SOUTHERN AFRICA GLOBAL COMPETITIVENESS HUB

Technical Report:

Review of Vegetable Production and Marketing (Supply Chain Analysis)

INCREASING THE VALUE AND QUALITY ASSURANCE FOR THE FRESH VEGETABLES AND HERBS SUPPLY CHAIN TO SUN INTERNATIONAL HOTELS IN ZAMBIA

by

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Introduction

This report is aimed at establishing the requirements for implementing a program to link smallholder farmers who wish to supply high quality fresh vegetables and herbs to Sun International hotels in Livingstone, Zambia. Sun International hotels have indicated they are interested in purchasing quality produce from smallholders in the Livingstone area. The project is supported by USAID/RCSA through the ASNAPP project and USAID Zambia through the IDE Zambia project. The study will evaluate all the various factors that will contribute to the success of the project or constraints that need to be addressed if the project is to succeed.

Background Information and Description of Project Area

The farming system in place is mainly small scale crop production with maize (or sorghum) as the main crop during the rainfall season. Other crops produced may be groundnuts, sunflower, sweet potatoes. Livestock are reared with cattle as the major interest. The main horticultural crops produced by smallholders are tomatoes and brassicas (cabbage, rape) but most farmers regard horticultural production as a secondary activity coming towards the end of the rain season and producing crops for home consumption with a surplus for sale.

The smallholder horticulture sector in Zambia is relatively underdeveloped with few farmers specialising in fruit or vegetable production. Horticultural production is usually a secondary activity producing food for home consumption with surplus for sale locally or in nearby towns.

The producers of vegetable crops in Zambia can be categorised into small scale farmers (with below 5 hectares) and medium scale emergent farmers (with landholdings between 5 to 20 hectares) as well as large scale commercial producers. Small scale farmers produce vegetables mainly for home consumption with the surplus for sale to nearby markets. They usually have limited access to credit for inputs and have major problems getting their produce to markets because of limited transport and poor roads. They rely mostly on family labour and use simple implements like hoes and animal drawn ploughs. Due to limited capital for vegetable production, they tend to use cheaper open pollinated varieties that are not always disease resistant or adapted to warmer conditions. They also use limited quantities of fertilizers and agro-chemicals and therefore their overall productivity is limited.

Farmers have poor control or influence over the markets like the major urban markets where middlemen have significant influence and push prices down. Various attempts have been made to increase returns to the farmer and to improve access to markets. Several outgrower schemes linking smallholders to high value markets appear to be functioning successfully but most of these are located around Lusaka. These markets however tend to demand high levels of quality and consistency of supply that most smallholders are unable to meet.

Another problem faced by smallholders is that they usually have limited access to water for dry season cropping. This is a major limitation to increased productivity and extension of the growing season because rainfall is only from November to April and in agro-ecological region 1 the total is less than 800 mm. Farmers are compelled to

produce vegetables under rain-fed conditions which are conduc ive to high levels of pests and diseases. The main production period for vegetables is therefore after the rainfall season up to the time when ground water reserves dry up (from April to about August). This problem can be overcome by the development of irrigation facilities; however credit facilities and other initiatives to encourage purchase of low cost pumps are not readily available to most smallholders. This means that dry season production is confined to perennial water sources or wetlands (dambos). Some smallholder growers however have tried to specialise in vegetable production due to the higher profit levels and they tend to be more responsive to extension advice and market demands and they are more willing to invest their own resources (e.g. they buy pumps with their own money).

Crop Production Factors

Observations:

Livingstone is located in agro-climatic region I and the 30 year mean annual rainfall is 763mm, although it is important to note that this is a drought-prone area. The coolest months are June and July, which have minimum temperatures of about 6 ^{o}C and maximum temperatures of about 25 ^{o}C. Frosts do occur although the incidence is not high with about 4 days when there is likelihood of frost. The warmest months are September and October (just before the start of the rainfall season) when the mean maximum temperatures get to about 32 – 34 ^{o}C.

As indicated earlier the main cropping season for horticultural crops is from late March as the rains decrease and the field crops start to mature. Sowing takes place until about June when there is less planting because of reduced water availability. Some farmers, especially those who have access to perennial water, will plant vegetables over a longer period.

Farmers who were interviewed indicated they had problems getting good quality seed. They indicated that some seed vendors sell mixed material or material with poor germination. They sometimes travel to urban areas to buy seed and one group even indicated they travel as far as Bulawayo in Zimbabwe to buy vegetable seeds. A visit to several seed suppliers revealed that the main varieties sold were the old varieties such as Copenhagen market (cabbage) or Nantes (carrot) or Texas Grano (onion). Seed companies do have improved hybrids for sale but theyare usually more expensive and they normally sell them only if they have a specific order.

Due to lack of training and due to the fact that smallholders are risk averse, they usually apply inappropriate agronomic practices. A good example is that farmers will only apply a compound fertilizer to the crop after they have transplanted it. They do this because they do not want to waste any fertilizer and so need to make sure the crop is well established. Unfortunately this technique results in the plant being unable to utilise all the fertilizer and so growth is poor. It is recommended to place fertilizer in the planting hole a few days before transplanting so that it is placed nearer to the root system of the growing plant.

Another reason for reduced fertilizer use is that although farmers are aware of the benefits of fertilization, they do not have money to buy adequate fertilizer for the crop

and so may reduce the actual application rate. Most farmers do not own their own vehicles for transporting inputs or produce. Any purchases they make such as fertilizer will have to include costs of public transport to get the goods home. Plant nutrition is further enhanced if well decomposed organic matter is added. The use of manure will reduce the need for fertilizer and will also improve overall soil condition. Unfortunately it has been observed that many smallholders do not properly compost their animal manure and organic matter and so the manure they do apply is less effective. Another problem is that many farmers do not have livestock and the overall livestock numbers have decreased due to disease epidemics that occurred in the Zambezi valley.

Farmers face major problems when it comes to disease control. This is due to inadequate training and also due to insufficient funds to purchase proper crop chemicals. There is widespread awareness of the benefits of pest control chemicals and most farmers will use them in one form or another. Farmers indicated that the main constraint to the use of chemicals is the lack of funds to purchase them. It should be noted however that there is frequent inappropriate use of chemicals. The main problems observed were the inability to measure out the correct dosage, lack of spraying equipment or poorly maintained sprayers and wrong diagnosis of pest or disease problem or control remedy. It has been reported for example that growers sometimes use chemicals used in dipping livestock for controlling diseases and pests in their gardens.

Discussions with agronomists, extension personnel and farmers revealed that the main pest problems were red spider mite and the leaf blights in tomatoes. Nematodes may also be a problem although they were not observed in the field. Rape, cabbage and other brassicas may experience pest problems like aphids and leaf pests that are usually easy to control but may carry viruses. The more serious problems can be found with fusarium, a soil borne fungal wilt and black rot, a bacterial infection in cabbage. Weeds were also observed in some farmers fields (where harvesting was almost complete) and efforts should be made to control them if a good crop is required.

Discussions held with marketers indicate that some grading takes place and there may be a price differential. Produce may be graded according to stage of maturity (ripeness), freshness, size and colour. It was observed however that the retail selection at the market was not strictly divided into various grades. The marketers implied that the requirement for different grades changes according to scarcity and sales technique. Grading has turned out to be a contentious issue where there are outgrower schemes for export vegetables. Many growers have been reported not to be happy with regrading (at the exporters packhouse) and subsequent lower prices for their produce.

Harvested produce are packed in either wooden boxes or plastic crates or in large polypropylene bags (that usually hold or carry 50 or 90 kg grain). Very little produce is stored because the practice is to harvest and sell immediately. There may be temporary storage at the homestead and this may be due to lack of transport on the day of harvest.

Constraints:

A major constraint that growers face is access to reliable water for cropping. The rainfall pattern can be very variable and this affects available water since most smallholders rely on streams and shallow wells for irrigation. The availability of reliable water supply and the use of water pumps and pipes are essential for the successful implementation of this project.

Another very important requirement is the introduction of Integrated Pest Management and Integrated Crop Management techniques for efficient and sustainable crop production. Although the climate is good for year round cropping, the rainfall period encourages disease outbreaks and the problem is that growers are not controlling diseases effectively. During the cool season (May to July) there are lower temperatures and so the growth rate is reduced and crops take longer to maturity and some crops e.g. green beans are difficult to grow.

Inputs for crop production are not a major constraint because they are available from a number of suppliers in Zambia. Problems may occur because of costs or accessibility since many growers are located far from major urban centres like Lusaka where most inputs would be found.

There is a major requirement for training and extension support to the farmers. This is mainly due to the fact that most agricultural development activities including extension and training are aimed at the main staple crops like maize and very little is aimed at supporting horticultural production. This project is proposing a significant change to the current seasonal production system to having year round vegetable production and it is important to have good training and extension support so the farmers adapt to the new production system.

Recommendations:

The question of water for irrigation has been addressed in the selection of IDE as a partner in this project. IDE has extensive experience in the design and implementation of small scale irrigation systems. It is also important to make it a requirement that any grower interested in participating in this project should have a reliable water source. This component is therefore not expected to be a major constraint in this project.

One of the project objectives aims to introduce year round vegetable production so as to ensure continuity of supply. This will be achieved by three main activities.

- Development and implementation of a cropping programme designed to produce high quality vegetables all year round. An association of growers who will divide the different crops and growing periods amongst themselves will implement this programme.
- Introduction of agronomic techniques for cropping during different times of the year. This will include the use of disease resistant varieties for summer production. Bolting resistant onion varieties for summer production and high dry matter onion varieties for long term storage under farmer managed conditions. The selection of varieties with short growing periods so that a three season rotation can be fitted into one year.

- The use of protected cultivation (growing under plastic) to reduce disease severity during the rainfall season and to improve growing conditions during the cool winter period. The improved growing environment will result in extended harvesting and high yields from a small area. The productivity of the growing houses will be further enhanced by application of crop nutrients in the irrigation water. In order to reduce costs the greenhouse structures will be of a simple low cost design.

Agronomic practices to improve water use efficiency need to be implemented. Irrigation using buckets is intensive manual work and so this operation may not always be efficiently carried out. Growers may over irrigate during cool periods and under irrigate during hot periods. There is need to consider other soil and water management practices like the use of mulches. Visits made to farmers' fields did not reveal the use of mulches as a regular agronomic practice and yet if growers did apply a mulch to the soil, they could reduce their water application rates by as much as 50%.

The participants in this project will need to receive training in Integrated Pest Management and in Quality Assurance systems. Training will have to be approached carefully and one possibility is to use the farmer field school approach. This is where the farmers attend a weekly session on a specific subject and then immediately implement what they have learned. Training usually takes place in the field and will follow the crop's life cycle. This may require the cooperation of a few lead farmers who will take the risk of having the initial crop but it has the advantage of being practical, targeted and there are no delays in implementation of the project.

Marketing Factors

Observations:

The marketing system in place is mainly that of direct marketing by the farmer at the farmgate or at a wholesale market. The farmer has to transport the produce to the market and he has to negotiate a price with the buyers although price is usually determined by supply and demand. There is also some marketing at specific institutions like hotels and lodges but this is the exception rather than the norm. The farmers use public transport to ferry their goods and some may carry their produce on foot or by bicycle. Some farmers indicated that they do hire pick-up trucks once in while and this is usually done when a group come together to share the costs of hiring a vehicle.

The traders and market vendors interviewed said that not all produce is sourced locally and they often go to other towns to look for vegetables during times when produce is in short supply. They said they go as far as Choma, Mazabuka or even Kapiri Mposhi over 400 km away. Long distance truckers who will ferry the produce for a fee usually transport produce sourced from outlying areas. Sometimes the train is used. The objective is to get the cheapest form of transport. It was also observed that once the produce arrives in Livingstone, it may take several days before all of it is sold. This is usually the case with slightly less perishable produce like sweet potatoes or tomatoes.

There are some growers who sell their produce in other countries through informal routes. Farmers in the Kazungula area (about 70 km west of Livingstone) grow a large quantity of tomatoes and leafy vegetables since they have abundant water. Traders then come across from Botswana and buy produce from the farmers and take it across the Zambezi in canoes for sale in towns like Kasane.

The number of market outlets that farmers currently use however is limited to one or two and this reduces the growers' marketing options. This is made worse by the fact that most growers do not investigate price and market trends before sending their produce to the market due to limited means of communication. A number of outgrower schemes do exist where the farmers sign contracts with a larger organisation that will market the produce on their behalf. These schemes are found mainly around the Lusaka area and there are none in Livingstone.

Constraints:

One of the biggest problems facing smallholders as they market their produce is the absence of cheap reliable transport. Many farmers use public transport such as buses. These are limited because they do not service all areas where farmers are located and so farmers have to carry their goods some distance to a bus stop. They are not always roadworthy and when they breakdown there is a risk that the perishable cargo may deteriorate. There is also the problem of damage in transit due to rough roads or rough handling or inappropriate packaging. When bicycles or carts are used the problem is the limited quantity that can be carried. Not many transport entrepreneurs are involved in ferrying horticultural produce because traders and farmers are worried about cost.

When transport is limited, the crop may need to be stored for a few days and no proper storage facilities were observed. This may be a problem because without storage, the farmer may lose some produce or may be forced to sell at low prices.

Another problem that was observed was the poor state of packaging used to carry produce. The wooden boxes were usually not well constructed and so may not adequately protect the product. The large bags used do not also provide good protection. This leads to the problem of downgrading of the produce when it arrives on the market due to bruising. This will need to be addressed if the client is to be satisfied that he is receiving a high quality product.

An issue that needs to be clarified is that of grading and quality standards. It was mentioned several times that some outgrower schemes have problems because of differences over grading standards. This project will need to look carefully at how standards are to be implemented. Many quality parameters are intrinsic and are related to the product itself. There are some instances of blemishes that do not affect eating quality but their presence will not be acceptable to the client. The product may exhibit poor shelf-life characteristics or poor eating quality characteristics. The client may have requirements different from the norm, such as baby vegetables and growers need to learn to adapt to the needs of the client. The other quality parameters relate to the delivery system and growers need to learn to supply the correct quantity at the correct time and the ability to be reliable is an important marketing tool.

A major constraint that is likely to come up is that of pricing. The client will have a set of requirements that need to be met in order to be satisfied with the arrangement. However, the grower also has his objectives and this includes earning a good income from his endeavours. If the price is not satisfactory then the farmer may be tempted to divert his produce and sell it elsewhere. This could happen because there is a wide fluctuation in prices over time and there may be times where the price is more attractive elsewhere (due to seasonality of production leading to gluts and shortages). This will lead to the breaking of contractual arrangements and can jeopardise the project.

Recommendations:

There is no easy way to get transport arranged for the growers. This is because it is a major cost item and can affect the final pricing of a crop. One approach would be to encourage transport entrepreneurs to consider moving vegetables. If these transporters have access to cheap loans to improve the viability of their businesses they may be willing to consider long term contractual arrangements with the growers. The advantage for the transporters is that they will have long term contracts that can be used as justification to pay back the loan. Attempts should therefore be made to identify credit finance schemes for small to medium scale entrepreneurs such as that provided by ZATAC.

In order to emphasize the requirement for improved handling it may be necessary to construct a simple grading shed. This consists of a table under a roof and will be used for all handling and packing operations. The table is the grading surface and the roof provides shade (and produce in shade will keep longer). Due to the fact that vegetables are highly perishable, consideration should be given to low cost storage methods like evaporative coolers constructed from grass thatch or charcoal. These structures reduce the ambient temperature by up to 10ºC and produce stored in them will keep for a few days longer in a fresh state. Evaporative coolers will be particularly effective when produce is being collected at a central point before transporting to market.

Quality control and quality assurance programmes will have to be introduced so as to deliver produce of the required quality to the client. The main strategy for implementing these programmes is to have an internal control system managed by the farmers themselves (similar to systems advocated by organic producers associations). The implementation of the program will then be supervised by ASNAPP and IDE who will also provide the required training to make it successful.

The farmers will be relying on Sun International as a high value market. There is a danger however of the farmers becoming dependent on this market. It is recommended therefore that the farmers association should pursue alternative marketing arrangements. Two possibilities include selling of produce to urban clients through Fairways Market, a fresh produce shop in Livingstone town, who have expressed willingness to purchase produce from smallholders. The second suggestion is to pursue regional markets such as Botswana using the association as an exporting body that arranges logistics for its members or is a legal company that does the exporting directly.

In order to further strengthen marketing options, the farmers association must receive training in selling and marketing. This will also empower growers so that they have improved marketing skills including negotiating for better prices and payment terms. Growers will also be able to investigate alternative markets with confidence. Some markets such as in Botswana are not easy to access due to a range of logistical issues, however it may be possible that the growers association apply for export and phytosanitary permits on behalf of their members or as mentioned earlier, the association is the exporter and applies for permits on its own behalf.

Socio-political Factors

Observations:

An interesting observation made during visits to the various farming areas is that most growers are organised into associations. These groups may or may not be formal associations or registered cooperatives. They do however perform similar functions for their members. The growth of farmer groups has increased because most government and development agencies prefer to work with them rather than with individuals.

Support to farmers is generally for the staple crops like maize where there have been a number of programs by development agencies and government schemes to provide seed packs, fertilizer and other activities. There is a lack of efficient horticultural support services for smallholders such as training, advice or input and farmers generally have poor training in business or entrepreneurial skills. A number of initiatives like the Agricultural Support Program have included some horticultural activities and this is also the case with some new programs like the Smallholder Market Enterprises Project (SHEMP) that aim to improve market access and market linkages. Other organisations such as Care International have drought relief and recovery programs where they have distributed treadle pumps to various farmer groups.

Constraints:

Although associations make it easier to work with a larger group of farmers, they can have problems. There have been reported successes and failures of various associations. In the Livingstone area, the Kazungula cooperative involved in dairy production is said to be doing well. Another group involved in vegetable production collapsed a short while back due to personality clashes and theft of funds and assets. Mobilization of farmers may face problems if the farmers are suspicious of each other or are not happy with the abilities of the leadership.

The project will require the input of other organisations active in the Livingstone area and problems may occur where there are differences in the methodology of working with farmers. This is not expected to be a major issue but the roles and responsibilities of the different organisations have to be clearly defined.

Recommendations:

There will always be problems with accountability in organisations that are supposed to be representing a group of people. The best way to avoid problems developing is to have a good training program for all the members of the association including the elected leadership. The members of the group should be made aware that they have a responsibility to check the actions of the leadership. Those who are heading the association should have good training in leadership skills and financial discipline. As a general rule it is always a good idea to use a participatory approach when initiating and implementing development projects. This will empower the beneficiaries and give them ownership of the project. They are less likely to be apathetic if they see something going wrong and there is a greater likelihood of sustainability of the project.