Essay on Development Policy

Constraints and Opportunities for Horticultural Smallholders in the Nacala Corridor in Northern Mozambique

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Abbreviations

AfDB	African Development Bank
AGROWAM	Wholesaler Association Nampula
CEPAGRI	Centro de Promoção da Agricultura
DPA	Direcção Provincial da Agricultura
DUAT	Direito de Uso e Aproveito da Terra
FDD	Fundo de Desenvolvimento Distrital
GDP	Gross Domestic Product
IIAM	Instituto de Investigação Agrária de Moçambique
INE	Instituto Nacional de Estatística
JICA	Japan International Cooperation Agency
MZN	Mozambican Metical
PARP	Plano de Acção para Redução da Pobreza
PEDSA	Plano Estratégico para o Desenvolvimento do Sector Agrário
RESTA	Wholesale Market Nampula
SDC	Swiss Agency for Development Cooperation
SDAE	Serviços Distritais de Actividades Econômicas
SPER	Serviços Províncias de Extensão Rural

1. Introduction

In the light of the Nacala Development Corridor[1] program the consumption of horticultural products in Nampula Province in Northern Mozambique has been constantly rising in recent years at the main urban markets in the cities of Nampula and Nacala. Despite these encouraging end-market conditions the estimated 20.000 commercially oriented horticultural smallholders cultivating an area less than 1 ha play a minor role in the horticulture value chain in the Corridor[2]. They are largely uncompetitive in terms of price, quality and seasonal availability against the estimated 300-400 local medium and large-scale producers and products from other Mozambican regions or abroad, above all from South Africa.

The horticultural smallholders face various problems which impede the upgrading of their production. These consist of, inter alia, limited access to agricultural inputs, irrigation water and technologies as well as weak support service markets concerning financial and extension services. Therefore, the present work analyses the major constrains horticultural smallholders face in order to identify upgrading opportunities in the value chain.

In a first step the paper outlines the conceptual framework, i.e. value chain structure and dynamics. Based on these explanations, the second part illustrates the role of smallholders in the horticulture value chain before analyzing their major constraints. As only limited data is available on the horticulture sector in Northern Mozambique, the main source of information is a baseline study which was elaborated with support from the author in mid-2013 for the SDC financed project "Horti-Sempre" implemented by Swisscontact and GFA Consulting. The data set includes a comprehensive quantitative survey with 248 horticultural producers, a market analysis and qualitative interviews with key stakeholders across the horticulture value chain.

The last part of the paper presents opportunities and recommendations for horticultural smallholders in the Corridor on how to the upgrade their production in terms of quantity and quality in order to satisfy the growing market demand and increase their income.

[1] In 2000 the governments of Mozambique, Malawi and Zambia formed the Nacala Development Corridor to improve access to the natural deep harbor in the Mozambican town of Nacala with investments in infrastructure and to lever development by attracting large-scale investments in the mining, tourism and agricultural sector.

[2] The term *Corridor* is used in this paper for the section of the Nacala Corridor in Nampula Province covering the districts – from W to E – Malema, Ribaue, Nampula, Meconta, Monapo, Nacala-Porto and Nacala-a-Velha.

2. Conceptual Framework: Value Chain Structure and Dynamics

This chapter briefly introduces the value chain concept starting with an overview over the structure of value chains, before outlining their dynamic components.

2.1. Value Chain Structure: Stakeholders, Institutional Framework and Support Services

The value chain represents an analytical concept first introduced by Porter in 1985 to illustrate all the "*activities that are performed [by a firm] to design, produce, market, deliver, and support its product*" (Porter 1985:36) with the objective to analyze the sources of competitive advantage at each stage where value is added to the product. Porters important distinction between primary and support activities shows that the greatest value is often added in support services rather than in the direct physical transformation of the product (cf. Kaplinsky/Morris 2001:7).

Whereas Porters concept is limited to the intra-firm level, modern value chain analysis follows a broader understanding. A common definition of value chains provide Kaplinsky/Morris (2001:4) as "*the full range of activities which are required to bring a product or service from conception, through the different phases of production, delivery to final consumers, and final disposal after use*." This includes all stakeholders that add value to the product, from input suppliers to producers, traders and end market buyers.

The core value chain is always embedded in an institutional environment generated beyond or with limited control of the value chain stakeholders, also labelled as "*enabling business environment*" (Albu/Griffith 2005:12). These norms, customs, laws, policies, public infrastructure, etc. either facilitate or hinder the flow of products or services along the value chain, e.g. due to high transaction costs or by causing entry barriers for stakeholders not complying with the rules.

Support services such as financial, technical, or quality assurance services represent another crucial element in a value chain as they allow the firm to grow and maintain competitiveness. Support services can be distinguished into governmental services, fee-based services, and embedded services as part of a commercial transaction of another product (Albu/Griffith 2005:14).

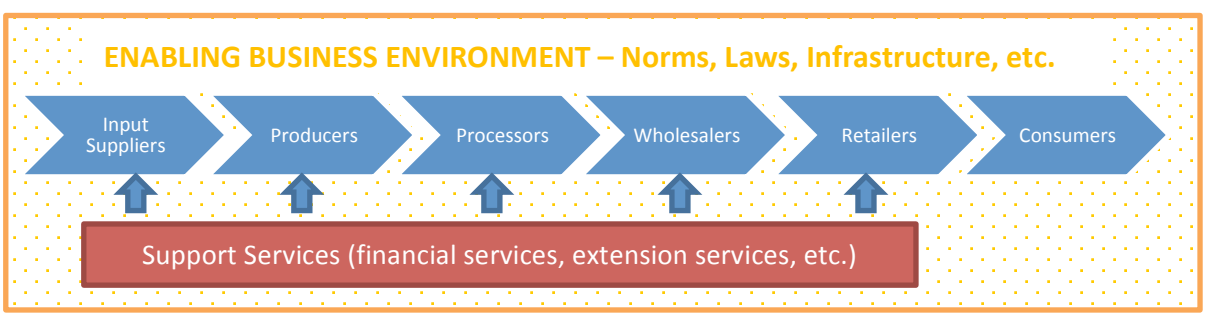

Fig. 1: Value Chain Model (own illustration based on Kaplinsky/Morris 2001; Albu/Griffith 2005)

2.2. Value Chain Dynamics: Governance and Upgrading

Besides structural components, value chains also consist of dynamic components which are crucial to understand constraints and opportunities for value chain stakeholders in improving their competitiveness. One dynamic feature of value chains is governance, i.e. how the interactions and relationships between value chain stakeholders are organized. Frederick/Gereffi (2009:3) state that governance "*relates to the ability of a stakeholder to determine, control, and/or coordinate the activities of other actors in the value added chain. At any point in the chain, a firm (or organization or institution) can set parameters under which others in the chain operate.*"

This indicates that power asymmetries play a crucial role within value chains, as powerful stakeholders create entry barriers by setting standards for suppliers to be met. The standards are set within the value chain by lead firms (e.g. quality, price, delivery reliability, etc.) or outside the value chain within the enabling business environment (e.g. environmental standards, labor laws, etc.) and may be formal or informal. Hence, depending on the kind of standard the compliance is monitored internally and externally by formal or informal stakeholders or institutions.

If not meeting the standards, a value chain stakeholder faces sanctions up to the exclusion from the value chain. Kaplinsky/Morris (2001:30f) argue that a proactive form of governance is necessary which provides assistance to value chain participants in meeting these operating rules. This is what Frederick/Geraffi (2009:3) call *supplier capability* which depends on their access to support services. If supporting markets are not available, suppliers rely more heavily on buyers to meet the set of rules and standards.

The second important dynamic component of value chains is upgrading, which means investments made by firms to achieve higher levels of efficiency. It is possible to upgrade processes or products but also to change the mix of activities or move to other value chains. However, from an analytical perspective upgrading depends on various firm external factors which facilitate or impede this process such as clear end-market opportunities, the enabling business environment and supporting services (Campbell 2008:3).

3. The Role of Smallholders in the Horticulture Value Chain

3.1. Horticultural Smallholders in the Corridor

In Mozambique family based small-scale agriculture remains the main income generating activity. About 3.2 million smallholders account for 95% of the countries agricultural production representing 29.8% of GDP in 2011 (FAO 2014; World Bank 2013). From the estimated 850.000 smallholders in Nampula Province (INE 2011:15) around 200,000 are (semi-)commercial horticulture producers out of which an estimated 20.000 sell at least a part of their produce in the Corridor on its main urban markets (Swisscontact 2013a:13)[3]. These farmers represent the core of the analysis and are primarily located close to the road and railway line that runs from Malawi to the port town of Nacala. Hence, the geographic area hereinafter referred to as the "Corridor" encompasses the area from the hilly Western districts Malema and Ribaue to the Eastern lowland districts Nampula, Meconta, Monapo, Nacala-a-Velha and Nacala-Porto in Nampula Province.

These 20.000 horticultural smallholders cultivate on average an area of 0.25 ha and generate an average gross income of only 272,- USD/year[4] (Swisscontact 2013b). Their production is focused on a limited range of crops mainly onion, tomato, cabbage, pepper, kale and lettuce.

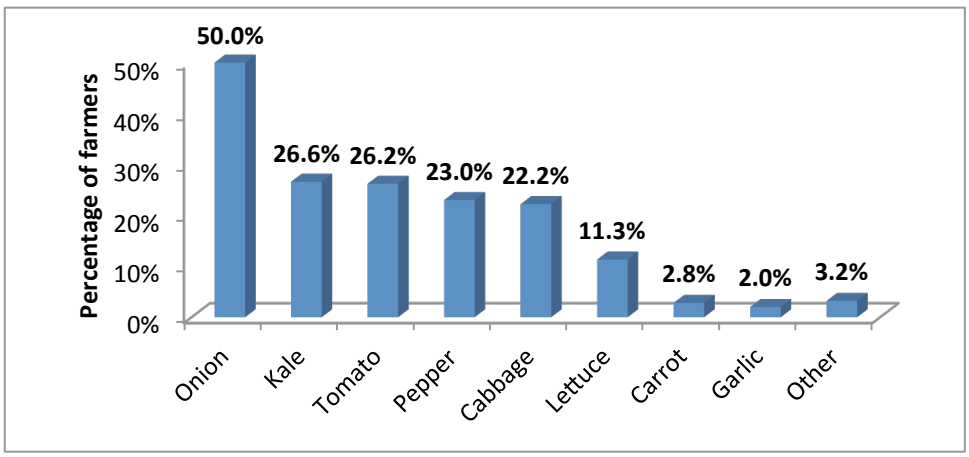

Fig. 2: Crops cultivated by producers in the Nacala Corridor (Swisscontact 2013b)

In the tropical climate of Northern Mozambique local horticulture production is currently limited to the dry cold season approximately between March and August and drops in the humid hot season approximately between September and February (Swisscontact 2013b). In general, productivity is low with an average of 4.8 t/ha for tomato and 7.2 t/ha for onion, well below the ideal commercial productivity of 45-65 t/ha and 35-45 t/ha respectively (FAO 2013).

[3] The remaining majority of horticultural smallholders live in remote rural areas trading in local and frequently informal markets generally characterized by low prices and quality (Swisscontact 2013a:13).

[4] The gross income was calculated as total revenue from horticulture production minus direct production costs for inputs (seeds, fertilizer, pesticides, gasoline, etc.) and contracted labor and services.

3.2. The Horticulture Market

Local production is not meeting the growing demand for horticultural produce that can be explained by the increased urbanization in the Corridor and the high income elasticity of vegetables (cf. König et al. 2008:viii). A huge wholesale market in Nampula City called RESTA functions as trading hub for the Northern Mozambican provinces distributing the majority of locally produced and products from other provinces or abroad. An estimated 15.000 – 20.000 tons are commercialized annually in the Corridor, whereas trade is dominated by five crops accounting for almost 90% of the market volume: potato (26,9%), butter beans (23,6%) cabbage (17,9%), onion (9,4%), and tomato (9,0%) (Swisscontact 2014).

Within the Corridor only onion production is competitive thanks to production clusters in the Western Malema district. But around half of the tomatoes, most cabbage and almost the totality of potatoes are coming from outside the Corridor, either from the Mozambican Provinces Maputo, Tete and Zambezia or being imported from South Africa and Malawi (see Fig.3).

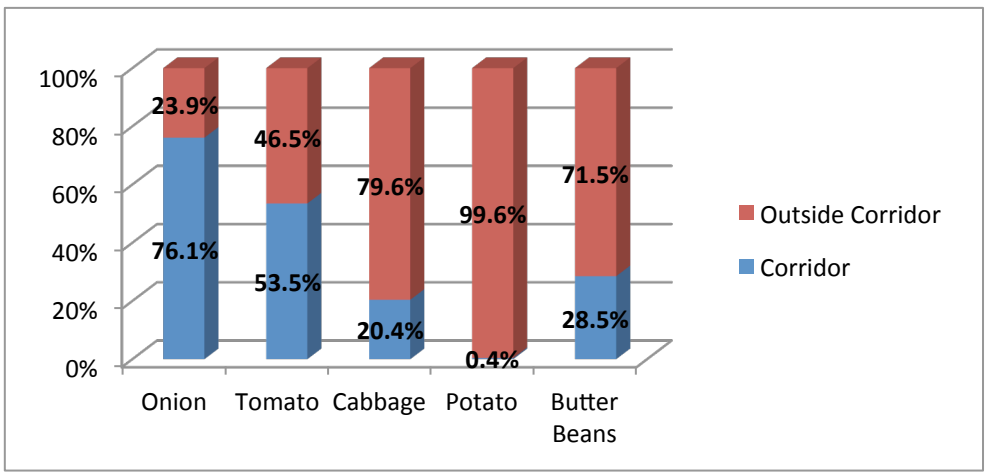

Fig. 3: Origin of products traded at RESTA in 2013 (Swisscontact 2014)

Therefore, horticultural smallholders in the Corridor are not only in competition with the estimated 300—400 local medium and large scale producers, but also with producers from other provinces and abroad.

3.3. Value Chain Structure

Stakeholders: The first links in the value chain are the input suppliers offering a limited range of products (seeds, fertilizers, pesticides, etc.) and agricultural equipment. They are mainly concentrated in Nampula City and to a lower extend in district capitals but also operate as ambulant agents on local markets in the communities.

Even though horticultural smallholders in the Corridor are located near by the major transport routes, transporting their products to the main urban markets is still linked to high transaction

costs[5]. Hence, 63.3% sell their produce directly on the field or transport it only to the community market where intermediary traders organize the transport to the wholesale market RESTA in Nampula City (Horti-Sempre 2013b).

The majority of wholesalers at RESTA market is organized in an association called AGROWAM that also buys directly from producers. Further, the wholesalers possess storage facilities and are responsible for grading, sorting and repacking. Retailers buy the vegetables and sell them to institutional clients[6] or directly to end consumers on one of the urban markets or as ambulant vendors (Horti-Sempre 2013b).

Support Services: Technical assistance is delivered mainly by public extension services, NGOs or informally by neighboring farmers. Financial services providers such as agricultural banks or micro-finance institutions exist in the Corridor but do not offer services for horticultural smallholders (Swisscontact 2013b). Only limited public funds for agriculture are available such as the District Development Fund (FDD). Supporting research in horticulture, e.g. on new varieties, is done by public institutions such as the Mozambican Institute for Agricultural Research (IIAM).

Enabling business environment: The business environment for small-scale horticulture producers in the Corridor is characterized by a government focusing on agricultural development. Its current Poverty Reduction Strategy 2011-2014 (PARP) and its Strategy for Agricultural Development 2010-2019 (PEDSA) highlight the important role of smallholders. For 2014, the government aims to spend 10.5% of its annual budget – approximately 800 million USD – for agriculture. An additional 50 million USD are allocated to the 128 Mozambican districts in the form of the FDD, also to finance local agricultural development (GoM 2013). In the Corridor, the government launched the ProSavanna program, a trilateral cooperation between Mozambique, Brazil and Japan aiming at an intensive commercial cultivation of soya, maize and rice (cf. MINAG 2014).

Another aspect is the poor infrastructure in the Corridor resulting in high transaction costs. However, investments have already been carried out and the main road in the Corridor linking Nampula City with Cuamba in Niassa Province is expected to be fully rehabilitated in 2014 (Verdade 2012). Further, the standards at the urban markets are high in terms of product size, grade, quality, seasonality, etc. representing an entry barrier for smallholders into the market driven horticulture value-chain.

[5] On average 0,10 USD/kg transportation costs compared to an average farm gate price of 0.30 – 0.60 USD/kg (Swisscontact 2013b;Swisscontact 2014)

[6] Institutional clients encompass Hotels, Restaurants, Mining- and Construction Companies, Hospital, Supermarkets (only 1 in Nampula City offering vegetables), etc.

3.3. Value Chain Governance

The following table presents the annualized average prices for smallholders, at the wholesale market and for end-consumers and illustrates how added value is allocated using onion and tomato as an example:

Crop	Farm gate price		Wholesale price (including intermediaries share)		Retail price	
	USD/kg	Share Added value	USD/kg	Share Added Value	USD/kg	Share Added Value
Onion	0,31	31%	0,71	40%	1,00	29%
Tomato	0,61	41%	1,14	35%	1,50	24%

Table 1: Prices Horticulture Value Chain (Swisscontact 2013b; Swisscontact 2014)

The table shows that horticulture production has a strong income generating potential, as the producers share of the product value is relatively high. However, production costs are also high with a weighted average of 0,22 USD/kg for onion and 0,45 USD/kg for tomato. Subsequently, profits are low. Moreover, only 26.6% of horticultural smallholders are organized in associations and even if organized, 87.9% of the members of an association sell their products individually (Swisscontact 2013b). This results in low bargaining power with traders, especially if they buy directly on the field of the horticultural smallholder where access to information on markets and prices is limited.

In addition, horticultural smallholders have to comply with product standards and norms set by the market in order to enter the market-driven horticulture value chain. Retailers and wholesalers are mainly responsible for the respective standardization and specification of the products in terms of weight, grade, etc. Especially institutional clients set high standards in quality and demand "*fresh, clean, spotless vegetables with the right size and weight together with reliable daily delivery*".[7] This represents a major entry barrier for horticultural smallholders who are often not well trained in post-harvest handling. Here support services play a crucial role to upgrade the *supplier capability* in meeting these standards.

[7] Interviews with six institutional clients in the cities of Nampula and Nacala (Swisscontact 2013b)

3.4. Value Chain Model

The value chain model below focuses on the role of smallholders illustrating the relevant stakeholders, support services and enabling business environment in the horticulture value chain:

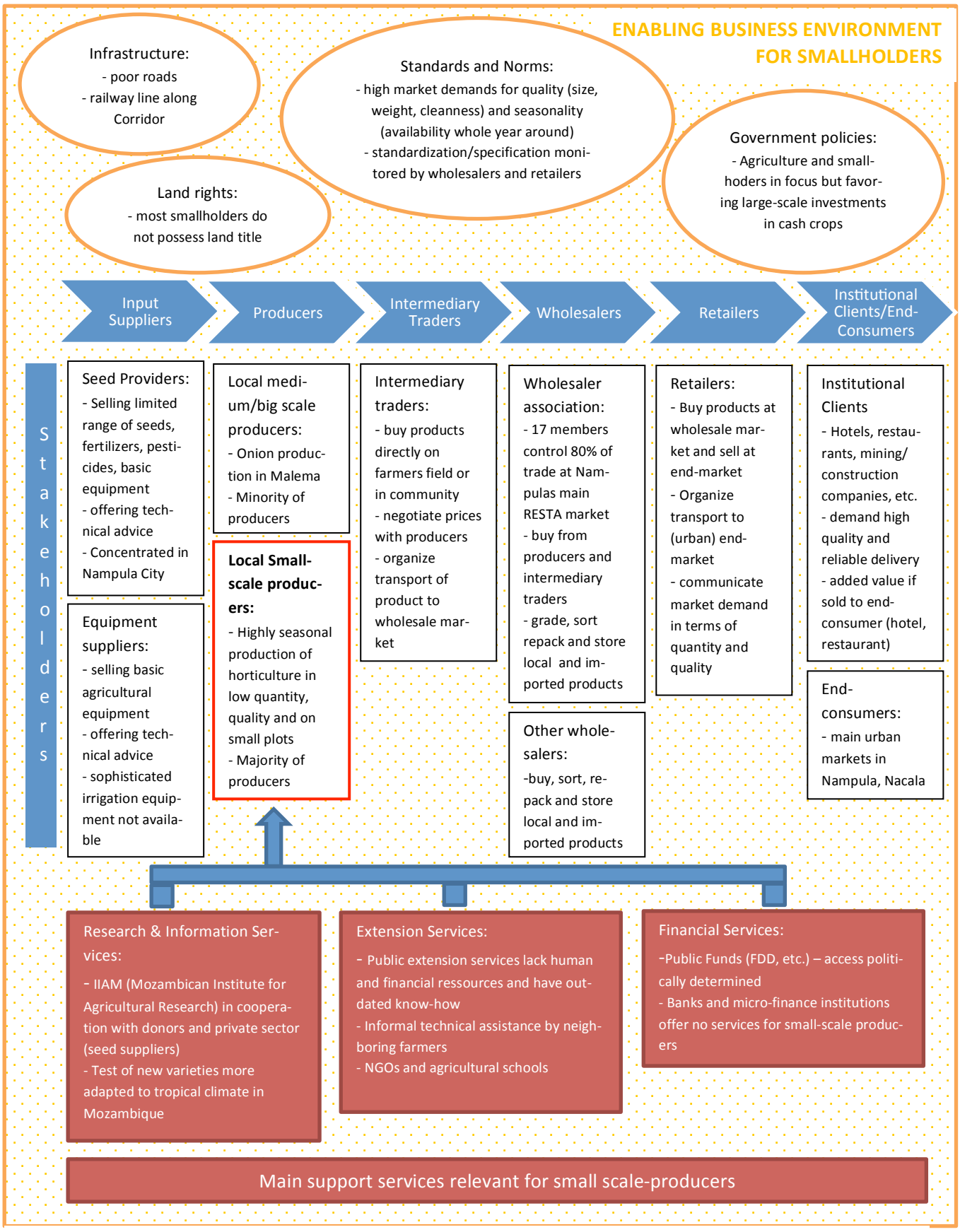

Fig.4: Horticulture Value Chain Model (own illustration based on Kaplinsky/Morris 2011; Albu/Griffith 2005)

4. Major Constraints for Horticulture Smallholder

The following section will discuss major constraints smallholders are facing with regard to the value chain model presented above.

4.1. Access to Inputs

Almost the totality of 95.6% of horticultural smallholders buys seeds. They mainly purchase quality seeds on the formal market with the exception of onion producers in Malema who almost exclusively cultivate the locally produced variety "Cebola Malema". Further, 87.9% of horticultural smallholders use fertilizers and 71.4% use pesticides, even though in small quantities (Swisscontact 2013b). This reflects the commercial orientation of the horticultural smallholders in the Corridor who invest in their production, as generally only a small number of smallholders use fertilizers (3.7%) or pesticides (2.5%) in Mozambique (INE 2011:80f).

The input shops are concentrated in Nampula City and in some district capitals. Hence, transaction costs to access inputs are high for smallholders in more remote locations. Further, the range of products and services offered is limited. For example 64.6% of horticultural smallholders use the pesticide Lamba-Cyalothrin that is actually used for cotton crops (Swisscontact 2013b). The available seed varieties – mainly imported from South Africa and Europe – are not adequate for the tropical climate in Northern Mozambique and only suitable for horticulture production in cold season (Swisscontact 2013b). The lack of adequate varieties hinders horticultural smallholders from extending their production into hot season and benefiting from higher market prices.

4.2. Access to Water and Irrigation Technologies

Only 49.2% of horticultural smallholders have a water source that guarantees water the whole year around. During the hot season many rivers that represent the main source of irrigation water dry up and only start to refill from November when the rainy season starts (Swisscontact 2013b).

Another major constraint for horticultural smallholders represents the lack of access to modern irrigation technologies. In the Western hilly districts of Malema and Ribaue irrigation is characterized by traditional gravity irrigation, whereas manual irrigation with buckets and watering cans dominates in the Eastern lowlands. Only 15.3% of the horticultural smallholders possess or have the capacity to rent a motor pump for irrigation (Swisscontact 2013b).

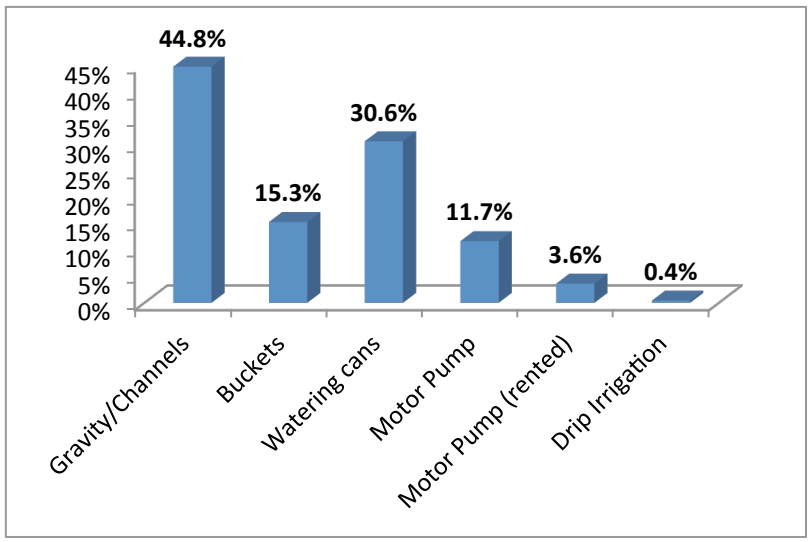

Fig. 5: Irrigation systems in use (multiple answers) (Swisscontact 2013b)

The relative absence of modern irrigation systems such as drip irrigation, sprinkler, etc. can be explained with the low capacity of investment of horticultural smallholders. The average annual net gross income is below 300,- USD combined with a lack of financial services to fill the gap.

4.3. Access to Support Services

Extension services do only exist to a limited degree in the Corridor and 51.7% of horticultural smallholders do not receive any technical assistance at all. If extension services are available they are mainly offered by the public institutions DPA on provincial and SDAE on district level as well as to a lower extent by NGOs. Another important source for technical assistance are neighboring farmers as highlighted in Fig. 6 below.

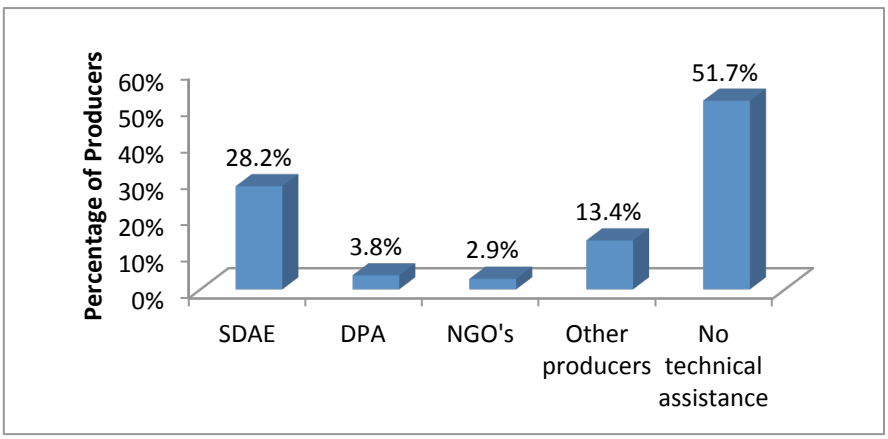

Fig. 6: Providers of technical assistance (Swisscontact 2013b)

Public extension services lack human and financial resources and DPA Nampula states that a "*network of public extensionists exists in the Corridor, but not enough to respond to farmers demand*"[8]. For example, the 90,000 smallholders in the districts of Malema, Ribaue and Nacala-

[8] Interview on 11 June 2013 with Eng. Ernesto Pacule, Head of Provincial Services for Rural Extension (SPER) at DPA Nampula (Swisscontact 2013b)

Porto (INE 2012a; INE 2012b; INE 2012c) are assisted by only twelve public extensionists and none of them is specialized in horticulture[9].

Only 1.2% of horticultural smallholders have access to finance and if so, only from public funds (Swisscontact 2013b). Banco Terra, the only commercial bank in the Corridor with a focus on the agricultural sector, provides loans only from 500.000,- MZN onwards (16.667,- USD).[10] Other institutions such as micro-finance banks that offer agricultural products require guarantees covering the amount of the loan. Given the low income levels, these pre-conditions hamper the access to finance for horticultural smallholders.

On the other hand, 36.6% of the horticultural producers are able to make savings with an average amount of 237,- US$ per year. The majority of savers (67.8%) keep their money at home, whereas only 18.9% bring it to the bank. This indicates that a culture of saving exists among smallholders, even though not well included in the formal banking system (Swisscontact 2013b).

4.4. Access to Markets

Market links seem to be already well established as 95% of the interviewed producers stated to horticultural producers sell their products to traders with access to the main urban markets in the Corridor. However, contracts – formal or informal – at not common and only 4.1% of horticultural smallholders have contracts with their buyers (Swissconatct 2013b).

Reliable transport routes only exist in the form of a railway line that links the port city of Nacala with Cuamba in Niassa Province close to the Malawi border as well as one tarmac road linking Nacala with Nampula City. The condition of the remaining roads including the one linking Cuamba to Nampula is still very precarious if not impracticable during the rainy season. However, in the course of the Nacala Development Corridor program this road is currently rehabilitated by the Government of Mozambique with support from JICA and AfDB and is due to be finished in 2014 (Verdade 2012).

In general the market system seems to work for the horticultural smallholders in Corridor as market links exist and demand for vegetables is growing. However, most smallholders depend on intermediary traders to sell their produce to wholesalers, also because the majority sells individually and only in small quantities not meeting the volumes requested by wholesalers.

[9] Interviews with representatives of SDAE Malema, Ribaue and Nacala-Porto (Swisscontact 2013b)
[10] Interview with representative of Banco Terra on 29 May 2013 (Swisscontact 2013b)

5. Conclusion: Opportunities and Recommendations for Upgrading

As market links exist and end-market demand exceeds local supply, horticultural smallholders primarily need a product upgrading to increase yields and product quality as well as decrease seasonality in order to realize significant economies of scale. To achieve this objective, smallholders depend strongly on other stakeholders in the horticulture vale chain and on improved support services.

Input Suppliers: First of all, input suppliers have to be encouraged in introducing horticultural varieties adapted to tropical climate but also widen their range of pesticides and fertilizers in the Corridor. In doing so, horticultural smallholders can generate higher yields and extend their production into hot season without high additional investments. Increased local horticulture production is an incentive for input suppliers as they would subsequently increase their sales.

Further, agricultural equipment suppliers need incentives to stock modern affordable irrigation equipment such as hand- or pedal pumps in line with the low capacity of investment of horticultural smallholders replacing manual irrigation with buckets and watering cans in the low lands.

Financial Services: For investments in sophisticated irrigation equipment such as drip irrigation or sprinkler systems, financial support services have to be improved. Public funds such as FDD as well as commercial banks only cover a limited area and primarily focus on medium to large scale farmers (Horti-Sempre 2013a:21).

Micro-finance institutions could fill the gap. Even though they are working primarily in areas where money is rotating fast (e.g. trade), specific micro-finance products taking into account the relatively short production cycles in horticulture and therefore easier predictable repayment periods could be a solution.

Technical Assistance: Public extension services are weak and horticultural smallholders are in need for innovative agricultural practices especially in post-harvest processes, e.g. cleaning, sorting and packaging of their produce. Besides increasing their yields, horticultural smallholders must also guarantee a product meeting market demands in terms of quality, size, grade, etc.

Embedded extension services could be a solution such as after-sales services offered by input suppliers or wholesalers supporting local horticultural smallholders to producing the expected quantity and quality. An incentive for wholesalers for example would be the saving in transport costs if not forced to import from South Africa during hot season.

Market Linkages: Even though market linkages exist, the majority of horticultural smallholders have no direct links to wholesalers. As selling individually and in small quantities, they need intermediary traders collecting the products and sell it in high quantities to wholesalers. Therefore, horticultural smallholders miss a potential benefit because of losing a share of added value to intermediary traders.

If horticultural smallholders have access to improved inputs and support services that allow them to offer the right quantities, quality and a reliable delivery, sustainable direct linkages with wholesalers could be established.

Business Environment: The business environment is generally favorable, as infrastructure is improving and there are no restricting laws such as fixed prices. However, horticultural smallholders should be supported in the bureaucratic process of acquiring land titles, as only 5.7% of horticultural smallholders possess a so called DUAT (Swisscontact 2013b).

In the light of the ProSavanna program, that is promoting intensive monoculture projects in the area, horticultural smallholders should possess legal security if large-scale farmers expand into their areas. Linking horticultural smallholders with these large-scale farmers (e.g. trough contract farming) will be difficult, as the program is focusing on the commercial cultivation of cash crops such as soya, maize and rice rather than vegetables.

In summary, horticultural smallholders in the Corridor have the potential to upgrade their production in order to play a stronger role in the horticulture value chain. However, only if inputs suppliers improve their range of products, financial services become available and technical assistance meets smallholders demands, they will be able to achieve the standards of quality and seasonality required by the market.

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