



Connecting Small Holder Farmers in the Pulses Value Chain to Markets Through Aggregation Centres



WFP
United Nations
World Food
Programme

Table of Contents

BACKGROUND	3
ZAMBIA CONTEXT	5
RATIONALE FOR THE PROJECT.....	8
THE PURCHASE FOR PROGRESS (P4P) PILOT.	9
COLLABORATION WITH THE FAO	12
CURRENT STATUS OF THE HGSF.....	13
EXPECTED BENEFITS	14
STUDY OBJECTIVES	15
ACTIVITIES	15
INTERVIEWS.....	16
DOCUMENTS REVIEWED	17
FINDINGS AND RECOMMENDATIONS	18
FINDINGS	18
<i>Cowpeas</i>	23
<i>Beans</i>	23
RECOMMENDATIONS	31
AGGREGATION CENTRE SELECTION	31
PROPOSED OPERATIONAL SYSTEMS FOR THE AGGREGATION CENTRES	33
<i>Key Players</i>	33
<i>Aggregation Centre Network Operations</i>	35
<i>Proposed Payment Methods</i>	37
<i>The Pricing System</i>	38
TIMELINE FOR DEVELOPING THE AGGREGATION CENTRE MODEL.....	41
STRATEGIC PRIVATE SECTOR PARTNERS	41
RECOMMENDED LEGAL AND CONTRACTING FRAMEWORK	42
WAREHOUSE PHYSICAL STANDARDS.....	42
WAREHOUSE TOOL REQUIREMENTS	43
<i>Warehouse Branding</i>	44
WAREHOUSE MANAGEMENT CERTIFICATION.....	44
WAREHOUSE MANAGEMENT	44
WAREHOUSE GRADING REQUIREMENTS.....	45
<i>Bagging</i>	46
PRODUCT SPECIFICATIONS	46
WAREHOUSE FINANCIAL CERTIFICATION.....	47
PAYMENT AND COMMUNICATION.....	48
<i>Communications</i>	48
<i>Payments</i>	48
REPORTING REQUIREMENTS.....	48
PRICE DETERMINATION	49
<i>Mode of Payment</i>	50
ACTION PLAN ON THE WAY FORWARD	50

Charts, Tables, and Figures

Figure 1 The Collaborative network required to deliver sustainable systems	9
Figure 2 Purchasing data under the P4P 2013/14 period	11
Figure 3 Map of CASU and HGFS districts	13
Figure 4 Organizational Relation Between FAO and WFP	19
Figure 5 Pulse Value Chain Constraints	20
Figure 6 Aggregation Centre Response to Value Chain Constraints	22
Figure 7: Agro-ecological zones within Zambia	22
Figure 8 Production Statistics for Top Crops in Zambia	23
Figure 9 Import and Export Exchange of Pulses in Southern Africa	25
Figure 10 Transportation Costs from Key Cities and Reference Points	25
Figure 11 Price trends for beans in production and non production zones	27
Figure 12 Main Bean Types and Prices within the Soweto Market	28
Figure 13: Farmer level economics of bean production in Zambia	29
Figure 14: Margin spread from farm to consumer in the beans/pulses value chain.	30
Figure 15 : Criteria used to determine ideal location of Aggregation Centres	31
Figure 16: Evaluation of Specific Districts for suitability to host aggregation Centres.	32
Figure 17 Map of CASU, HGFS, and Potential Aggregation Hubs	32
Figure 18: Schematic of the inter relations within an Aggregation Centre	34
Figure 19: A Schematic of how the Aggregation Centre Network is expected to operate	35
Figure 20: Comparison of possible payment systems for Aggregation Centres	37
Figure 21 Reference Price Rationale	39
Figure 22 Map of Reference Price Locations	39
Figure 23 Timeline of Aggregation Center Rollout	40
Figure 24 Potential Private Sector Players	41
Figure 25 Product Specifications for Beans and Cowpeas for WFP purchasing	46

Acronyms

CASU	Conservation Agriculture Scaling Up
FAO	Food and Agriculture Organization
FISIP	Farmer Input Support System
FRA	Food Reserve Agency
HGSF	Home Grown School Feeding Programme
IFAD	International Fund for Agriculture Development
NAIP	National Agricultural Investment Plan
P4P	Purchase for Progress
RBA	Rome Based Agencies
SHF	Small Holder Farmer
WFP	World Food Programme
WRS	Warehouse Receipt Systems
ZAMACE	Zambian Agriculture Commodity Exchange



Background

Zambia Context

Zambia is located in the central part of Africa, and has a total landmass of 752,618 sq. km lying between 1000 to 1600m above sea level. It borders 7 other southern and central African countries, Namibia, Zimbabwe, Angola, DRC, Malawi, Tanzania and Mozambique. Zambia's main drainage systems are the Zambezi, Kafue, Luangwa and Chambeshi-Luapula rivers. The country has five major lakes: Kariba (man-made), Bangweulu, Mweru, Mweru-Wantipa and Tanganyika. The annual rainfall ranges between 500 mm and 1,500 mm from November to March, varying with latitude and altitude. (NAIP 2014-2018)

Zambia is considered to be a high potential agricultural country due to a combination of favorable factors. It has a tropical climate, which is moderated by altitude as a result of most of the country being on the central African plateau. It has 3 distinct seasons, a wet season (December to April), a cool and dry season (May to August) and a hot and dry season (September to November).

The country has three main agro-ecological regions, namely the dry south-east; the central region stretching east to west, having the highest agricultural potential and the northern region which receives the highest average annual rainfall.

A total of 25 million hectares is considered to be available for agricultural purposes (about 20% of total land mass). Of this amount about 1599 sq. km is under irrigation. This is despite the fact that Zambia has 40% of all the water resources of Southern Africa (New Agriculturalist),

Agriculture however is only the second largest contributor to the GDP at 20.1%, while mining is the heart of the economy. However in employment terms, agriculture dominates, providing employment for almost 85% of the working population.

The most significant agricultural commodities by volume are sugar cane (2,5m mT), maize (1,3m mT), cassava (1,1m mT) and fresh vegetables (about 250,000 mT)

As sector agriculture, fisheries and forestry has experienced positive and robust growth of more than 10% per annum since 2009, albeit coming from a negative growth period between 2005 to 2007.

Favorable weather conditions in most of the major agricultural regions of Zambia; Increased fertilizer use among smallholders, primarily caused by increased distribution of fertilizer under the government's Farmer Input Support Programme (FISP), Increased hybrid seed have sustained the growth in recent years.

On average more than 60% of the expenditure on agriculture goes towards two programmes, the Farmer Input Support Programme (FISP) and the Food Reserve Agency. (NAIP, 2014-2018)

Unfortunately most of Zambian agriculture remains subsistence farming, characterized by over reliance on rain fed agriculture, low productivity, and poor access to agricultural requisites. Government statistics indicate that about 72.7 percent of all small-scale farm households cultivate less than two hectares of crops. Of this number, less than a third received FISP inputs in 2010 and a majority did not anticipate selling maize. Of those very small farmers that anticipated selling maize, the quantities they anticipated selling were small. This implies that they are not benefiting from government maize-buying policies because they do not have surplus to sell. (NAIP, 2014-2018)

Since the bulk of the population is rural based (64%), poverty and nutrition statistics indicate that as much as 45% of the population is considered undernourished (CountrySTAT, 2015). This is against a Sub Saharan African level of 23.8% (The State of Food Insecurity in the World, FAO, WFP, IFAD, 2014). Food insecurity indicators of availability, access, stability and utilization are not consistent with a country that has the agricultural potential that Zambia possesses.

Challenges associated with this state of affairs are listed below;

- **Generally low energy intake** (45% of Zambians consume less than 50% of the FAO daily recommendation of between 2600 to 2750 calories per day)
- **Serious Stunting Levels** (stands at 45% for children under 5 years)
- **Dominance of mono cropping** (maize mono cropping is practiced by 82% of small holder farmers, which creates a challenge as only 2% of calories come from pulses, vegetables and nuts)
- **Poor coordination among key players dealing with food and nutrition** (increased agricultural productivity has not resulted in improved nutrition.)
- **Poor food storage at household level.**
- **Inadequate nutrition education.**

The State of Food insecurity in the World report further makes the point that hunger; food insecurity and malnutrition are complex problems requiring a multi-sectoral approach. Actions may be necessary in agricultural production, rural development, social protection, public works, trade and markets, education, health and other areas. The proposed Home Grown School Feeding Programme is a classic example of how this multi stakeholder approach could work.

The National Agricultural Investment Plan (NAIP) 2014-2018 has identified four priority areas for intervention;

- (I) Sustainable use of the natural resource base;
- (II) Infrastructure and market access;
- (III) Food security and disaster management; and
- (IV) Research and technology

Food security is a key part of the focus areas, within the NAIP, and therefore the proposed joint programme by the WFP and FAO supports this effort.

Rationale for the Project

Building off the experiences of countries like Brazil with their Fome Zero (Zero Hunger) strategy, there is a groundswell of opinion that one of the ways of creating sustainable responses to rural hunger and malnutrition; is to link small holder production to social programmes such as school feeding schemes.

The approach is often referred to as Home Grown School Feeding (HGSF). The World Food Programme has led the efforts to proactively source food locally for distribution into school feeding programmes. Most school feeding programmes endeavor to ensure that school children have access to a balance meal, which must consist of a cereal, some vegetables and pulses (beans) for protein.

For definition purposes, “WFP considers HGSF programmes as those that explicitly link school feeding to agricultural production through the purchase of domestically produced food in order to stimulate local economies, and where feasible directly benefitting smallholder farmers”

Globally within the WFP, the guiding principles are contained in the Paris Declaration (2005) and the follow up Accra Agenda for Action (2008), as well as the WFP school feeding policy (2009) which all support the use of national systems for delivering school feeding as well as transitioning these systems to be nationally owned programmes.

The 2011 policy update, commits the WFP to;

- Linking WFP-supported programmes to national procurement;
- Increasing purchases from small farmers to farmers associations such as done using P4P;
- Supporting the processing of local products; and
- Working with partners and through South-South cooperation to help governments to develop home grown school feeding programmes

This aligns well with the draft strategic plan for 2014- 2017 that emphasizes the need to strengthen local capacity to establish and manage equitable and scalable food security and nutrition institutions, infrastructure and safety net systems, by linking

them to local agrofood supply chains. These approaches are key to developing collaborative networks that have a high chance of success.

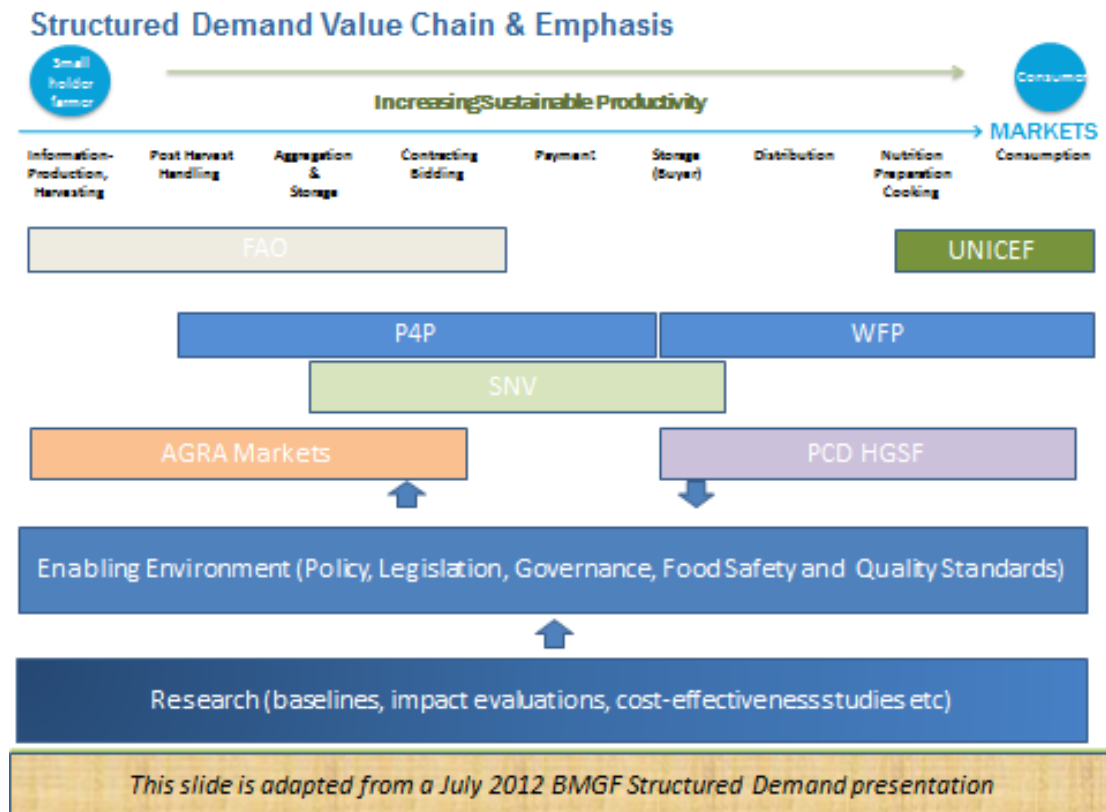


Figure 1 The Collaborative network required to deliver sustainable systems: source WFP

The Purchase for Progress (P4P) Pilot.

In Zambia, the Purchase for Progress (P4P) initiative is the obvious precursor to a fully-fledged HGSF programme. This programme has over the last 4 years been an essential part of the activities of WFP in Zambia. It has ensured that the commodities that the WFP needs to distribute were primarily sourced locally in a manner that supports local production.

The P4P programme rests on three pillars;

- a) **Demand** (where WFP tests innovative ways to buy staple food and promote marketing opportunities to smallholder farmers.)
- b) **Supply** (where the programme links WFP's demand with expertise and resource of partners who support farmers to achieve improved yields, reduce post harvest losses, and improve crop quality.)

- c) **Learning and Sharing** (where P4P gathers and shares lessons on effective approaches to connect smallholder farmers to markets in a sustainable way and share them widely with stakeholders.)

However due to the market distortions in the Zambian maize markets, the programme has generally sourced maize donations from the government through the Food Reserve Agency (FRA). An attempt has been made to however direct procurement of beans/pulses towards local sourcing. In the 2013/14 seasons alone over 1000mT of dry beans and cowpeas (Figure 1) were purchased from smallholder farmers across Zambia for distribution as part of WFP's standard programmes.

However a number of challenges were experienced by WFP in the P4P beans/pulses exercise that would require attention if, linking of school feeding to small holder farmer production is to succeed.

Some of the challenges experienced are listed below;

1. There was no reliable data on product availability to better direct purchasing activities.
2. Coordinating farmers to supply into a semi formal market was made difficult due to the very informal nature of beans/pulses trade in Zambia.
3. Price formulation was made difficult by the lack of a proper price formation mechanism.
4. Logistics proved difficult due to the unpredictability of available quantities at the designated collection points.
5. Lack of FISIP type support for beans/pulses production meant that issues of quality seeds, fertilizer and agronomy support for beans/pulses was often lacking thereby affecting the quality and quantity of production.
6. Lack of a standardized local grading system meant that there were always challenges in determining acceptable quality in a manner that made sense for farmers and the P4P programme.

Region/\$ per mt	Sum of GR QTY	Sum of VALUE
PULBEA	942.300	504,322.325
LUAPULA	308.200	162,966.018
517.99	258.200	133,745.018
584.42	50.000	29,221.000
NORTHERN	634.100	341,356.307
517.99	440.500	228,174.595
584.42	173.600	101,455.312
586.32	20.000	11,726.400
PULPEA	103.900	40,993.055
EASTERN	31.050	12,765.549
399.30	11.250	4,492.125
417.27	19.550	8,157.629
463.18	0.250	115.795
SOUTHERN	72.850	28,227.507
367.35	3.500	1,285.725
388.49	69.350	26,941.782
Grand Total	1,046.200	545,315.380

Figure 2 Purchasing data under the P4P 2013/14 period (source; WFP Zambia)

In spite of these challenges, WFP has seen a number of opportunities in promoting the production of beans/pulses to support the HGSF programme.

- a) Linking with the FAO, EU sponsored Conservation Agriculture Scaling Up (2013-2016) programme (CASU) initiative that is promoting beans/pulses production by smallholder farmers in various districts of the country that also require HGSF support.
- b) Build on the model of creating agricultural hubs/ aggregation centers that the P4P programme has experimented with in two sites in the North and North East of the country.
- c) Leverage the existing private sector infrastructure to enhance the efficacy of aggregation and distribution activities into the HGSF programme.
- d) Collaborate with initiatives such as the Zambian Agriculture Commodity Exchange (ZAMACE), and the envisaged Warehouse Receipt System (WRS) as a tool for making pulses tradable commodities.

- e) Pioneer the establishment and creation of proper quality and grading standards for the beans/pulses sector thereby assisting to formalize the trading of beans /pulses.
- f) Use the WFP's purchasing power to stimulate the creation of a robust beans/pulses value chain that promotes access to and use of appropriate inputs, develops top quality agronomic support, and links to an efficient and equitable supply chain.

Collaboration with the FAO

The WFP has explored the possibility of collaborating with the FAO in Zambia, as part of efforts to ensure Rome Based Agencies work synergistically. The development of the HGSF programme's beans/pulses initiative dovetails well with the FAO's CASU programme.

The FAO run Conservation Agriculture Scale Up (CASU) programme is part of the European Union's initiatives in Zambia. This Euro 11 million programme was launched in 2013 with the objective of;

- Scaling up conservation agriculture in 31 districts across Zambia
- Support 21,000 lead farmers who in turn work with 315,000 follower farmers.
- Consolidating and expanding conservation agriculture in the country;
- Improving skills in conservation agriculture for the extension workers and farmers;
- Improving conservation agriculture farmer input and output supply chains;
- Promoting best international practice in environmental and gender issues.

The project seeks to ensure that there is increased crop production as well as increased incomes by the participating farmers. Furthermore the expectation is that the project will contribute to the reduction of malnutrition by promoting crop diversification through crop rotation. This approach will lead to increasingly diversified diets and better nutrition in the participating communities. A key part of this crop rotation is the production of beans/pulses as a rotation crop to maize.

The level of correlation between CASU districts and HGSF districts is high and therefore creates the ideal conditions for collaboration between the parties. In some instances, CASU districts are adjacent to the HGSF districts, making linkages easy. It is expected that the creation of a coordinated approach to linking smallholder

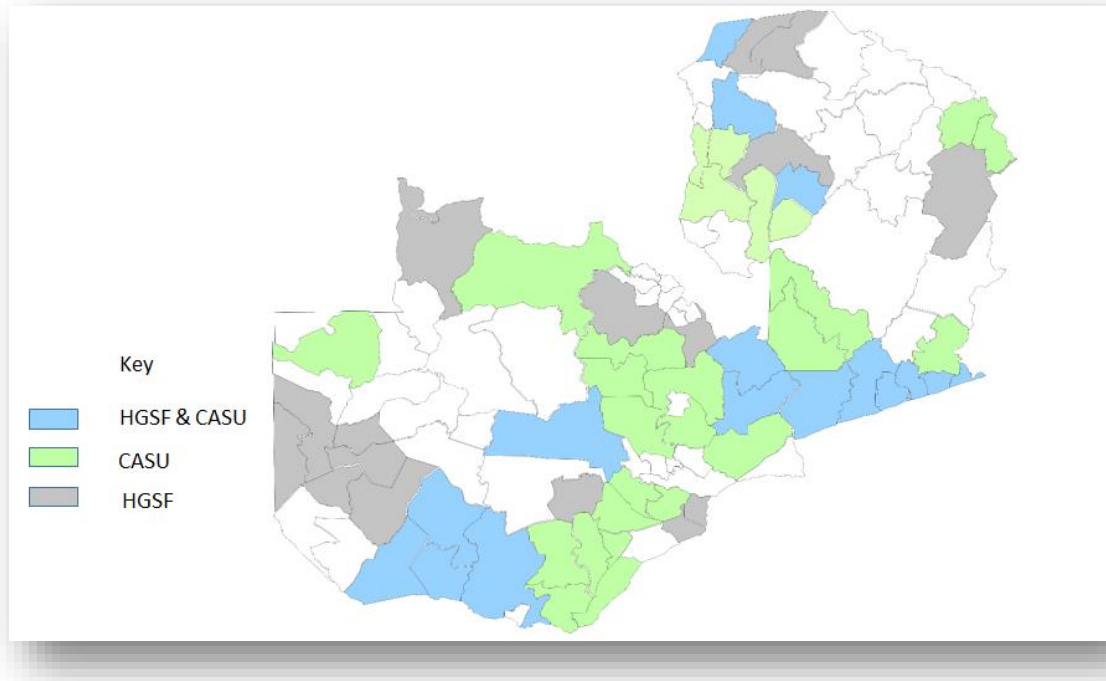


Figure 3 Map of CASU and HGSF districts: source WFP Zambia

farmer production to the needs of the HGSF programme will support the resolution of the stubborn high malnutrition situation in Zambia.

Current status of the HGSF

The school feeding programme was introduced by the WFP in 2003 in response to the severe drought of 2003. The programme has grown from about 10,000 children benefitting to well over 861,000 children in 32 food insecure districts, in over 2212 schools. Children are fed a meal of fortified maize meal, beans or cowpeas and vegetable oil enriched with Vitamin A and D.

Each child receives at least 120g of cereal, 20g of pulses, and 10g of vegetable oil. A combined total of 23,444 mT of mixed commodities per year are required to deliver the programme.

However improving this system and creating a locally sustainable approach will require attention to the following;¹

- Mapping of the locally available nutritious foods for possible inclusion in the food basket.
- Identifying and mobilizing smallholder farmers/cooperatives to produce required commodities and training them up in group marketing.
- Decentralizing the procurement process to district level.
- Developing /Investing in processing technologies of foods at local level.
- Provision of appropriate storage solutions at district and school level to handle all HGSF commodities, including horticultural products.

EXPECTED BENEFITS

The proposed approach that seeks to connect smallholder farmers in the beans/pulses value chain to markets through aggregation centers offers a possible solution to some of the challenges highlighted so far. However the proposal can only be evaluated on the basis of whether it truly results in the integration of the nutritional needs of the country together with the need to support the improvement of smallholder production. Envisaged benefits, include but are not limited to;

- a) Schools have access to food all year with minimum losses in the supply chain.
- b) Schools are able to provide a more nutritious meal.
- c) Local crop production effectively linked to a sustainable homegrown school feeding demand.
- d) Increased employment and job opportunities in rural areas

¹ Strengthening local food procurement for the institutionalization of homegrown school feeding (HGSF) Programme.

- e) Increased trade, business and related economic opportunities in rural areas
- f) Increased incomes and income generating opportunities for rural people
- g) Proof of a successful Public Private Partnership in practice
- h) Improved food security

Study Objectives

The overall objective of the study is to design a procurement and distribution model through the establishment of Aggregation Hubs for the Home Grown School Feeding program, which is sustainable, cost effective and works in tandem with the private sector.

Sub objectives

- To determine feasibility of rural Aggregation Hubs to operate between demand (schools) and supply (SHF)
- To review constraints of current delivery model for School Feeding
- To make an inventory of private sector stakeholders and their conditions to participate
- To assess interest Government stakeholders (Ministries, utility providers, FRA) and define their potential role
- To develop a practical and objective investment tool which can determine the location, financial turnover, functions, partnerships etc for an Aggregation Hub
- To advice on the management structure and ownership of the Aggregation Hub

Activities

The study team undertook a series of activities in collaboration with WFP staff in Lusaka, Zambia. Below is a listing of the interviews that were conducted by the project consultants.

Interviews

Organization	Contact
Food and Agriculture Organization	George Okech
Zambia Agriculture Commodities Exchange (ZAMACE)	Jacob Mwale
Smallholder Agribusiness Promotion Programme	Kwibisa Liwali
NWK	Christian Morris
MUSIKA	Reuben Banda
TechnoServe	Luke Potter
Olam	Varun Mahajan
ETG	Alok Dikshit
Zambian Pulse Crops Value Chain Initiative	USAID
Zambia National Farmers Union	Coillard Hamusimbi
IFAD	Abla Benhammouche
Cargill	Eric Stubbs
AFGRI	Joof Prestorius
Profit Plus	Alex Pavlovic
World Food Programme	Simon Cammelbeeck

New Soweto Market	Charles Simusokwe
Purchase for Progress	Aurore Rusiga

Documents Reviewed

Document Title	Source	Relevance
Strengthening local food procurement for the institutionalization of a Home Grown School Feeding (HGSF) Programme.	WFP	Background on Zambian context and required solutions.
Linking school feeding to domestic production to benefit local economies and small farmers.	WFP	Background on the development of WFP thinking on Home Grown Feeding Schemes.
Groundnut and common bean IP Final	IFAD	Proposed technical assistance programme for bean farmers.
IFC Mobile Platform Final	IFC	Potential Trade Information systems
State of Food Insecurity in the world 2014	WFP, IFAD, FAO	Status of malnutrition globally.
Zambia National Agriculture Investment Plan 2014-2018	Zambia Ministry of Agriculture and Livestock	Understanding the priorities of the national government.
The commodities exchanges bill, 2011	ZAMACE	Understanding potential linkages with national commodities trading system.
2003-2004 Small Scale Final		
2010-2011 Crop Forecast Survey Report		
2012 Rural agricultural livelihoods survey		
Gender and Energy Usage Zambia		
IAPRI Zambia Crop Data		

Monitoring and Survey Report 2006 -2010	Zambian Central Statistical Office	
Effects of subsidized legume production in Zambia	Peter Zulu, University of Zambia	Research based analysis of the impact of FISIP on legume production
Zambia’s Agricultural finance market: Challenges and Opportunities	ZNFU	In-depth analysis of agro-finance sector in Zambia

Findings and Recommendations

The study team has sought to outline recommendations and next steps, on the basis of the findings of the study.

Findings

1.0 WFP and FAO’s collaboration is mutually beneficial to both organizations.

- The partnership between WFP and FAO missions is to develop a sustainable cowpea and bean value chain as an incentive for farmers to adopt conservation agriculture:
- The collaboration aims to achieve the following:

Create greater sustainability and crop diversification of the FAO’s CASU farmers and provide supply locally sourced beans/pulses into the WFP’s Home Grown School Feeding Programme

Develop localized aggregation centers which will increase efficiency and transparency within the pulses value chain

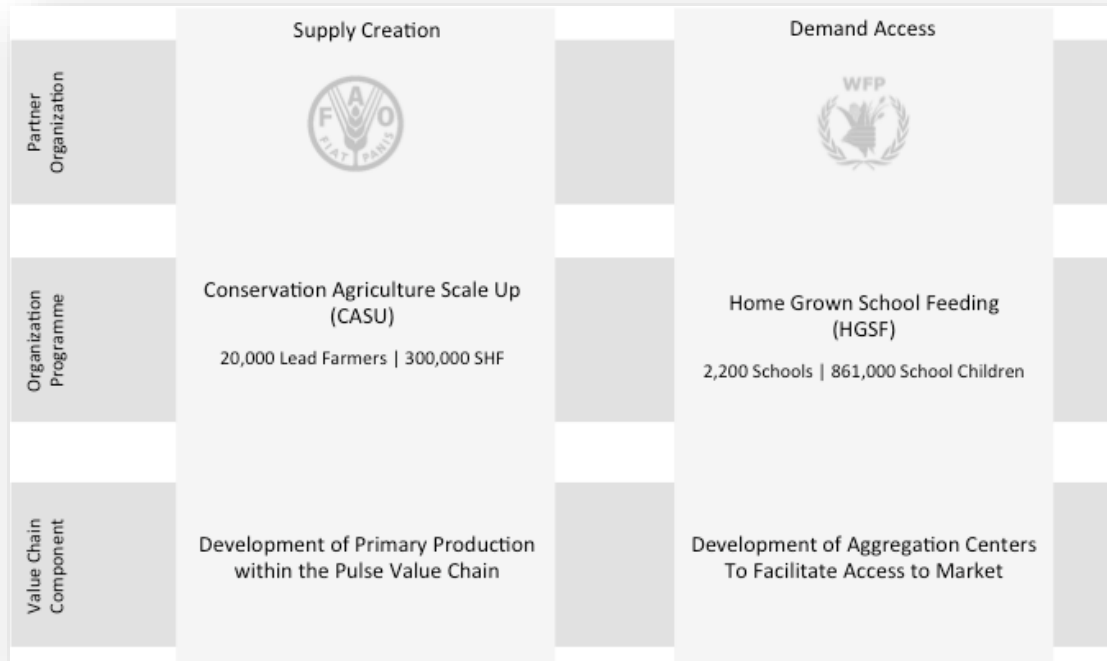


Figure 4 Organizational Relation Between FAO and WFP

- It is therefore essential that the final plan must answer key questions that assist both organizations to operationalize the concept.:

What are the key factors determining the commercial viability of the aggregation centres?

What are the main prerequisites for the creation of a sustainable beans/pulses value chain model?

Who are potential partners for operating and supporting the aggregation centre?

What are the key operational issues for aggregation centres to operate sustainably?

2.0 The Beans/Pulses value chain is largely underdeveloped in Zambia, and a number gaps exist along the value chain.

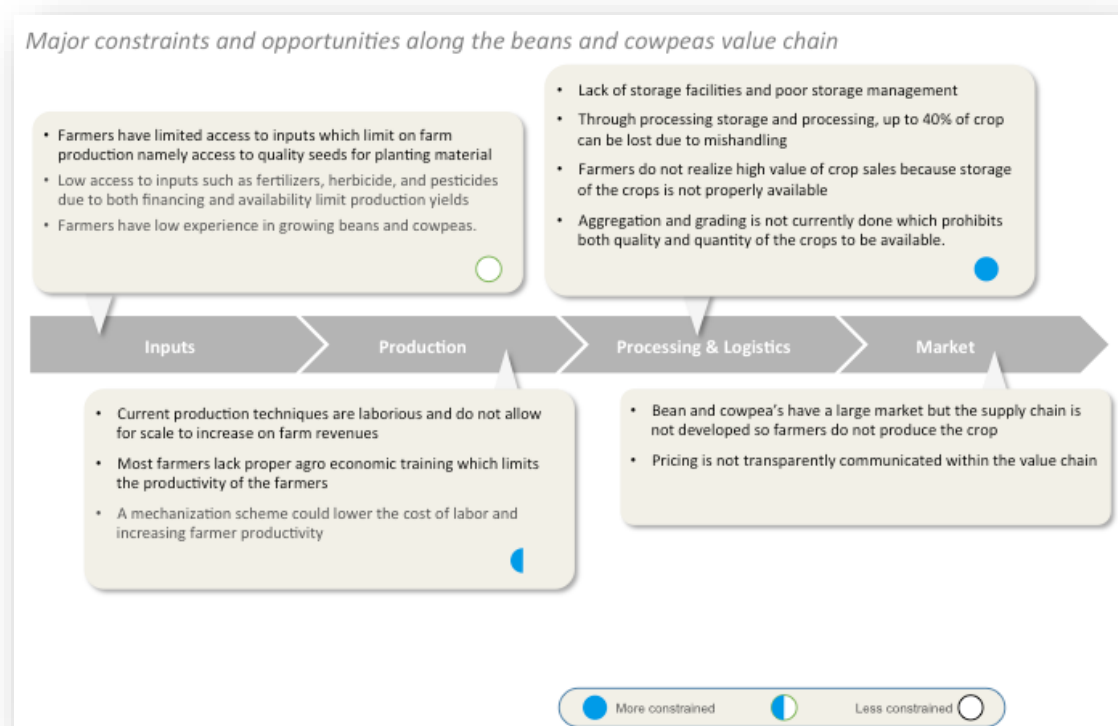


Figure 5 Pulse Value Chain Constraints

The biggest constraints within the value chain exist in the production and processing and logistics phase of the chain. Any sustainable intervention would be expected to address the low level of technical knowledge and inadequate access to processing facilities for post harvest handling of beans/pulses.

3.0 The aggregation centre approach will create benefits to various stakeholders in the agricultural sector and the nutrition sector.

The aggregation centre approach creates significant value for the Government of Zambia, the Private Sector, Farmers, WFP and FAO. The ability for all stakeholders to derive value is a good foundation for creating a collaborative platform that can deliver a long-term sustainable system.

Stakeholder	Importance to the Aggregation Centre Concept	Significant Benefit Derived by Stakeholder
Zambian Government	Sets policies that can either support or hinder the development of the value chain	The government will realize support priorities under the National Agriculture Investment Plan 2014 – 2018 (a) Agricultural production and productivity improvement; (b) Market access and services development; (c) Food and Nutrition security and disaster risk management
Private Sector Aggregators	Possess an existing infrastructure and vital industry knowledge on trading in agricultural commodities	Increased volumes at sites which reduces operating costs per unit moved, low risk opportunity to experiment with new commodity, and free training of staff for grading of beans and cowpeas
Farmers	As the primary producers they are at the heart of the value chain. If they see value they will participate in the system	Firm price, accessible and transparent market, and opportunities for input purchase. Crop diversification for farmers, and improved nutrition.
WFP	Has a mandate to localize its operations per WFP policy.	Structured and predictable access to local source of beans, which may result in lower purchasing costs. The HGSP will gain access to food closer to consumption sites. Palatable and localized product more suited to local tastes.
FAO	Has the mandate to support the creation of resilient agrofood systems	Access to a secured market for conservation agriculture farmers which farmer produce under.

The Aggregation Centres will become catalysts for rural development

Properly functioning Aggregation Centres have the power to catalyze real rural development by crowding in actors and service providers into areas where they wouldn't otherwise have operated. The demand for services, inputs and information along the value chain can be met within the Aggregation Centres.

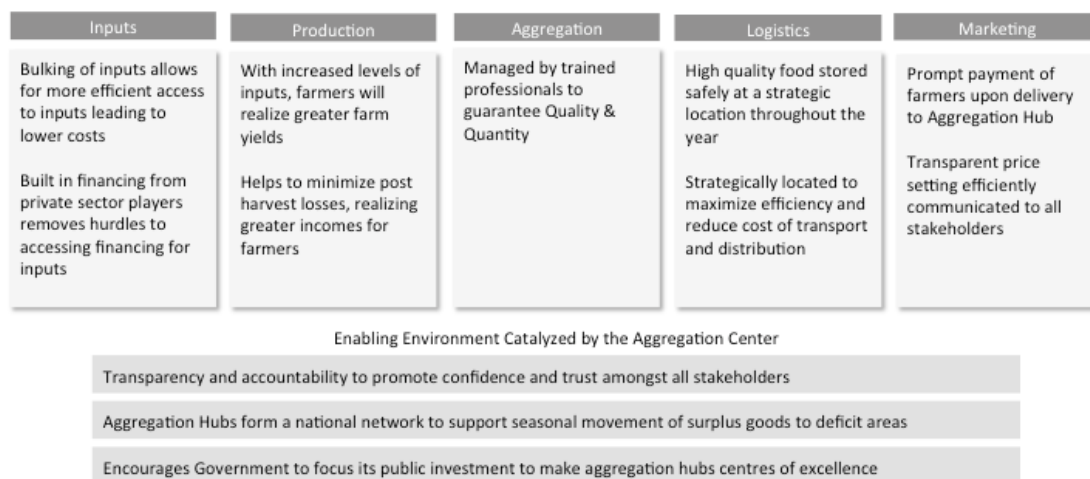


Figure 6 Aggregation Centre Response to Value Chain Constraints

4.0 The Zambian Government's policy initiatives in the agricultural sector have had the effect of distorting non- cereal value chains.

Overinvestment in maize production has created unintended consequences of crowding out private sector players from the sector, and also reducing the relative importance of other crops to smallholder farmers.

Government Practice	Impact on Smallholder Agriculture	Potential impact on beans/pulses value chain
Maize inputs are provided under the FISP programme.	Productivity improvements on maize production by smallholders.	Beans/pulses production relies on poor quality inputs such as retained seeds.
The Food Reserve Agency (FRA) provides a guaranteed market for maize.	Smallholder maize farmers have an appreciation of the value of their crop.	The absence of formal pricing of the beans/pulses exposes farmers to exploitative trading practices.
Over-investment in maize research and development	There is wide range of seed varieties options for farmers to choose from.	Poor access to certified seeds, which impacts productivity.

5.0 Large areas of Zambia have the ideal agro climatic conditions for the production of beans/pulses.

Agro ecological zones III (Northern and North Eastern) and I in the South are ideal growing areas for beans/pulses.

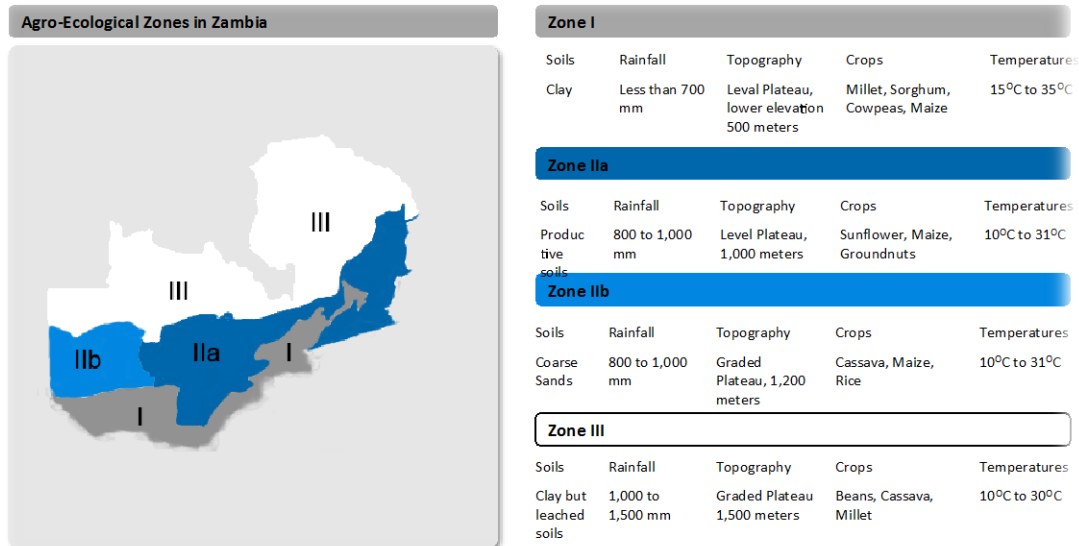


Figure 7 Agro-ecological Zones within Zambia

6.0 Beans and Cowpeas are generally characterized by poor productivity

Cowpeas

Cowpeas are the 15th most important crop in Zambia in terms of volumes produced. The average yield is currently at about 0.5mT per hectare. The dominant provinces are Southern and Central Provinces.

Beans

Beans are ranked fifth in terms of volume produced, and are an important food crop in Zambia. Productivity is currently at 0.7mT per hectare. Most of the production is concentrated in the Northern, Eastern and Central Provinces.

Production Statistics for Top Food Crops in Zambia

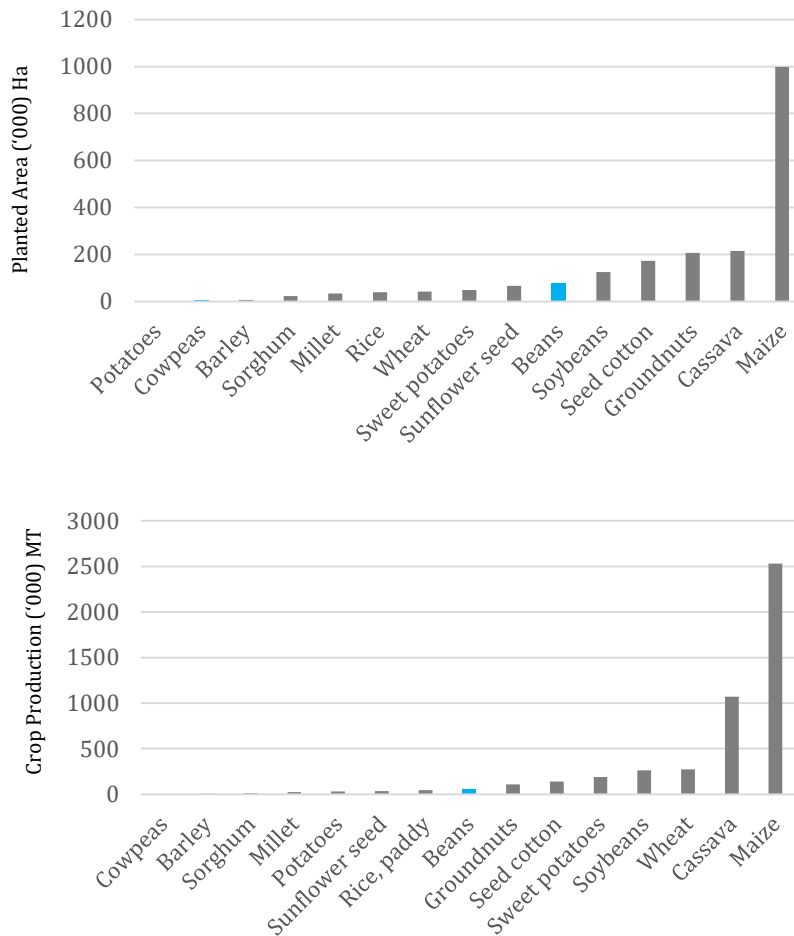


Figure 8 Production Statistics for Top Crops in Zambia

7.0 There is evidence of a rather robust trade in beans/pulses within the Southern African region.

As much as 4000 mT of beans are traded with neighboring countries via informal means.

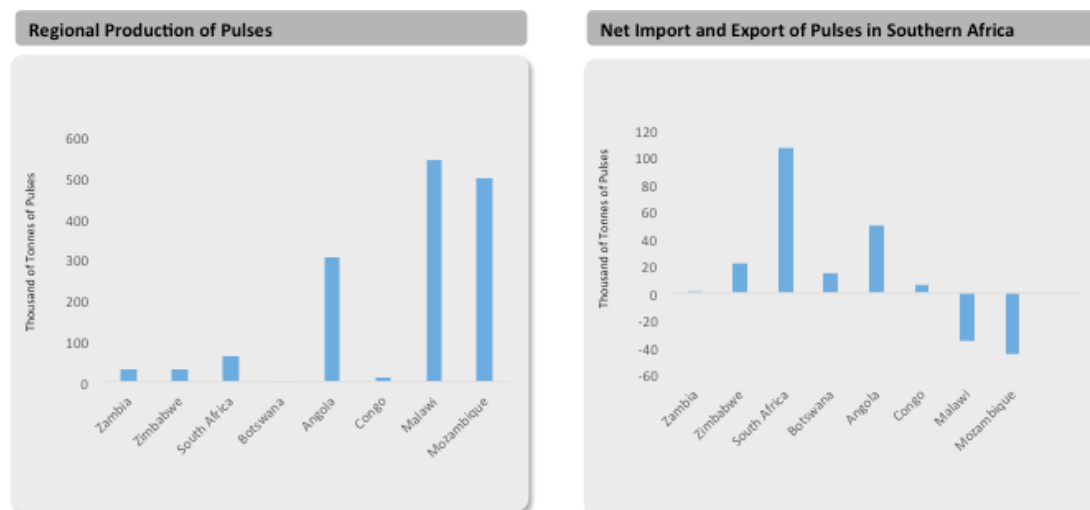


Figure 9 Import and Export Exchange of Pulses within Southern Africa

8.0 Logistics for the transportation of both inputs and outputs are a major factor in the cost structure of Zambian agricultural commodities.

Zambia is a vast country, with significant logistics infrastructure challenges. Moving inputs such as fertilizers and seeds during the production part of the season, and harvests at the end of the season, is a costly exercise. Any system of aggregation must take into account these significant challenges and the resultant costs.

Below are some indicative costs of transporting a tonne of any commodity between major centres.

	Kilometers	Cost
Isoka to Lusaka	908	\$163.44
Katete to Lusaka	490	\$88.20
Livingston to Lusaka	428	\$77.04
Kitwe to Lusaka	457	\$82.26
Mansa to Lusaka	758	\$136.44
Kasama to Lusaka	855	\$153.90
Chavuma to Lusaka	771	\$138.78
Kasempa to Lusaka	679	\$122.22
Kasama to Kitwe	754	\$135.72
Solwezi to Kitwe	180	\$32.40
Mansa to Kitwe	223	\$40.14
Isoka to Kitwe	806	\$145.08
Katete to Kitwe	791	\$142.38

Figure 10 Transportation Costs from Key Cities and Reference Points

9.0 Consumption patterns of beans/pulses suggest the sector is underdeveloped and highly informal.

The study found that in areas where farmers traditionally produce beans/pulses, the households consume the more than a third of annual production. A significant portion of about 46% is sold mainly through bartering with local traders. Significant postharvest losses of up to 23% are not uncommon due to a combination of factors. The biggest factor is pest management of the harvested bean/pulses crop, as most farmers do not have ideal storage facilities or access to the appropriate chemicals for improving storability.

A study of the trade in beans at the Soweto Market in Lusaka revealed that by far the most popular beans are the Kabulangeti (red variety), the yellow and white bean combination, the Lusaka bean (mustard coloured), and the Solwezi bean (red speckled). Market agents revealed that the supply of beans was largely seasonal and supplies became difficult towards the harvest season. Most traders lamented the fact that they had to rely on often-unscrupulous middlemen to procure the product, due to the informal nature of the bean trade. Price variability between production and consuming areas is also a major feature of the trade in beans.

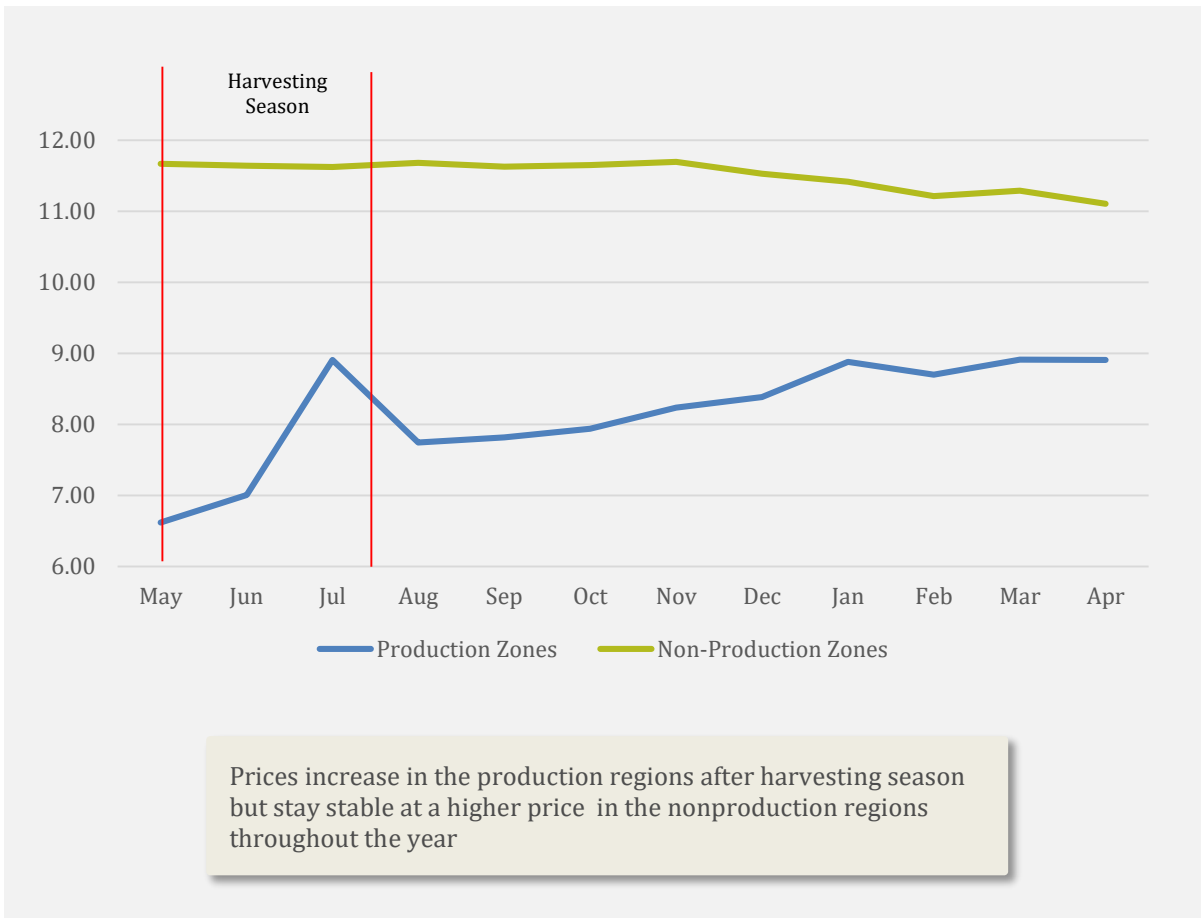
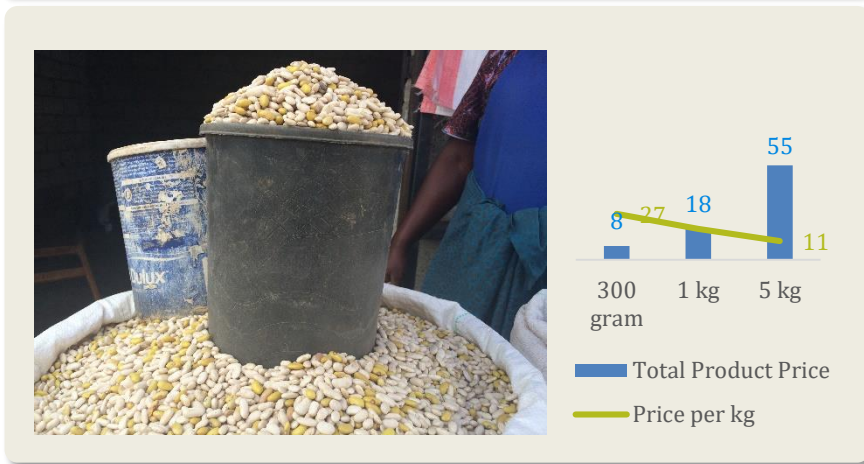
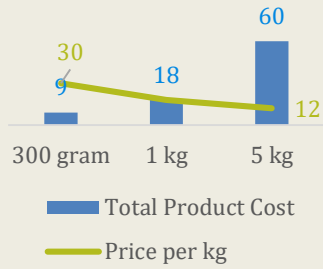


Figure 11 Price trends for beans in production and non production zones (WFP Data Calculation)

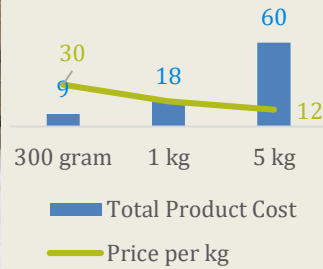
Yellow and White Beans



White Beans



Yellow Beans



Kabulangeti Beans

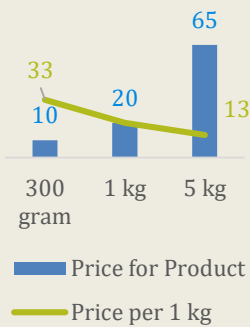


Figure 12 Main Bean Types and Prices within the Soweto Market

10.0 Properly supported farmers have the potential to derive significant value from farming and trading in pulses.

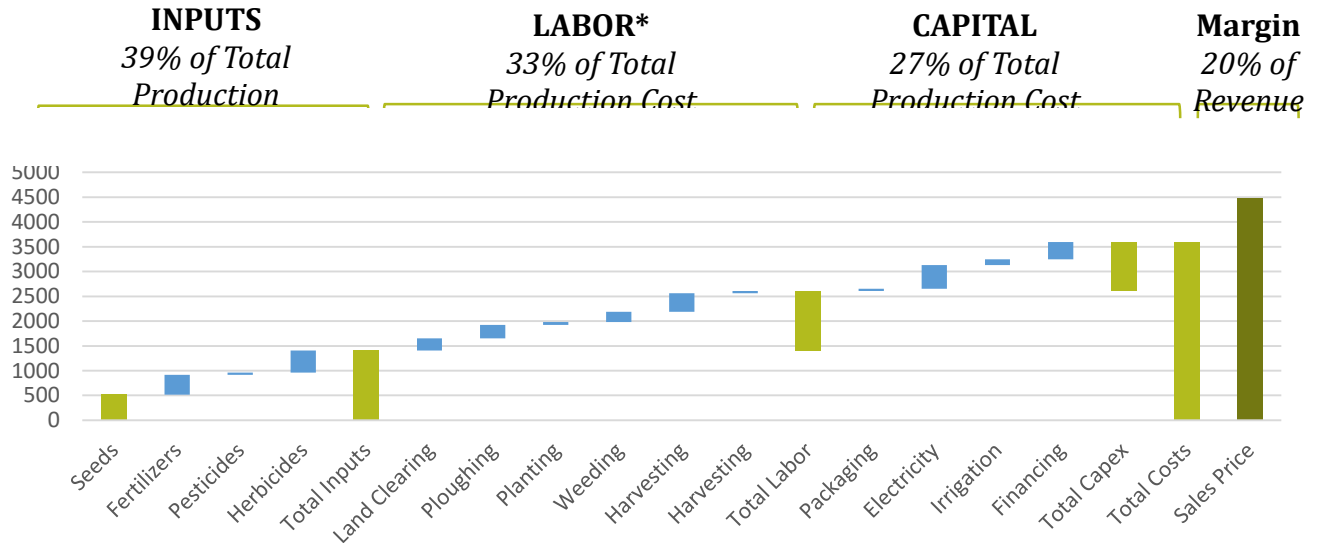
The study team engaged agronomists and agricultural economists to try and determine the profitability of bean/pulses production by farmers who have access to correct seed, inputs, agronomic and post harvest support.

The engagement revealed that a farmer applying proper agronomic practices, and using correct inputs could achieve yields of up to 1.3 mT per hectare. Such a yield results in as much as ZMK 900 profit per hectare. This amount can increase if the farmer does not hire in any of the labour. Effectively double this return is achievable.

An analysis of the margins along the value chain indicated that, the long trading chain that has layered margin takers generally disadvantaged farmers. If the chain were shorter, due to the presence of properly established aggregation centers, farmers would realize greater value than they currently are able to obtain.

Farmer cost economics for beans

Kwacha per Ha, per annum



1.3 tonnes per hectare, sales price is K3, 450 per tonne. If farmer supplies labour he/she should realize this as a net gain. If labour cost is reduced than farmer margins increase to 47%

Figure 13: Farmer level economics of bean production in Zambia

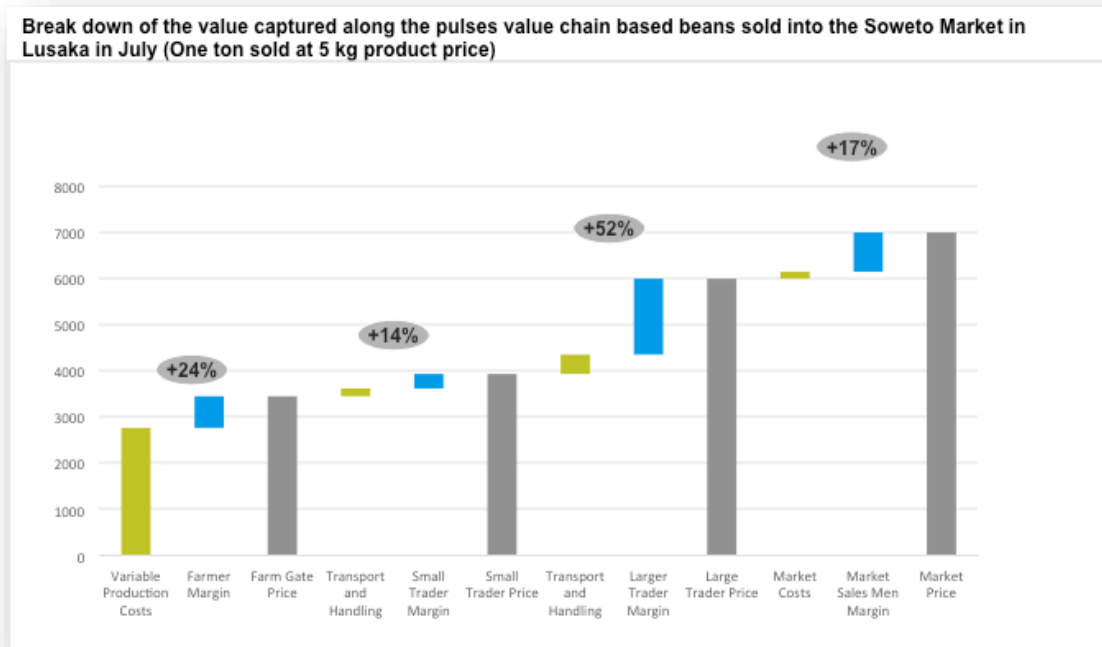


Figure 14: Margin spread from farm to consumer in the beans/pulses value chain.

Recommendations

Aggregation Centre Selection

The study team examined a number of critical criteria that would be a prerequisite to the selection of a centre to be included into the network of approved aggregation centres. The following criteria were considered;

- The existing facilities currently operated by WFP, and private sector players, namely NWK Agri Services, AFGRI, Cargill and Zambia National Farmers Union (ZNFU).
- The location of CASU districts in relation to HGSF districts.
- Proximity to CASU districts with high levels of production of beans/pulses.
- Potential logistics costs from areas to supply to areas of demand.
- Availability of suitable storage facilities (that are of the quality required to be registered within the WRS).
- Anticipated management costs to the scheme.

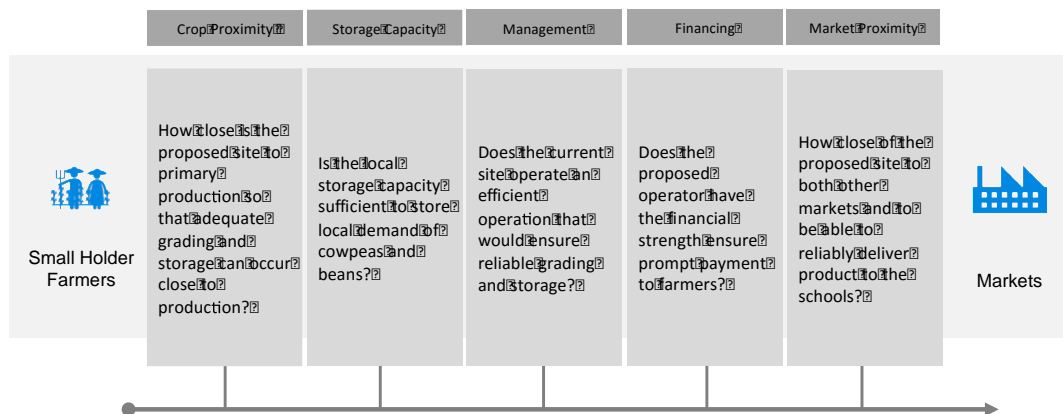


Figure 15 : Criteria used to determine ideal location of Aggregation Centres

A matrix was developed to match the areas that had a strong correlation between supply and demand factors. This matrix was then used to develop a shortlist of ideal potential sites.

The Market Opportunity and Assessment Metric for Phase 1 and 2

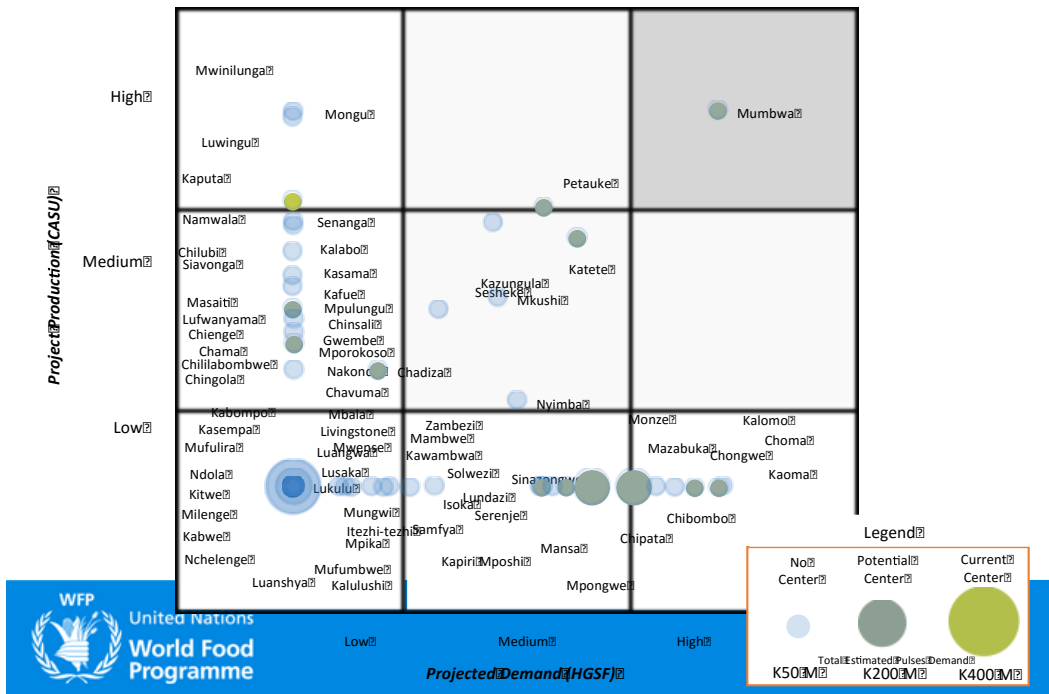


Figure 16: Evaluation of Specific Districts for suitability to host aggregation Centres.

A number of sites were selected and recommended to form the initial set of sites that meet the criteria. The exercise identified 20 sites belonging to NWK Agri

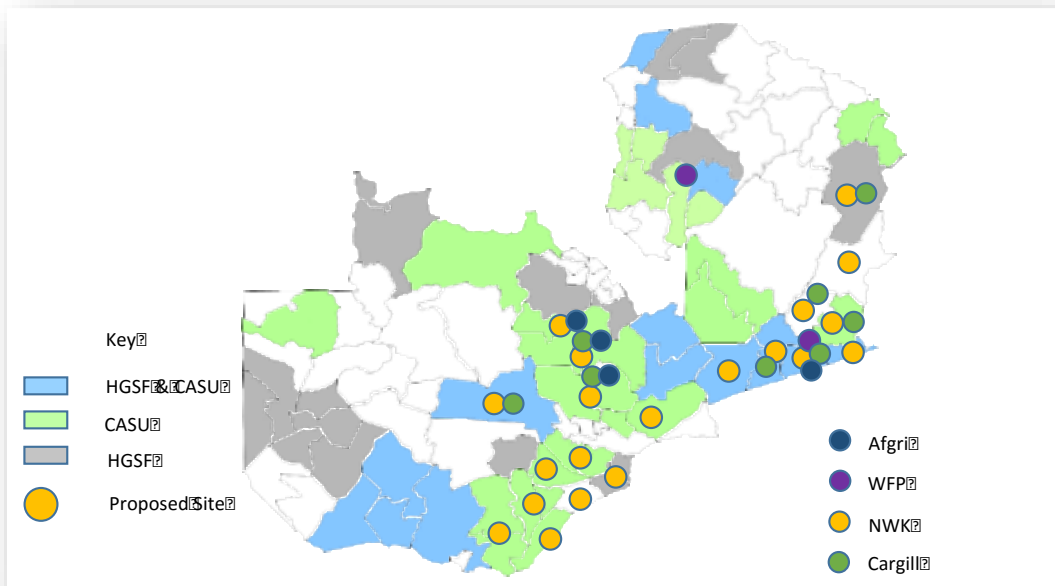


Figure 27 Map of CASU, HGFS, and Potential Aggregation Hubs

Services, 8 belonging to Cargill, two existing WFP hubs, and 4 AFGRI sites. The distribution of these sites matches both the production potential areas as well as the HGFS sites.

Proposed Operational Systems for the Aggregation Centres

Discussions with various actors and players to determine the best operational model for the Aggregation Centres indicated the need to clearly identify the key players, their functions and the inter-relations between parties as the basis for the operational model

Key Players

Aggregation Centre Operator

The aggregation centre operator must be able to fulfill the function of inputs distribution, production planning and technical support, as well as market coordination of the harvested crop. The conclusion was that it would not be viable for an aggregator to only provide a collection service for the harvested crop. The costs of maintaining aggregation centre infrastructure and staff would be too prohibitive if

activities only took place at harvest. If the aggregator offers the full range of services, input supply and potentially mechanization services will be offered at the beginning of the season. During the growing season, technical support and crop monitoring will be provided to participating farmers. At the end of the season, consolidation of crops and their marketing will be the main activity. This will ensure a full suite of services that can be rendered throughout the whole year.

Some aggregators will even be able to provide financial services to participating farmers as a further value added service.

Lead Farmer

The CASU programme is premised on the existence of a core group of lead farmers who are the primary recipients of information and inputs. The project envisages these lead farmers having the responsibility to organize distribution of inputs and collection of production. The lead farmer will be responsible for disseminating price information, aggregation local production and coordination of delivery to the nearest Aggregation Centre.

The emerging or follower farmers

As part of the CASU programme, each lead farmer is expected to support at least 15 follower farmers by way of last mile input distribution, and information dissemination. These farmers are expected to improve their productivity over time and therefore be able to have excess production to sell into the aggregation centre. The whole programme depends on an upward trajectory of the productivity of follower farmers. Their performance will increase volumes available for marketing, which in turn will improve the viability of the functioning of the aggregation centres.

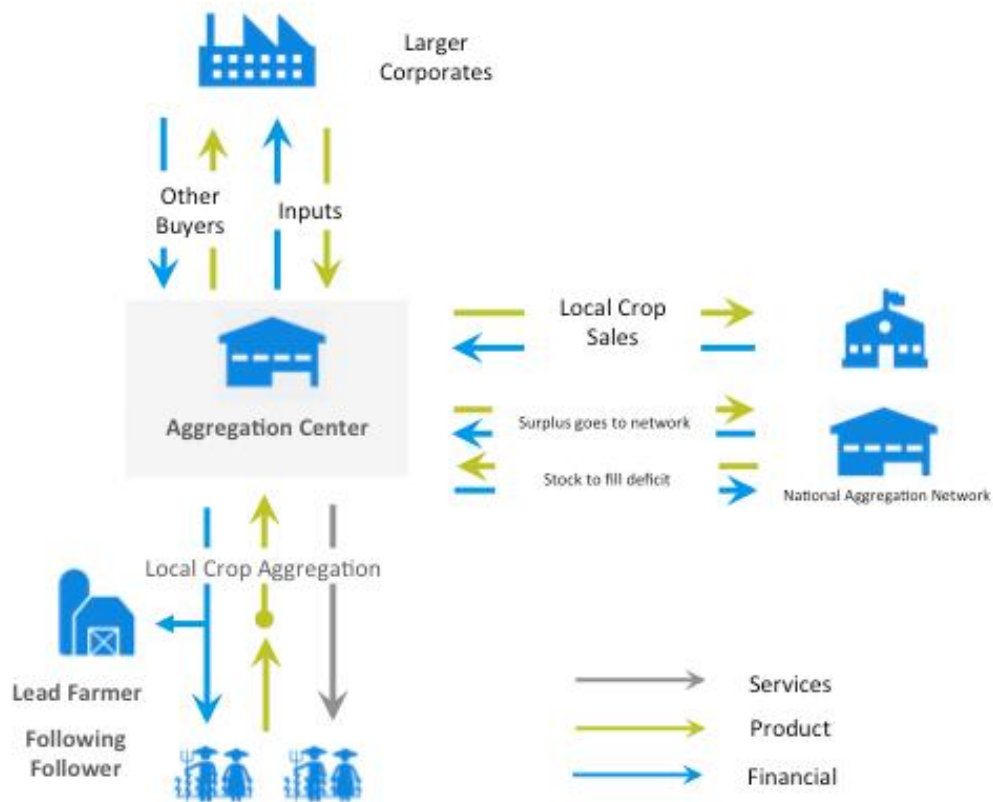


Figure 18: Schematic of the inter relations within an Aggregation Centre

Aggregation Centre Network Operations

The network of aggregation centres will all be interlinked in order to create a level of uniformity or predictability. Some of the key functions and activities will include, farmer mobilization, provision of crop estimates into the network, facilitating and coordinating 1st leg transport and logistics, price communication based on an agreed reference price, and the administration of payments to farmers.

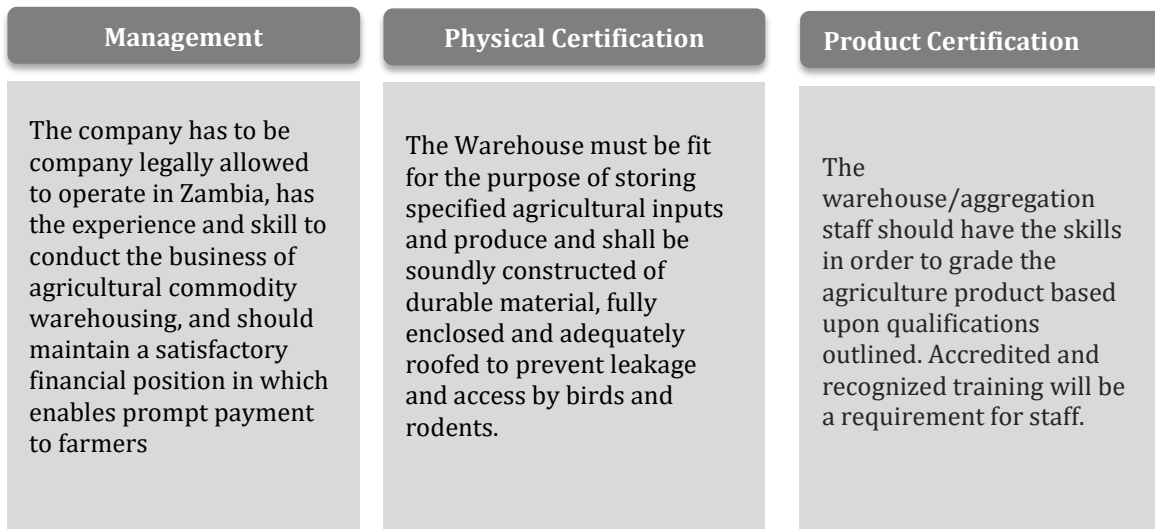
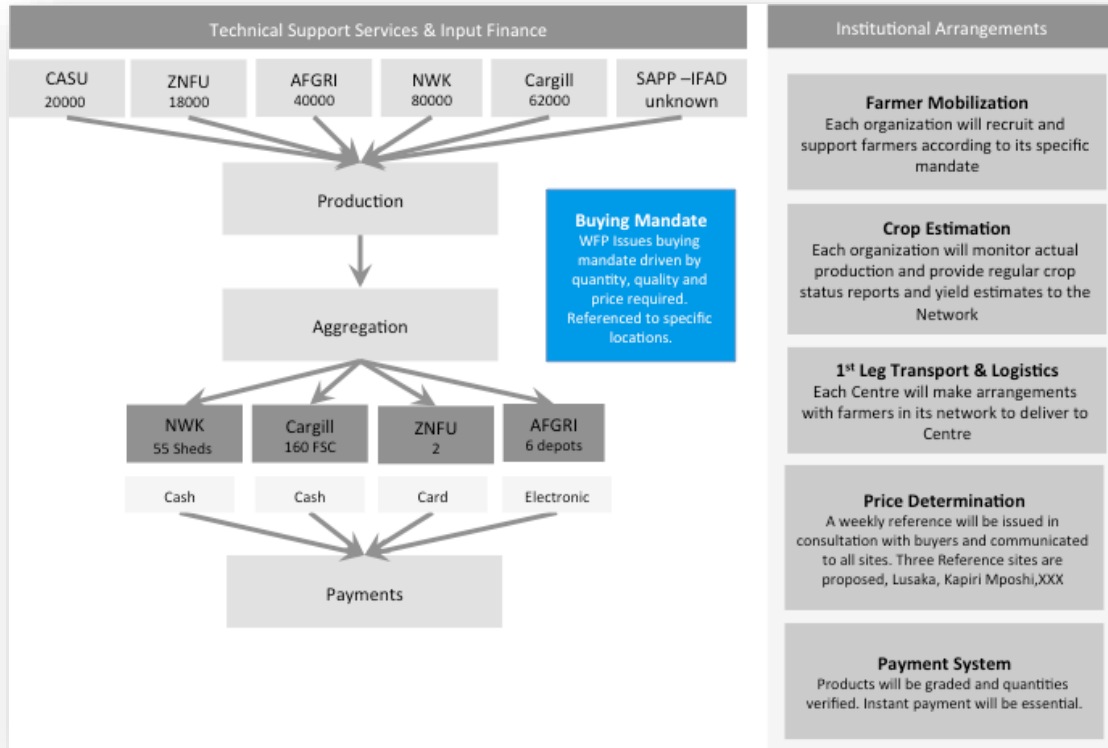


Figure 19: A Schematic of how the Aggregation Centre Network is expected to operate.

In order to ensure the standardization of network operations, some key issues have been highlighted as non-negotiable minimum compliance standards. The three factors are the Certification of Warehouses/aggregation facilities, Minimum management capability requirements, and capacity for product certification.

Proposed Payment Methods

The credibility of the scheme for farmers will largely depend on the perceived reliability of the services offered at the aggregation centres. In addition to timeous supply of inputs, provision of sound agronomic advisory services, the product grading and farmer payment systems will need to be beyond reproach. Discussions with various actors outlined a number of options on how payment systems can be handled. Three potential systems were evaluated, cash payments, mobile payments, and electronic card payments.

Cash Payments

The advantage to farmers is that they would immediately be able to realize the value of their transaction/sale immediately in a format that they are familiar with. However handling large sums of cash is an expensive exercise that also creates substantial security risks. Most private sector aggregation centre operators have adequate systems for handling cash.

Mobile Payments

Mobile payments are touted the world over as the most innovative means of administering payments. However the suitability of mobile payments is often premised on universal or high mobile network coverage, and availability of agencies that allow farmers to convert mobile money to cash, when they need to. The banking system must also be able to provide reliable payments back office to mobile operators. It would appear that the mobile money system in Zambia is still in need of development.

Our recommendation is that mobile payments be included as part of the suite of payment options for farmers.

Electronic Card Payments

Electronic card payments are similar to the electronic voucher payment systems that have already been used extensively in the distribution of inputs by programmes such as the CASU programme and government input distribution systems. Some players like the ZNFU have developed electronic payment cards that allow them to load farmer loan data, and administer input access as well as revenue collection when

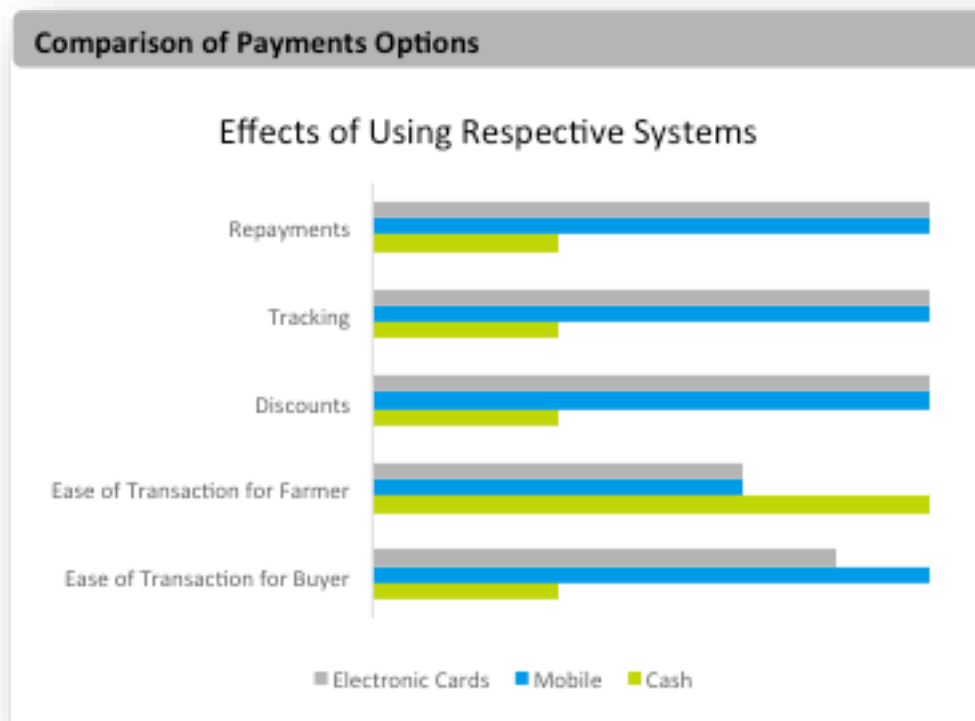


Figure 20: Comparison of possible payment systems for Aggregation Centres

farmers sell their commodities through approved networks.

Our recommendation is that where appropriate, it might be necessary to adopt such a system.

The Pricing System

The pricing system will need to be a transparent and credible system that properly discloses factors such as administrative costs, storage and handling, and logistics costs in a manner that farmers can understand and accept. Failure to achieve this level of transparency might collapse the whole scheme.

In discussion with the various private sector players, there seems to be acceptance of a reference pricing system, which will be, based on accepted reference areas, and add transport and logistics costs as well as handling and storage costs to determine the price the farmers receive.

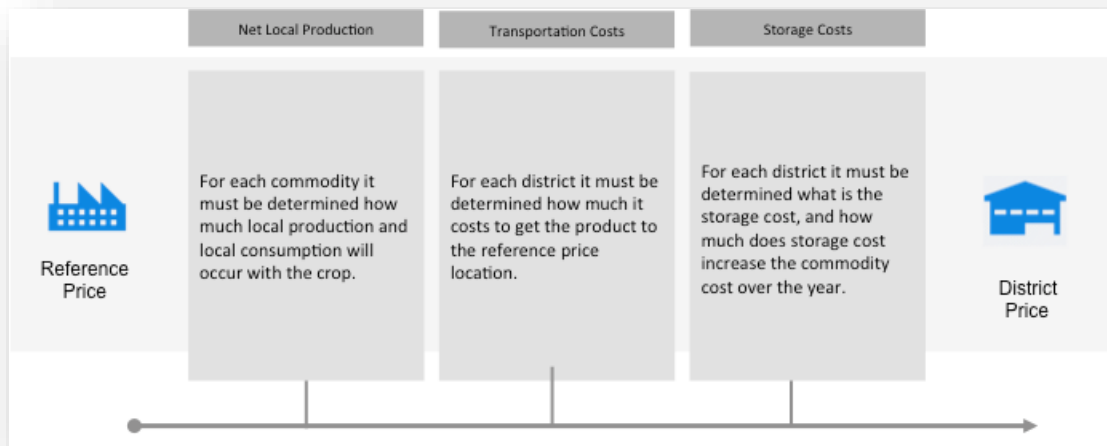


Figure 21 Reference Price Rationale

The study has sought to establish 4 reference locations that are located in the Northern, Central, Eastern and Lusaka provinces.

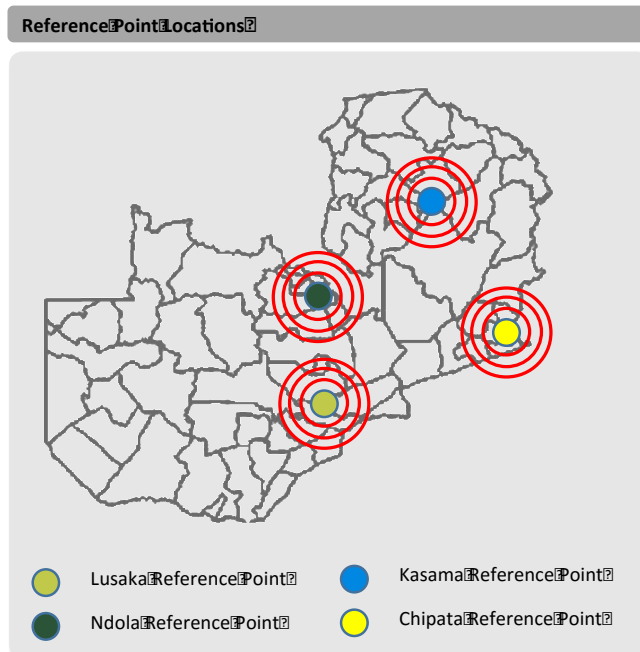


Figure 22 Map of Reference Price Locations

Rationale for the reference points

Lusaka: The main consumption in Zambia

Ndola: The main location for DRC export

Kasama: The main production region

Chipata: Third highest population concentration and export to neighboring countries

Since the beans/pulses market is not currently transparent, several iterations of pricing will need to be done to find an adequate market price.

Through using the reference prices based on historical information to serve of a launching point, conversations with local players the price will adjust the price throughout the year. Regions with higher demand than production will have higher prices mostly due to transport costs.

Regions where there is higher production than local consumption will export to other regions. Since there is enough local production the crop must be exported to a consumption point, which will lower the local market price due to transportation to those markets.

Consumption preferences, which change localized demand patterns, can be found throughout the country.

Timeline for developing the Aggregation Centre Model

It is recommended that the development and refinement of the Aggregation Centre model be carried out over a minimum of three years. The first year should focus on setting up the initial twenty (20) Aggregation Centres and allowing for the testing of the model. Beyond year one, the priority would be expansion of the network and integration into the WRS and ZAMACE systems and ultimately setting up a franchisable system in year three.

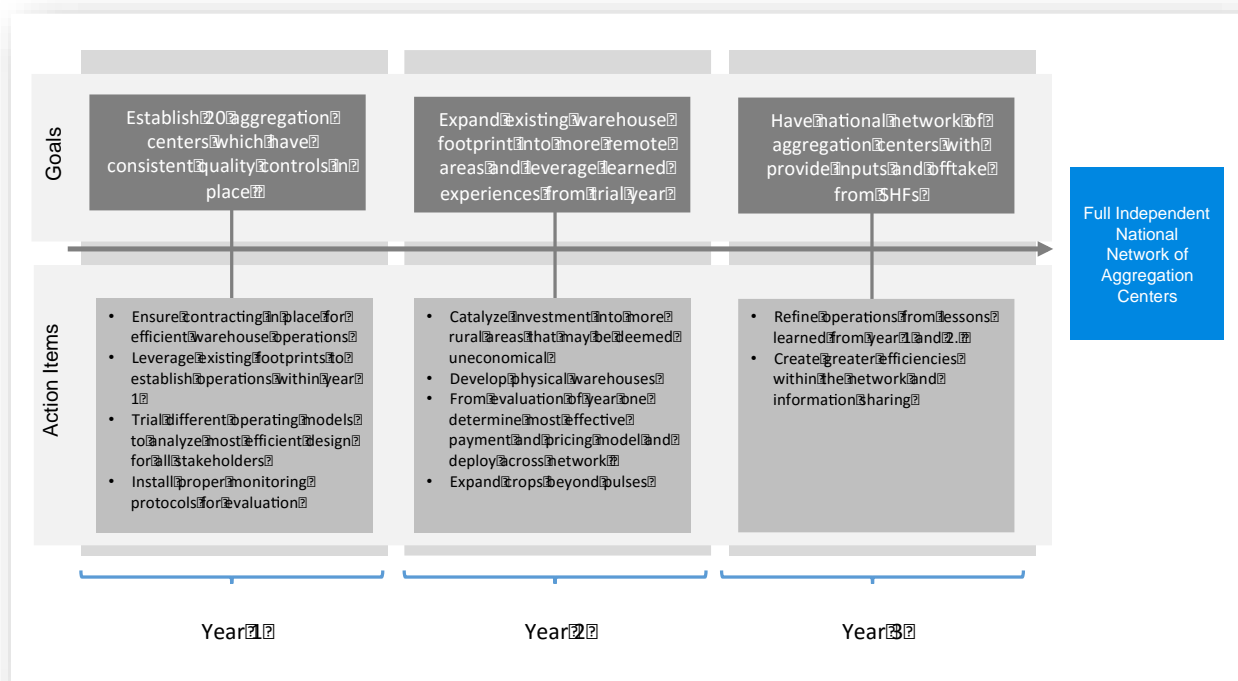


Figure 23 Timeline of Aggregation Center Rollout

Strategic Private Sector Partners

From the discussions that were held with private sector partners, 3 partners have been identified that possess the right kind of footprint across the country, possess capability to disseminate information and an in-built ability to manage a payment system of the nature that this undertaking will require.

The matrix below shows the comparative capabilities of the three private sector partners.

	Overview	Footprint	Marketing	Payment
NWK	Extensive footprint with inputs and offtake from SHFs	60 collection points	SMS system to communicate with farmers	Cash delivery to farmers when product is delivered
Cargill	Clean and bright appearance, natural odor	160 collection points	SMS system to communicate with farmers	Cash delivery to farmers when product is delivered
Afgri	Experienced grain manager with limited rural footprint	6 large depots	SMS system to communicate with farmers	Electronic system to pay farmers when product is delivered

Figure 24 Potential Private Sector Players

Recommended Legal and Contracting Framework

All selected aggregators will be expected to adhere to a set of standards that relate to the facilities that are used, the processes, the quality standards, pricing and general reporting requirements. The basis a most of these recommendations is the proposed Warehouse Receipt System as proposed by ZAMACE.

Warehouse Physical Standards

The Warehouse/Aggregation Centre must be fit for the purpose of storing specified agricultural inputs and produce and shall be soundly constructed of durable material, fully enclosed and adequately roofed to prevent leakage and access by birds and rodents. There must be adequate, well-maintained and effective drainage and sufficient clean hard standing at the warehouse entrance(s) to minimize seepage of water and mud into the Certified Warehouse.

The warehouse operator must ensure that the whole site is kept in a satisfactory condition all the time by ensuring the following:

- Repair or replace damaged sections;
- Ensure adequate lighting;
- Fit standard padlocks;
- Make sure drainage is working;
- Fill potholes;
- Remove all rubbish from the premises;
- Cut grass, bushes and trees;

Boundary fences and gates must be secure against unauthorized entry of people and animals.

The ventilation must be adequate to prevent the build-up of hot air and to prevent condensation.

All electrical switches, sockets, wiring, lighting etc., shall conform to relevant fire/safety regulations and be sited well clear of all stored materials.

The warehouse/ aggregation centre must have a smooth concrete floor that is hard enough to bear the load expected and prevents cracks or holes making it easy to clean and does not offer insects any place to hide. Polythene or PVC sheets must be used as a groundsheet and be placed under the first layer of bags. All bags must be placed upon pallets. The groundsheet is intended to shield the bags from moisture penetration.

Warehouse Tool Requirements

The Warehouse/Aggregation Centre Operator shall have well maintained equipment necessary to sample and grade all inbound and outbound commodities for which a Warehouse is certified. A Certified Warehouse/ Aggregation Centre must also have an area with sufficient lighting designated for grading agricultural commodities. The following equipment must be available for sampling and grading purposes:

Each Certified Warehouse must be equipped with suitable platform scales in good order, and so placed that all grain, whether for storage or not, can be weighed in and

out of the warehouse. The scales shall be subject to annual examination and certification by the Superintendent Assizer under the Weights and Measures Act Chapter 403 of the Laws of Zambia.

Each Certified Warehouse shall at all times comply with fire prevention and control requirements as prescribed by insurance policies they take, including having adequate, functional fire fighting equipment and materials on site as given below:

- a) Fire Extinguishers
- b) Bucket of sand
- c) Designated assembly point in case of fire.

Warehouse Branding

Each warehouse must utilize the branding outlined within the branding section of this document. The branding must be displayed prominently.

Warehouse Management Certification

A Certified Warehouse Operator shall only employ competent and where necessary qualified handlers of commodities including samplers, graders and weighers.

All employees should have the required licensing for their respective positions.

All Certified Warehouse Operator employees shall be made aware of the importance of their own personal hygiene and shall be provided with proper toilet and washing facilities which must be kept clean at all times.

No person known to be suffering from a communicable enteric disease shall be employed in the handling of agricultural commodities in a Certified Warehouse.

All Certified Warehouse Operators shall take cognizance of and adhere to all obligations under Zambian employment, health and safety legislation and any other legislation relevant to the conduct of business related to trade in the agricultural commodity for which it is certified.

Warehouse Management

Every Certified Warehouse Operator shall at all times exercise such care in regard to the agricultural commodities in his/her custody as a reasonable careful owner would exercise under the same circumstances and conditions.

The Certified Warehouse Operator shall keep any bagged commodities in an orderly manner so as to permit easy access to all lots and to facilitate inspection, sampling, counting and identification of each lot.

Mending the roof and use of sand bag snakes to avoid damage to the stored commodity must prevent any water entry into a Certified Warehouse through leakage and seepage.

A Certified Warehouse Operator shall take all necessary measure to exclude rodents from the vicinity of any Certified Warehouse and such measures shall be designed to ensure that poison baits cannot contaminate agricultural commodities stored in a Certified Warehouse.

A Warehouse Operator shall take all necessary measures to discourage birds from the vicinity of Certified Warehouses and to prevent their entry into Certified Warehouses. Only pesticides approved by the Ministry of Agriculture and Livestock shall be used in a Certified Warehouse.

A Certified Warehouse Operator shall keep his Certified Warehouse reasonably clean at all times and a routine cleaning program must be employed covering all parts of the store and structures.

Any equipment used for loading or unloading must be suitable for the purpose and must be routinely maintained in a clean condition.

The Warehouse Operator must ensure initial fumigation of the warehouse by way of spraying. Once the warehouse becomes operational, the warehouse and commodities therein requires fumigation on a regular basis. The frequency of fumigation depends on the judgments made by the Warehouse Operator after his routine inspections of the stock. However fumigation must be done at least once a month. A licensed company must execute fumigation.

Warehouse Grading Requirements

Only Graders, Samplers or Weighers certified by ZAMACE shall be authorized to grade, sample or weigh commodities stored by a Certified Warehouse.

- Grading of pulses and other agricultural commodities shall be carried out in accordance with commodity standards. For cowpeas and beans the

requirements may be found within the following page. WFP may from time to time develop and amend standards for the grading and sampling of agricultural commodities, which will be negotiated and communicated with relevant parties.

- As soon as practicable after grading or weighing agricultural commodities when receiving or issuing at a Certified Warehouse and not later than the close of business on the next following business day, the Certified Grader and Sampler or Weighers shall issue a Weighing and Grading certificate for each lot or parcel of the agricultural commodities and make it accessible to parties interested in storage of the said lot or parcel of agricultural commodities.
- Weighing and Grading certificate issued shall contain such information as: name and location of the certified Warehouse in which the agricultural commodities are stored; whether the said agricultural commodities are graded or weighed in or out of the Certified Warehouse; net weight or grade of the commodity; date of certificate; consecutive number of the certificate; a statement that the certificate is issued under the rules and requirements of WFP; and the signature of the certified Grader and Sampler or Weigher.

Bagging

- All products destined for WFP purchases must be put into a 50 kg WFP labeled bag. For cowpeas the product must be transposed into a 50 kg PICS bag which is labeled with WFP.

Product Specifications

The minimum product specifications are based on the WFP's product specification protocols. We recommend that these be the minimum specifications for product sourced in this system.

	Beans Limit	Cowpeas Limit
Organoleptic	Clean and bright appearance, natural odor	Clean and bright appearance, natural odor
Moisture	12.0% m/m max by ISO 711-2009	16.0% max by weight ISO 712:2009
Foreign Matter	1.0% m/m max by visual examination	1.0% m/m max by visual examination
Damaged	1.0% m/m max by visual examination	5.0% m/m max by visual examination
Shriveled	2.0% m/m max by visual examination	
Weevil	1.0% m/m max by visual examination	
Contrasting	1.0% m/m max by visual examination	1.0% m/m max by visual examination
Split	1.0% m/m max by visual examination	
Admixtures	1.0% m/m max by visual examination	10.0% m/m max by visual examination
Aflatoxin	3 ppb max	
Live/Dead Insects	Nil, 10 per kg max by visual examination	Nil by visual examination
GMO	0.0% of GMO material	

Figure 25 Product Specifications for Beans and Cowpeas for WFP purchasing

Warehouse Financial Certification

The company has to be a limited liability company with issued share capital and duly registered under the Laws of Zambia, and conducting or intending to conduct the business of agricultural commodity warehousing

The Warehouse operator must provide WFP with the following documents:

- Copy of certificate of incorporation
- Tax Clearance Certificate / VAT Registration Certificate
- Tax Payers Identification Number (TPIN)
- All other relevant municipal / Local council Licenses
- Insurance

A Warehouse Operator applying to be a purchaser for WFP shall, obtain a certificate of insurance evidencing an effective policy of insurance issued by an insurance company licensed by the Pensions and Insurance Authority to do business in Zambia. A Certified Warehouse Operator shall not cancel any approved insurance coverage without the prior written approval during the duration of contracting with WFP.

The Certified Warehouse Operator shall ensure full compliance with the terms and conditions of any insurance policies, and shall not commit any acts nor permit any

employees or other persons to commit any act or omission, which may impair or prejudice such insurance policies.

Financial

All Warehouse Operators should maintain a satisfactory financial position in which enables the warehouse to pay farmers when product is received in either cash or cash equivalents. Payment systems outside of a cash transfer will need to be approved by WFP.

Payment and Communication

Communications

Each warehouse operator must maintain a database and a communication system in which the warehouse operator can directly communicate with farmers and other interested parties. All farmers who have delivered product to the warehouse within the last three years must be maintained on the database.

On Monday of each week, the warehouse operator must communicate the price of goods to the constituents maintained in the database.

Payments

Each warehouse operator must utilize a system to guarantee prompt payment to farmers at the time of delivery.

Payments must be tracked by the warehouse operator and stored on the database in accordance with reporting standards outlined within.

The best payment systems will utilize some incentive program in which farmers can get rebates for purchasing input from the warehouse operator.

The price to be paid to each farmer per unit and quality of product will be determined through negotiation with WFP, which will initially be based upon a reference price model.

Reporting Requirements

Efficient record keeping provide the information that enables the warehouse Operator to make the correct decisions. Without an effective record keeping system, management decisions will be impaired or made impossible. Following below are the

key documents and their use, which must support all the transactions, related to commodity receipt, storage and dispatch.

Certified Warehouse Operator shall maintain and keep updated on a daily basis a Daily Stock Summary that shall be a record of commodities stored at each Certified Warehouse and the Daily Stock Summary shall at a minimum state:

- Commodities received daily;
- Commodities shipped daily;
- Commodities remaining in each Certified Warehouse at the close of each working day;
- Commodities belonging to any third parties for which transfer of ownership has not taken place

The warehouse operator must keep a system which can track which farmers, by national identification numbers, are delivering which type of product, the quantity of the product, the grade of the product, the amount of money or its equivalents paid to the farmer, the price per unit.

The reporting should be accessible by WFP or an affiliated partner. Every effort will be taken to ensure that the database is not shared with competitors of the warehouse. The warehouse operator must collect any other data required from the aggregation centre by WFP and/ or FAO for the project evaluation that would have been agreed upon in the terms of contract.

Price Determination

The initial price will be determined based upon consultation with players in the field, and historical pricing information. Each district will have a different purchasing price based upon the nearest reference price available. The district price will be set as the floor price for the product. The district price is the price, which will be communicated to farmers and paid to them.

The contract price that is determined includes all costs such as sieving, cleaning, bagging, and loading the product. The price includes statutory VAT and other taxes, if any and is the price, which will be paid to the aggregation site operator.

Storage costs will be set at a flat rate of ##² USD per ton per month.

The Seller and the buyer must agree that once the market price fluctuates beyond certain limits the buyer and seller will jointly review the price and harmonize accordingly. If the price fluctuates at lower side, the floor price for this agreement shall remain. The district price may also change based upon consultation between the buyer and the seller if it is deemed that the market price is too low to secure the quantities of product needed.

Prices will be determined on Monday of every week and delivered to the market through the corporate's communication channels by 16:00 Zambian local time Monday of each week.

Mode of Payment

The Seller and Buyer shall agree to make ALL payments through bank transfers.

Payment will be made within ## days (##) after the buyer receiving the quantity of beans of quality and standards as agreed in this contract.

The buyer will have to pay the seller in a United State dollar denominated amount in the local currency (Zambian Kwacha) once the seller submits invoice and delivery note to the seller. {Price will change according to market prices}

Payment to Farmers

Payment to farmers should occur at the time of delivery to the collection point. Farmers should receive 100% of the market price.

Action Plan on the way forward

The recommendation is that the following activities be instituted in order to operationalize the Aggregation Centre Model.

- I. Convene a stakeholder's workshop to share the recommendations of the study. The key stakeholders should be WFP, FAO, IFAD, private sector agribusinesses, the ZNFU and ZAMACE.

² To be determined in consultation with operators.

- II. A pilot set of the recommended 20 Aggregation Centres be evaluated and accredited.
- III. WFP issues a buying mandate to each of the sites, indicating quantity, and price reference.
- IV. Review the progress of the Aggregation Centre performance at the end of the marketing season (July/August 2015)