts pressure on already very low incomes.

This paper presents the analysis of one of the first empirical data collected from smallholders in Sierra Leone since the end of the civil war, comparing the impact of two poverty reduction strategies targeting smallholders in Sierra Leone: support to rice production and support to coffee and cocoa production in terms of sustainable income generation and contributing to macroeconomic stability and growth. Supporting rice production is intended to help the country regain self-sufficiency in its traditional principle staple. This will help towards improving food security and reducing dependency on volatile world market prices which, for example, with respect to the recent global spike has had dramatic effects on the lowest incomes.

Support to cocoa and coffee production on the other hand aims to create and increase income by producing exportable commodities with higher value added. This research addresses strategic options most successful in improving food security and accelerating economic development. Additionally, bottlenecks in terms of inputs, infrastructure and social and economic factors are identified and analysed in order to isolate those which once improved will impact most on productivity.

After the introduction which briefly recapitulates both the economic and social context, the main part describes the agricultural sector, the agro-ecosystems and the smallholder characteristics which are then discussed along with the aid programmes in the empirical part. The conclusion summarises the main points observed and provides an outlook of future policy needs.

Three crops are of particular importance: Rice representing the staple food of the population and cocoa and coffee as main export commodities. Rain-fed rice can be grown in various agro-ecosystems all over the country. Currently, the country imports almost a quarter of the population's consumption, but the gap between production and consumption is decreasing as the country is moving closer to self-sufficiency. Since cocoa and coffee need a forest ecosystem, they are mainly grown in the Eastern part of the country.

Between 2005 and 2007 food production (cassava, rice, etc...) has steadily increased; the adequacy of food consumption rose from 56% to 71% and rice self sufficiency increased from 63% to 72% (Chaytor, 2009). The crop sub-sector (with rice, the national staple, as the dominant crop) generates more than two-thirds of the agricultural GDP (Sesay, 2008). The

production of roots and tubers (mainly cassava and sweet potatoes) exceeds the national nutritional requirement (Sesay, 2008).

Several factors, in particular limited access to local resources and inadequate infrastructure, contribute to the agricultural sector operating far below its potential, and consequently crop production still depends on farming by smallholders. These traditional subsistence farming systems are characterized by low input/output production with weak yields. Unsustainable farming practises and the inability to invest in economic activities render the farmers particularly vulnerable to remaining stuck in the poverty-trap.

The Government of Sierra Leone requested the use of the 8th EDF STABEX funds for the improvement of national rice production and the rehabilitation of cocoa and coffee plantations to achieve its food security goals and accelerate economic recovery. Most of the support provided by the projects is focused on increasing yields. In this context, understanding the relationship between agricultural productivity, farm income and rural poverty alleviation remains an important research topic that is particularly relevant to policy since it allows assessing and comparing the impact of development assistance strategies in view of a good utilisation of funds and resources.

## II. Characteristics of the agro-ecosystems and farm households

### Land

The climate in Sierra Leone is tropical wet. The dry season stretches from mid-November to April and the wet-rainy season from May to mid-November. Annual rainfall increases continuously from about 1 900 mm in the east to more than 3 300 mm on the coast (FAO, 1996). As Sierra Leone has an over-abundance of rainfall for half of the year, it leads to intrinsically leached poor soil (Sesay, 2008).

Land suitable for cultivation is estimated at 5.36 million ha or about 74 percent of the total land area. The arable lands in the uplands are estimated at 43,000 km<sup>2</sup> while about 90 percent of the lowland area is considered arable. The lowlands are differentiated in four ecosystems as summarised below:

Table 1: Major categories of land and land use in Sierra Leone

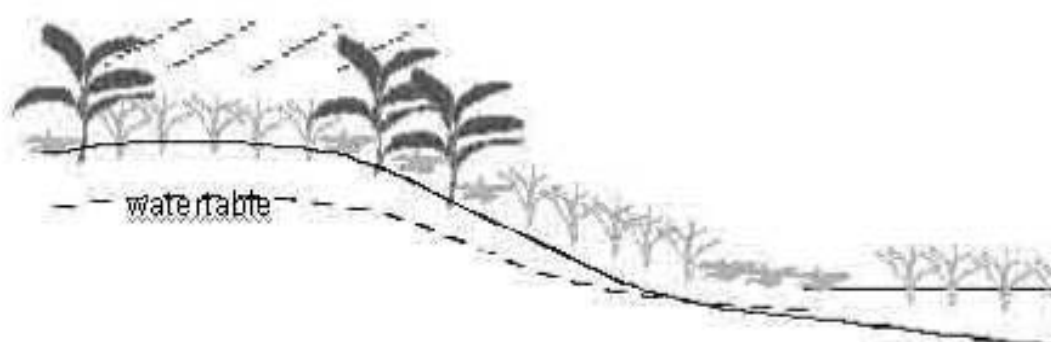
Ecosystem	Arable Land		Area Under Production Annually	
	ha (1000)	% Available Land	ha (1000)	% Arable Land
Upland	4,300	70.9	280	6.5
Inland Valley Swamp	630	91.3	100	15.9

Boliland	120	82.8	10	8.3
Mangrove Swamp	200	100.0	25	12.5
Riverain Grassland	110	84.6	20	18.2
<b>Total</b>	<b>5,360</b>	<b>74.1</b>	<b>435</b>	<b>8.1</b>

Source: UNDP/FAO, 1979 Land Resources Survey, 1979 (in the Agricultural Sector Review – Main Report – June 2004)

Moreover, the country has a total of 5 365 000 ha of arable land, which represents 74.1% of the total area of the country (MAFFS, 2001). Depending upon the topography, the arable land can be positioned between the continuum of two major types of agro-ecologies: the less fertile Uplands and the very fertile Lowlands, which comprise the inland valley swamps, the bolilands, the riverain grasslands and the mangroves (NASDP, 2009).

**Figure 1: The upland-lowland continuum**



Uplands	Hydromorphic slopes	Lowlands
<i>Main water supply</i>		
Rainfall	Rainfall + watertable	Rainfall + watertable + floodwater

Source: FAO, 2003

These lands represent the five main types of agro-ecologies or cultivable land in Sierra Leone, present all over the country and described below:

The Uplands account for more than 78% of available arable land and can be found all over the country. The soils are largely feralitic and highly leached with low fertility. It extends from the savannah grasslands in the North to the tropical rain forests in the South and the East. The land is suitable for the production of food crops such as rice, cassava, maize, sweet potatoes, and vegetables. Tree crops such as cocoa and coffee are grown in the forest areas in the South and the East of the country.

The Bolilands are seasonally flooded plains that are found mainly in the central plains of the northern region, especially in the districts of Bombali and Tonkolili accounting for almost 3%

of the cultivable land. Although it is inherently poor in fertility it is suitable for large scale production of rice in the rainy season. Small scale household rice cultivation is widespread, but mechanized rice production is practiced.

The Inland Valley Swamps (IVS) are found across the country and account for almost 13% of the cultivable land. They are generally highly fertile. Rice is grown during the rainy season and vegetables, ground nut or cassava during the dry season when the water table drops but remains wet enough to allow the production of short duration crops. Some IVS are perennially flooded or at least remain wet enough to allow for the cropping of rice multiple times throughout the year. Thus intensive agricultural production of food crops is practiced, especially in the Northern region and in urban and periurban areas.

The Riverain Grasslands account for more than 2% of agricultural lands and are flooded in the rainy season. They are relatively fertile, and they are suitable for rice production. They are mostly found in the districts of Bonth and Pujehun in the southern region.

The Mangrove Swamps are estimated to cover almost 4% of the usable land. They are subject to sea water flooding during the rainy season. Fertility is moderate to medium. They are suitable for rice production. Mangroves are found along the coasts in the districts of Kambia and Port Loko in the north and in the districts of Bonth, Moyamba and Pujehun in the south.

The majority of the cultivated land is used for food crops, with mixed cropping being the common cropping pattern. Rice is usually the main crop in the mix with cassava, maize, millet, groundnut and sweet potatoes as the other crops that are present in varying proportions.

In order to provide a representative sample, 600 smallholders were interviewed during summer of 2009, reflecting the economic and social reality of the rural areas. Households producing coffee and cocoa in Southern Sierra Leone (Kailahun, Kenema and Kona) both upland and lowland rice in the North (Bombali and Tonkolili) were included.

According to the MAFFS (2005), the northern and the eastern regions are the most productive regions due to the larger areas under cultivation. The area allocated to rice production represents the largest area under cultivation. Between the two regions, the area dedicated to rice in the east represents three quarter of the north.

The estimated current yields of the major crops grown in Sierra Leone are relatively low compared to the African averages for the same traditional crops, with the exception of cowpea (Table 3).

**Table 3: Yields of Major Crops in 2008 in Sierra Leone compared with other countries**

Major Food Crop	Average crop yield in metric ton per hectare	
	Sierra Leone <sup>a</sup>	Africa <sup>b</sup>
Upland Rice	0,70	
Boliland Rice	0,72	
IVS Rice	1,58	
Riverain Rice	1,56	
Mangrove Rice	2,61	
All Rice Ecologies	1,43	2

Cassava (Upland Sole Crop)	6,37	10
Sweet Potato (Upland Sole Crop)	3,77	5-10
Groundnut (Upland Second Crop)	0,68	0,8
Maize (Upland Second Crop)	0,84	1-1,2
Cowpea (Upland Sole Crop)	0,49	0,1-0,4

Source: a) PEMSD, 2009; b) Raemaekers, 2001

## Land tenure

Rural land in Sierra Leone are owned by landowning families (extended families or lineages), with a leadership or chieftaincy structure that plays an important administrative and custodian role. While chiefdoms vary in size, boundaries can disagree upon. The extended family or community are tied to specific areas within chiefdom.

The chiefdom is divided into plots belonging to each extended family. These family plots do not increase over time as the family becomes larger and larger, and consequently, the descendants of each subsequent generation inherit increasingly small parcels within the family plot. This "parcellation" leads to the reduction of the size of the nuclear family's field and may cause a shortage of land.

The most important role in land matters is held by the paramount chief who can have significant influence over the sharing of land even for members of landowning families.

The significant role of the paramount chief has grown in importance after the war, when many displaced and strangers are attempting to access or re-access lands. As is the case in many postwar scenarios, this "return" is complicated, and is linked to issues of: restitution, squatting, one's land being occupied for years by others (thus potentially qualifying for any "adverse possession" claim in a land or property law), conflict, and issues of legitimate or illegitimate claims, as well as food security. The paramount chief has an important role in deciding which claims are valid and presiding over disputes. Since their return the chiefs have become quite aware of their enhanced role in governance, but also aware of the social changes that have occurred in their chiefdoms during and after the war (Jon D. Unruh and Harry Turray (2006) for the FAO).

## Household composition

A typical household is composed of 6.5 persons (NRDS, 2009). The household head is generally male. A woman can be the head only if there is no male in the household. The number of female-headed households in rural areas has increased (Sesay, 2008).

Generally, the household and farming tasks are shared out according to gender and age. Men deal with the occasional tasks that are particularly physically demanding (such as the cutting down of a tree, for example), while women, helped by children, are in charge of the more regular tasks such as maintaining the plot, weeding, etc (field observations). Women produce 60% of food crops and handle processing and storage (Sesay, 2008). When a large amount of labour is necessary (e.g. rice), farmers of a same village may group and take turns working on each other's fields. Lately, one observes a shortage of labour due to the exodus of young people to the big cities. In the northern region, this labour shortage means that farmers are unable to harvest the entirety of their crop, and are obliged to leave part of their crop in the fields.

The plots in a household are shared out too. The male head of household is responsible for most of the family plots and for feeding the family. His plots are considered to be the family

capital. The spouse is generally responsible for one of the smaller plots, deciding the use of her plot.

### Farming practices

The "bush fallow" shifting cultivation system predominates. Almost 80% of the cropped land is found in the uplands (MAFFS & MFMR, 2004). All the major food crops are cropped through this system and up to 15 different crops (sorghum, millets, maize, peas, groundnuts and other grain pulses, cassava, sweet potato and vegetables) are traditionally grown in mixed stands, with rainfed upland rice dominating, being grown by 96 percent of farmers (FAO, 2005). Even though this traditional system of farming has served the people well for centuries, increasing population pressure and falling soil fertility are necessitating a reevaluation of the system. The government would like to discourage this system and it is in favour of a higher value permanent cropping system with more sustainable tree crops and food crop intercropping (NSADP, 2009).

Intercropping is the main system that is adopted by the upland farmers due to lighter labour input requirements and gender/age division of responsibilities, risk minimization, improved pest and disease management and availability of food over a longer period of time. Risk minimization is given priority over profit maximization, which characterises most of the African smallholders farming systems.

In this mixed crop system, the major crop is rice. The ratio of rice to other crops is approximately 3:1 (MAFFS & MFMR, 2004). Intercropping is carefully coupled with relay cropping. Cassava has become the second food crop in terms of importance. It is grown both for its tubers and its leaves. Sweet potatoes, groundnuts and vegetables are always grown in varying proportions, mostly for family consumption, although these two last can be used by women as cash crops for family income (Sesay *et al.*, 2004). Cassava and sweet potato are substitutes for rice for many households in Sierra Leone. (NSADP, 2009).

### Crop-mix

Rice is the main staple crop for over 90% of the population in Sierra Leone and is grown by almost 80% of all small-scale farming households. The rainfed rice cultivation ecologies include the uplands and the various lowland systems.

In the uplands, rice is grown on mixed plots in the first year following clearing of the bush fallow. Upland "slash and burn" cultivation includes many stages before harvesting and storage, and the overall labour requirements for an entire cycle of these cropping operations amount to 185 man-days/ha on average (MAFFS & MFMR, 2004).

The lowlands are cropped with rice on a more permanent basis, although some shifting cultivation is practiced on these lands as well. A second crop, normally groundnut and/or vegetables, is grown during the dry season, generally on a small portion of the plot. Lowland labour requirements for swamp rice-cropping amount to 309 man-days/ha on average (MAFFS & MFMR, 2004).

The high potential of crop production in the lowlands is generally well known to farmers. However, because lowland cropping does not allow for crop diversification and has higher labour requirements, farmers attach more importance to the upland plot, maintaining the lowland plot only as a complementary part of the farming system. So its allocation is requested as a minor component of the overall farm holding and utilised for the production of marketable surpluses.

After a crop cycle of 2-3 years, the land is then left to lay fallow in order to regenerate organic matter, soil structure and nutrients. Due to the increasing population pressure resulting from the traditional land tenure system, changes in the economic situation and technological progress, the bush fallow intervals have progressively shortened from an average of 20 years in the 1960s to a mere 4-7 years currently (NSADP, 2009).

Forms of more permanent cropping are practiced for the tree crop plantations in the eastern uplands and for the food crop plantations in the relatively more fertile lowlands, mainly in the north. Tree crop plantations in the eastern part of the country constitute the bulk of agricultural exports and of the domestic edible oil supply

The tree crops of major economic importance are oil palm, coffee and cocoa. Oil palm is considered as a subsistence crop, while coffee and cocoa are grown only for export. Large-scale plantations are not common and the majority of farmers have undertaken tree crop plantations with holding sizes ranging from 1 to 5 ha. The tree crop plantations are developed under natural vegetation shade. In general, the old plantations that were abandoned during the war are rehabilitated, instead of new planting crops. Thus, cocoa and coffee plantations, mostly grown in the forest ecosystems that are predominant in the Eastern part of the country, tend to have low productivities. In the northern part, priority is given to palm oil trees but also to citrus, mango and other fruit trees.

Only minimal processing of the cocoa beans takes place within the country before export. First, the farmers leave the beans to ferment for 5-6 days either on the ground or in big rattan baskets. Then, the beans are left to dry and finally they are bagged. Small-scale farmers do not have access to mechanical hullers. As for the processing of coffee, the berries are sun-dried and the beans hulled manually in the main growing areas. The bulk of palm oil is processed traditionally with a labour-intensive and low-efficiency system.

### Farming system

Most farm operations are carried out using rudimentary technologies such as hoes and cutlasses.

Farm labour is expensive for the farmers: the daily salary for a man is 6000 SLL<sup>1</sup>. Thus the household depends largely on family labour.

The use of yield increasing technologies is very low. Fertilizer use amounts to 4 kg/ha, which is very low when compared to the 9 kg/ha for Sub-Saharan Africa (NSADP, 2009). Most farmers rely upon the natural fertility of the soil since fertilizers are usually either unavailable or unaffordable. The use of improved planting materials and production methods is also low (FAO, 2005), especially for cocoa and coffee (low densities, age of the orchards, use of old cultivars, lack of maintenance, inadequate cultivation methods, etc.).

Estimations show that the average post harvest losses can reach 40 percent (MAFFS, 2009b; NSADP, 2009). This number can be even higher for perishable crops such as vegetables, fruits, cassava, and sweet potatoes. In fact losses for these crops can sometimes rise above 50% (MAFFS, 2009b). Poor handling, poor transportation and poor storage facilities are the main causes of this high rate of losses. This problem is due to lacking control of produce harvested and the need to add value through processing, something that is impossible because the agro-processing facilities in the country are almost non-existent (MAFFS, 2009b).

### III. State of development and aid-effectiveness

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<sup>1</sup> Approximately 1,5 US\$



Crop production is characterized by low yields and productivity and occurs in a setting severely deprived of institutional facilities (FAO, 2005). Nonetheless, Sierra Leone is naturally endowed with sufficient land, water, human resources and favourable climatic conditions necessary to enable the agricultural sector to contribute highly to economic growth and food security. The slow growth of the sector may therefore be attributed to the interplay of several factors influencing the farmers' behaviour and farm productivity.

The low use of purchased input, including tools, seeds and technology is largely due to widespread poverty among the farming communities. The lack of purchasing power and the inadequacy or ineffectiveness of government support programmes through extension services and to some extent the slow pace of adoption of improved technologies by farmers have contributed to the poor performance of the sector (NSADP, 2009).

The typical farmer exhibits a very poor knowledge (FAO, 2005) and most of them have poor access to agricultural financial services. Lending to agriculture is generally low. Small farmers are generally disadvantaged due to lack of collateral (i.e. land possession, NSADP, 2009) which is usually demanded by lending institutions. Although some NGOs provide micro-credit facilities these services are few and the amount provided is usually too small for any meaningful investment in production. Coupled with this is the unavailability of improved technologies (NSADP, 2009).

Bad or inexistent roads, particularly feeder roads, make access to the villages and the farms difficult, especially during the rainy season. This constraint faced by service providers to the sector contributes to inefficient delivery of support services to the farming communities. Moreover, the bad state of the overall road network restricts access to major markets (FAO, 2005). Output markets are underdeveloped. Most farmers depend on occasional markets or middlemen for the sale of their produce. Farm-gate prices are therefore low and post harvest losses due to spoilage high. Facilities for value addition are inadequate. Processing facilities for most commodities are either not available, inefficient or not accessible. The quality of produce such as cocoa and coffee is usually affected as a result of poor processing technologies and methods.

In 2005, the Government of Sierra Leone, in its effort to achieve its food security goals and accelerated economic recovery, requested to use the balance of the 8th EDF STABEX funds for the rehabilitation of tree crop plantations and for rice production. The project targeted 9500 farmers.

The support is focussed on rice production and marketing in two the Northern districts of Bombali and Tonkolili, and includes targeted support to rice production, processing and marketing, and the strengthening of farmers associations and of local extension services. The project is entrusted to Action Aid International - Sierra Leone.

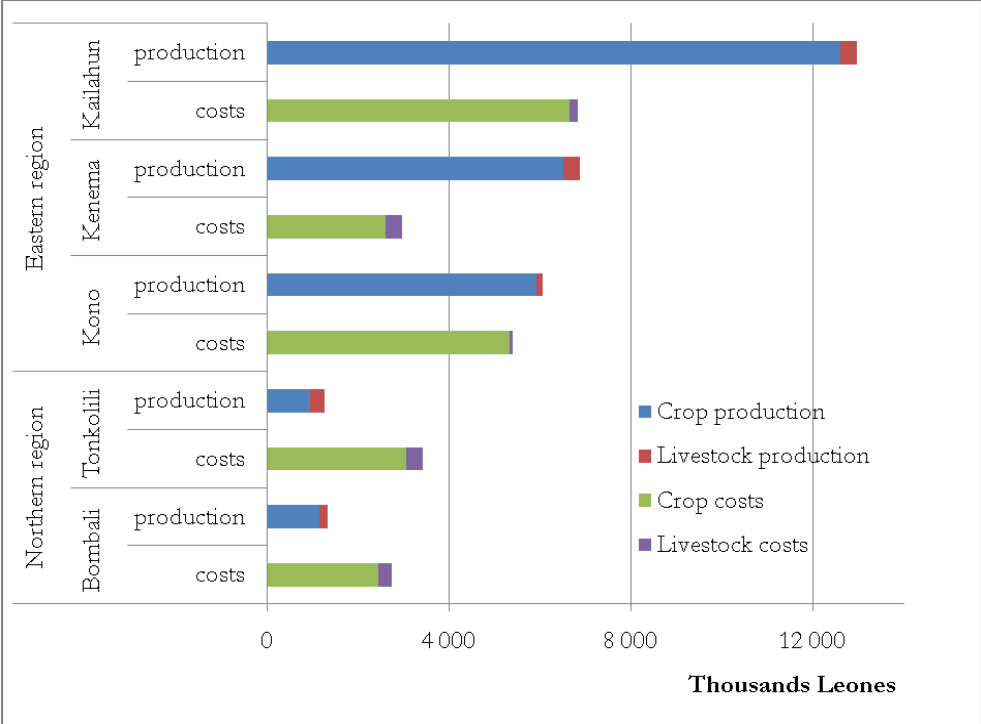
The project worked with 9500 farmers on improving the livelihood of farming households through improved rice productivity and postharvest activities (ActionAid, 2009). More specifically, objectives and activities targeted increasing rice production through training, rehabilitation of storage and drying facilities, improve marketing and transport. Concerning cocoa and coffee, the objective was to raise the income and to improve the well-being of farming households through improved production and marketing of cocoa and coffee in the districts of Kenema, Kailahun and Kono (Eastern Province). Low investment interventions with high labour components should be favoured. Considering the international market situation, the priority was placed on support to cocoa production. The project was implemented by the German NGO Welthungerhilfe. The project worked with 3500 farmers on

(Welthungerhilfe, 2007) aiming increasing production through training, rehabilitation of plantations, improving marketing and quality and strengthening farmer associations.

Data was collected in three stages from March to November to coincide with the farm production calendar. The multiple visit interview schedule adopted in this study is expected to improve the reliability of the information provided by the respondents. Because of the high illiteracy rate and the culture of not keeping farm records, it is expected that the shorter the memory recall period the higher the accuracy of the information provided. Interviews were held with household heads in their respective villages at times convenient to the respondents, usually in the morning or evening hours.

Figure 2 provides an overview of the aggregated relationship between costs and production in the different districts:

**Figure 2: Production and costs for smallholders by district (truncated averages evaluated using sample average prices)**

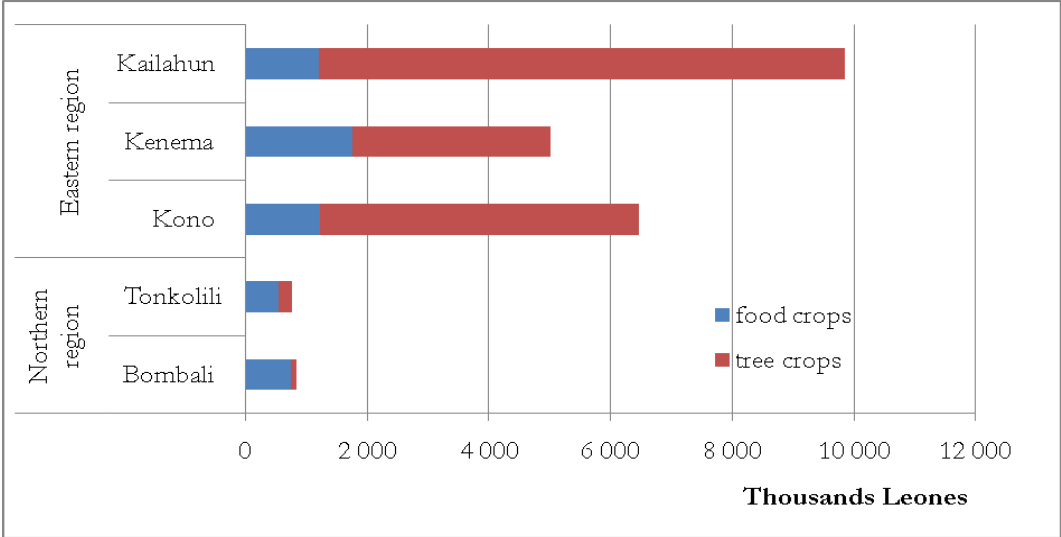


The value of livestock production is marginal relative to the value of crop production, regardless of the district. The value of production is much higher in the Eastern region than in the Northern region, with Kailahun standing out in the Eastern region. The average household in Kailahun produces twice as much value as their counterparts in Kenema and Kono, which in turn produce four times as much as the average households in Tonkalili and Bombali. The value of production outweighs costs in the Eastern region, with the opposite being true in the Northern region. In Kailahun and Kenema, the ratio of the value of production to costs is roughly 2 to 1, whereas in Bombali and Tonkalili, the same ratio is 1 to 2. Households in Kono more or less break even.

In the following sections, we decompose production and costs into their crop and livestock components.

Figure 3 focuses on crop production, distinguishing between the food crop and the tree crop components.

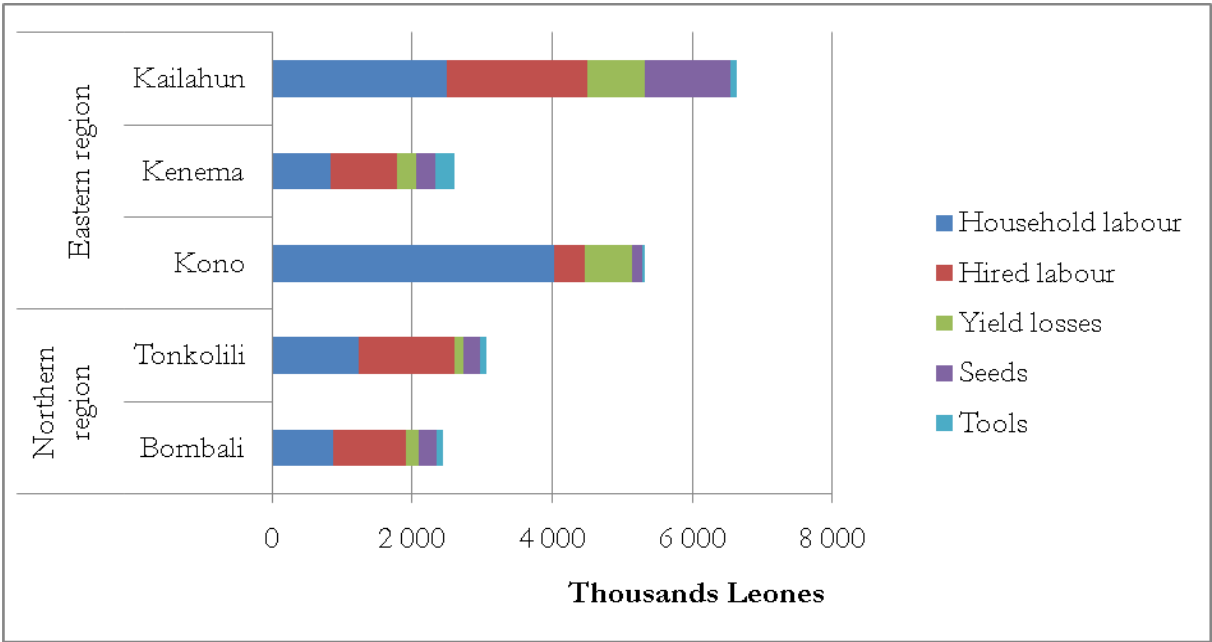
**Figure 3: Composition of crop production for smallholders by district (truncated averages evaluated using sample average prices)**



Tree crop production is essentially concentrated in the Eastern region. Households in the Eastern region produce more tree crops and more food crops (roughly twice as much) than their counterparts in the Northern region.

Figure 26 focuses on the cost side of crop production, decomposing production costs into yield losses, household labour, hired labour, seeds and tools.

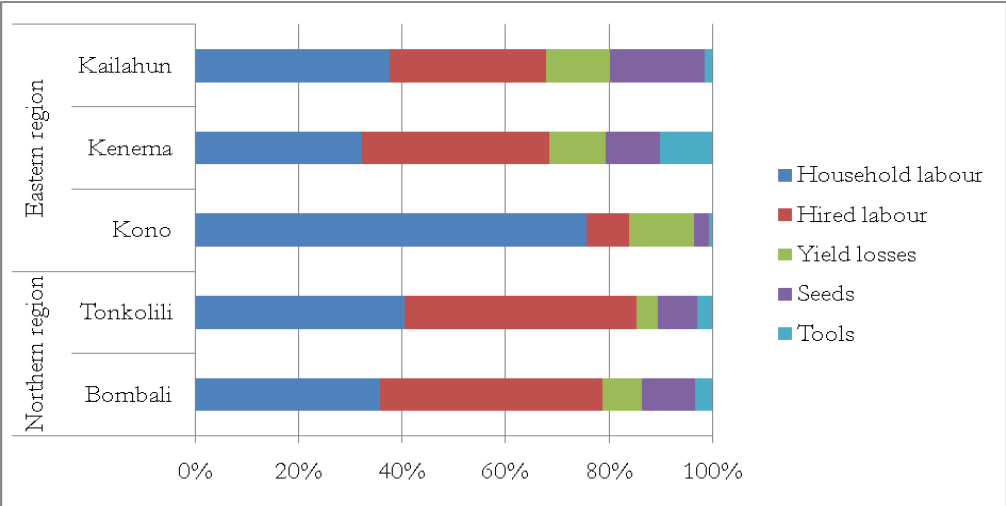
**Figure 4: Composition of crop production costs for smallholders by district, in Leones (truncated averages evaluated using sample average prices)**



This graph helps to appreciate the absolute size of costs the smallholders face in the five districts. Note that whereas yield losses and household labour can be considered as opportunity costs, the purchase of hired labour, seeds and tools will give rise to (some) cash payments (part of the payments are also made in kind). Consequently this graph potentially provides us with an idea of the average cash needs of households.

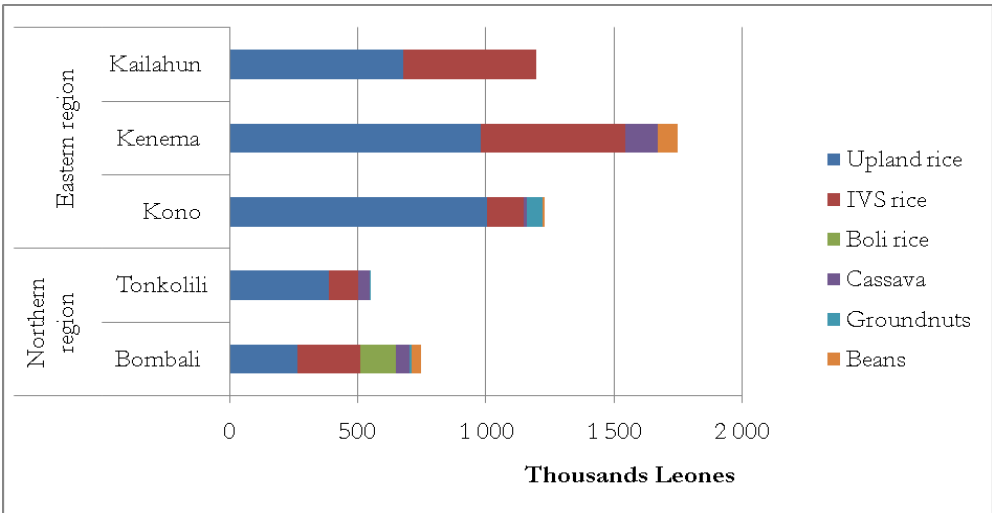
In order to compare the average composition of production costs across districts, the same information is presented below:

**Figure 5: Composition of crop production costs for smallholders by district; in percentages (truncated averages evaluated using sample average prices)**



Labour costs account for around 80% of production costs in all districts. The overwhelming importance of household labour relative to hired labour stands out clearly in Kono. In the four other districts the household only provides about half of the labour needed (Figure 6):

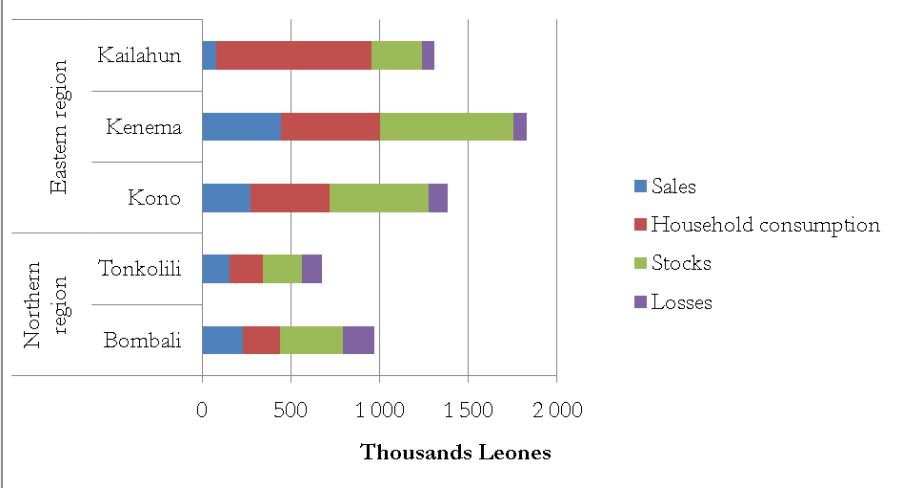
**Figure 6: Composition of food crop production for smallholders by district (truncated averages evaluated using sample average prices)**



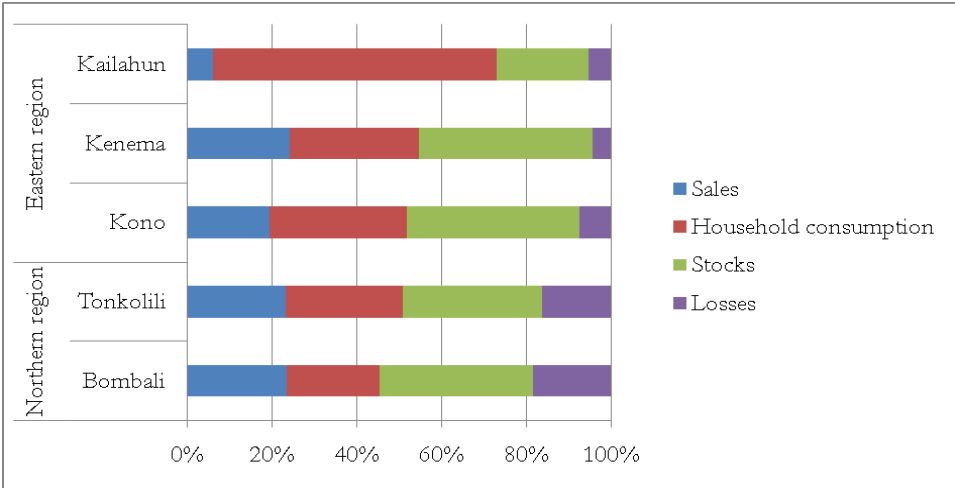
Rice makes the big bulk of food crop production in all districts. Upland rice accounts for a bigger share of food production than IVS rice, and Boli rice is cultivated only by households in Bombali.

Figure 7 and Figure 8 present the allocation of food crop production to yield losses, household consumption, sales and stocks.

**Figure 7: Allocation of food crop production for smallholders by district, in Leones (truncated averages evaluated using sample average prices)**



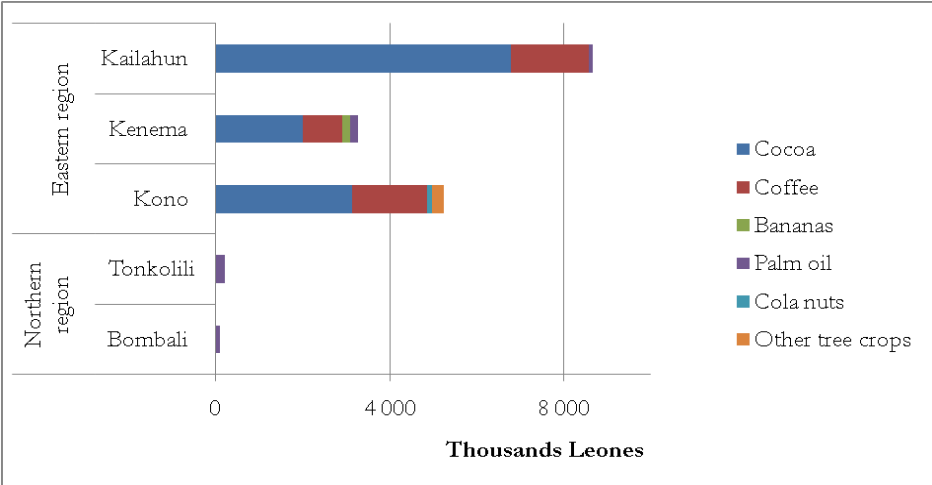
**Figure 8: Allocation of food crop production for smallholders by district, in percentage points (truncated averages evaluated using sample average prices)**



The households in all of the districts except for Kailahun seem to present a broadly similar profile in terms of food crop production allocation. The four districts sell and consume similar proportions of their productions. Households in the Northern region suffer roughly twice as much yield loss as households in the Eastern region, which weighs down on their household consumption and the levels of their agricultural stocks. Finally, households in Kailahun consume about double the consumption in the other districts.

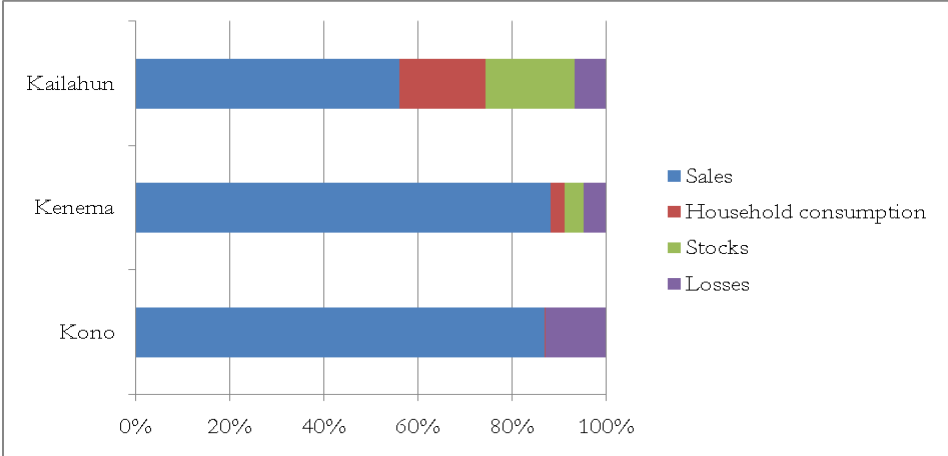
Question 9 focuses on tree crop production, identifying the different tree crops cultivated on average by the households in the different districts.

**Figure 9: Composition of tree crop production for smallholders by district (truncated averages evaluated using sample average prices)**



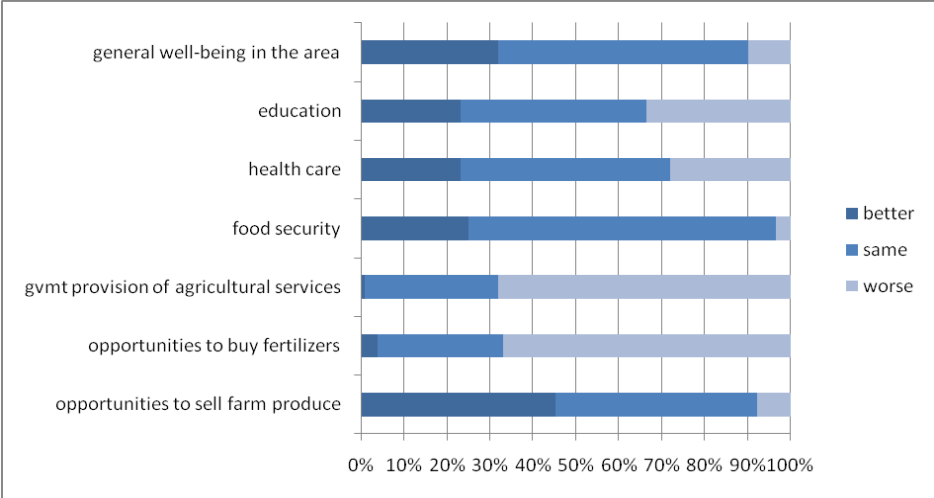
Very little tree crop production takes place in the Northern region. Cocoa production makes up the bulk of the tree crop production, with coffee production making up most of the rest of the tree crop production.

**Figure 10: Allocation of tree crop production for smallholders by district, in percentages (truncated averages evaluated using sample average prices)**

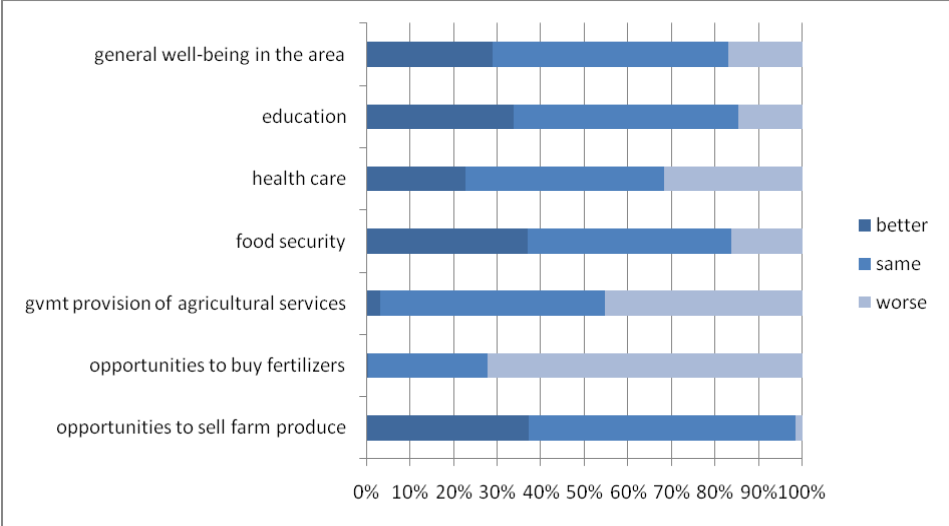


The figures indicate that tree crop production is primarily destined to be sold, with Kenema households consuming and stocking roughly 5% of the whole, and Kailahun households consuming and stocking roughly 20%. In Kono, households do not consume or stock any of the tree crop production.

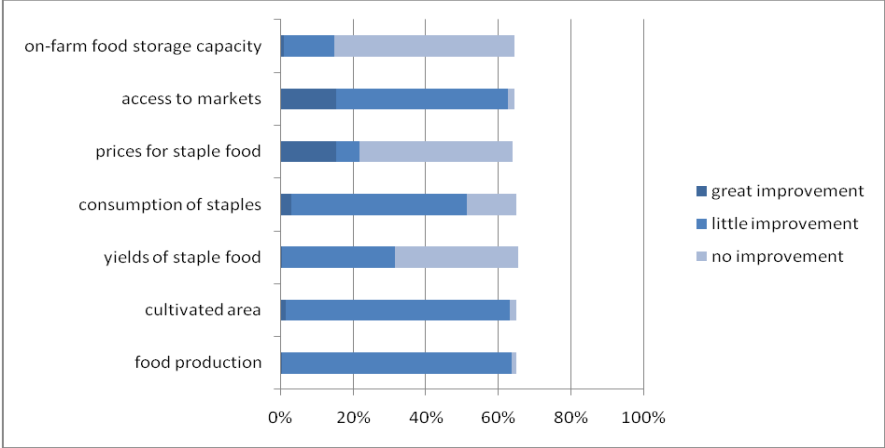
**Figure 11: Changes in different areas of development during the last two years in the Eastern region**



**Figure 12: Change in different areas of development during the last two years in the Northern region**

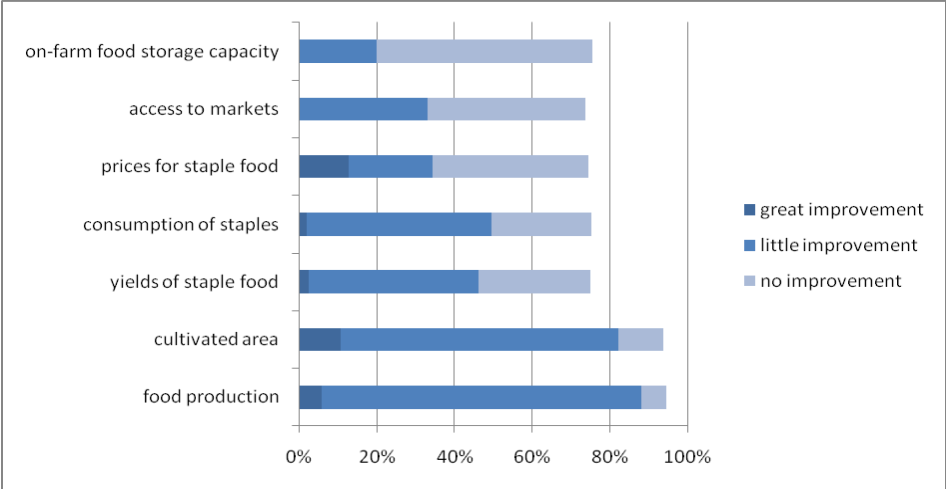


**Figure 13: Impact of support on different aspects of food security in the Eastern region**



In the Eastern region, the results are mixed. The lowest impact is observed for on-farm food storage capacity, followed closely by prices for and yields of staple foods. The highest impact is observed for access to markets, followed closely by cultivated area and food production.

**Figure 14: Impact of support on different aspects of food security in the Northern region**



In the Northern region the results vary relatively continuously from on-farm food storage capacity with the lowest impact to cultivated area and food production with the highest impacts. In the both the Northern and the Eastern regions, the highest impact observed is a consensus of “little improvement”; a “great improvement” is only experienced by less than 15% of the sample and only for a couple of the aspects under consideration.

Overall, the general well-being in both the Eastern and the Northern regions seems to have improved in the sense that more respondents claim that the situation has improved than the opposite. This overall sense of well-being seems to be driven by similar improvements in food security and in opportunities to sell farm produce. On the other hand, government provided services (agricultural, educational and medical) seem to have deteriorated (except for education in the Northern region) in the sense that more respondents claim that the situation has gotten worse than the opposite. The same is also true for opportunities to buy fertilizers.

**IV. Conclusion**

Two sets of conclusions may be drawn from the preceding statistical analysis and evaluation of the different projects: The first set of conclusions summarizes the statistical analysis of the smallholders in the Northern and Eastern regions. The second set of conclusions addresses the nature of the aid provided to the smallholders in these regions.

The smallholders in the Northern region are primarily dependent on food crop production for their livelihood. They are involved in some non-farm activities and some livestock breeding, and they receive some income from friends and relatives, but these non-farming sources of income are limited and only relevant to a small minority of smallholders. The main food crop is rice, supplemented by an assortment of other crops destined mainly for household consumption. Rice has not proven to be an income generating activity.

Smallholders in the Eastern region are involved in food crop production on a scale that is similar to food crop production by smallholders in the Northern region, but in addition they are also involved in tree crop production, namely coffee and cocoa production. Contrary to the production of rice, the production of coffee and cocoa is relatively profitable on average. In addition, the constraints facing smallholders in the Eastern region are not as harsh as those facing smallholders in the Northern region. The non-farming income is more substantial and relevant to a bigger proportion of the population in the Eastern than in the Northern region. Consequently household income in the Eastern region is more diversified. Moreover, even



though rice remains unprofitable, it is less marked in the East as yields are higher and costs are lower than in the Northern region.

These characterisations of smallholders in the Northern and Eastern regions raise a couple of issues that point to potential improvements that could be made to similar surveys in the future. One very striking result is the magnitude of losses involved in rice production, regardless of the region. Three factors contribute to these losses: Firstly, the market price for locally produced rice is very low, approximately half that of imported rice. Apparently this is due to the fact that households are prioritising immediate cash returns and therefore do not negotiate prices according to market reality. Here there is some room for improvement in terms of education and information: Understanding price formation on the market for rice could give smallholders the confidence they need to hold out for higher prices, and knowledge of market prices could give smallholders the information they need to know where to sell their rice for a better price. Given the good mobile phone coverage that already exists in the Northern region, mobile phone ownership could provide some leverage on this point. Secondly, labour productivity is low. Indeed the tools that are used by the smallholders remain very basic. Many smallholders do not have access to proper drying floors. Consequently, rice production is hugely intensive in labour. Thirdly, stakeholders in the field agree that yield loss could amount to between one-third and two-thirds of production. One widely cited cause of major yield loss is the absence of land preparation. These numbers contrast strongly with the smallholder's own much smaller estimates of yield loss. This discrepancy suggests a certain level of unawareness of the smallholders regarding their losses, and point to another area of possible intervention.

The second issue in this context is how these losses are compensated financially, i.e. alternative sources of income and cash calculations. Income from livestock is quantified, but other sources of incomes such as non-farm income, gifts and remittances are merely counted and ranked, but not quantified. Similarly to previous issues, education and awareness-raising can potentially improve the situation. During the survey additional elements that play a key role in the livelihood of smallholders have emerged. For example, for smallholders receiving significant sums in remittances, a mechanism designed to facilitate transfers could probably provide an important structural improvement to their situation. Moreover, one of the key aspects of vulnerability is the degree of income diversification. In the absence of sufficient income diversification, smallholders well-being evolves along with the price of its main crop. Another important issue revealed through the survey was the units of monetary and non-monetary flows: From an analytical perspective, only monetary units allow certain calculations, but a large part of values, both on production and cost sides, are seldom exchanged in cash. On the production side, household consumption falls into this category and on the cost side, household and even a significant proportion of hired labour falls into the category. The survey revealed the common practice to pay hired labour in meals and very little in cash. The way that the information is collected in the survey does not allow us to identify the cash component.

Finally, the strikingly different shares of yields and costs shown by cocoa and coffee production in the Eastern region stands out as major result of the survey. As already mentioned, this could be explained by differing densities of tree crop plantations and in direct relation to the density of the tree crop plantations, the overgrown size of the trees resulting from the lack of pruning. During the field visit, it became very clear that both inappropriate farming practices and labour constraints contribute to this situation of low productivity. It became clear that plantations need to be rehabilitated in order to recover higher levels of productivity.

Regarding the aid provided to selected smallholders, the amount provided was deemed insufficient. Consequently, smallholders only report a small improvement in production and

in income as a result of this aid. Regarding expected sustainability, tools and seeds are the two items that were considered to be the most sustainable elements. In addition, training and information provision is also considered in the same light in the Eastern region, a bit less in the Northern region. These results strengthen observations made above on low labour productivity resulting from low mechanization and low educational levels.

To conclude, this study allowed us to identify the following two main areas of intervention. First, there is a clear need for training in yield loss minimisation and in marketing. Smallholders need to be aware of the productivity potential of their land and to understand what they can do to achieve this potential. This involves learning about land preparation, pruning, shading, etc. Smallholders also need to be aware of the market potential of their production. This involves learning about price formation. Second, in order for training to be operational, communication needs to be improved so that the required information is made available to smallholders. Smallholders need to know the prices in the different markets in order to make decisions regarding where and when to sell their production. Facilitation of mobile phone ownership would contribute to achieving this objective. Additionally, it could also contribute to the facilitation of capital transfers.

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