



Government of Zimbabwe

Rural Agro-Industrial Development Centres

Aggregation Model Investment Brief

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Investment Brief: Agricultural Produce Aggregation

Investment Opportunity: Rural Agri Industrial Development Centres- Commodity Aggregation and Onion Drying Facilities

Investment Summary

Problem	<p>Lack of aggregation facilities for small holder farmers results in loss of potential gains that would ordinarily ensue from economies of scale and time of sale. A case in point is onion and garlic farmers who experience challenges in maintaining the quality of their produce. Studies indicate that smallholder onion farmers lose up to 30% of their produce due to post-harvest losses. In essence, if farmers are losing 30% of their commodity value due to post-harvest losses, they are making huge losses. The losses are mainly attributed to lack of appropriate storage facilities as well as pre-treatment of the onion bulbs to preserve and prolong its shelf life. Onions and garlic need areas that are dry and spacious to allow air circulation. Several smallholder farmers do not have such kind of treatment and storage facilities. To reduce post-harvest losses attached to perishability, there is need either for cold room storage or dehydration or drying facilities to prolong onion shelf life.</p> <p>Other horticultural produce is affected by lack of aggregation and cold chain to minimise post-harvest losses and maintain quality. Banana losses can be as high as 65% from field, transport, distribution, and retail (Mogge et al. (2020) and Mvumi et al. (2020))</p> <p>Fish farmers and small livestock farmers have no access to cold chain facilities to preserve their produce and collectively bulk produce to achieve cost effective economies of scale during transportation and marketing.</p>		
Solution	<p>Development of aggregation and cold chain facilities in the production centres shall reduce the cost of marketing, preserve the quality of produce, minimise post-harvest losses and encourage farmers to have well organised and timed production processes. This shall minimise market disruptions associated with flush productivity that tends to cause excess supply of produce or prolonged shortage windows.</p> <p>The development of drying facilities shall allow farmers to control the moisture levels of long shelf life of produce like garlic and onions. Deployment of blast freezers and cold room enables farmers to preserve for long fresh produce and freeze meat products including poultry, other small livestock, fish, and beef.</p>		
Investment Outlay	Private Sector	Aggregation centres and working capital	US\$87.3million
	Public	Land, duties, and taxes rebates	US\$22million
Product /Services	Drying facilities, storage, cold storage, blast freezing, transportation, offtake market, distribution		
Forecast initial market/demand	The urban population in Zimbabwe is 4,110,456 (Zimstats 2021)		
Scale	Aggregation centres only	Mhangura, Shamva, Nyanga, Zvishavane, Chinhoyi, Gweru, Matopo, Zaka, Chegutu, Gokwe, Birchenough Bridge, Murehwa, Kwekwe/Zhombe, Domboshava, Mutoko, Umguza, Macheke	
	Cold rooms and pack sheds	Chegutu and Chinhoyi, Gokwe-Kwekwe-Gweru, Mutoko-Murehwa-Domboshava, Mazowe-Bindura-Shamva, Nyanga-Mutasa-Mutare	
	Onion driers	Manicaland and Mashonaland West	

Profitability Indicators	IRR 24% NPV US\$53.6million ROI 25% 5 year average PBP 3 years 2 months	
Socio-Economic Impact	Smallholder Farmer Support	Number of farmers reached- 250 150
	Poverty Indicators	<p>Small holder farmers are expected to commit 0.5ha of land to horticultural production. The expected annual income from a basket of crops (leafy vegetables, cabbages, tomatoes, onions, and beans) is US\$1 250 per annum up from an estimated US\$437 for above average farmers.</p> <p>Horticulture crops complement incomes and are vital for nutritional benefits. Affording 250 150 households that would in turn sell excess produce to more rural households and millions urban dwellers shall have a positive impact on nutrition.</p>
	Efficiency & Output Indicators	Production and productivity index: Creating a viable market for small holder farmers shall improve productivity of over 1million small holder farmers.
		Market Access: The horticultural market in Zimbabwe is well defined: retail supermarkets are the major delivery channel
Environmental Impact		
Enabling environment	Investment Approval and licencing	Government, through the Zimbabwe Investment Authority to facilitate a one stop shop investment approval and licencing process.
		Investor to commence international certification process of the pack house and cascade the process to farmers in preparation for export of produce.
	Fiscal Incentives	Duties and taxes rebates Tax holiday for an agreed period Dividend and capital repatriation modalities and funds escrowing to be put in place. This allows ease of funds movement from in-country to investor's country of origin.
	Policy Incentives	Government to protect the investor by restricting imports (industry protective measures) of horticultural produce during peak production periods.
Interconnected Investments	Input suppliers, processing entities (value addition), livestock abattoirs,	

A. Introduction

Horticultural production in Zimbabwe is a mixed bag ranging from mostly unstructured production by both classes of farmers for the local markets to highly controlled and managed production processes for the export markets. There are no aggregation facilities hence every farmer is responsible for transporting own produce to the markets. The lack of economies of scale increases the cost to the farmer and chipping off the thin gross profit margins.

The existing models are structured as follows:

- farmers produce as out growers or on open market basis.
- During harvesting, farmers secure purchase orders from off-taker companies,
- deliver the produce to the buyer,
- are offered a price by the buyer regardless of cost of production (sometimes the price is attractive and in other cases sub-optimal),
- are offered payment terms that range from cash on delivery, 14- 30-day terms and at times struggle to be paid.

Thus, the current production and marketing model is best described as unstructured. Individual marketing also proves to be less attractive, and farmers are at a weak position in entering negotiations with middlemen who use collective action in purchasing produce. The aggregation centre will play a long way in restoring farmer confidence through bettering their bargaining position. However, aggregation centres need appropriate structures with high storage efficiency. This is necessarily because, even when dried, onions need a cool dry place to maintain their quality. Otherwise, the whole produce can be contaminated, and farmers can encounter huge irrecoverable losses.

Banana marketing requires end-to-end cold chain to prevent or reduce huge losses being incurred by farmers. The huge losses are decimating farmers' profitability from the enterprise.

B. Context Analysis

Situation Analysis:

Lack of aggregation facilities for small holder farmers results in loss of potential gains that would ordinarily ensue from economies of scale and time of sale. A case in point is onion and garlic farmers who experience challenges in maintaining the quality of their produce. Studies indicate that smallholder onion farmers lose up to 30% of their produce due to post-harvest losses. In essence, if farmers are losing 30% of their commodity value due to post-harvest losses, they are making huge losses. The losses are mainly attributed to lack of appropriate storage facilities as well as pre-treatment of the onion bulbs to preserve and prolong its shelf life. Onions and garlic need areas that are dry and spacious to allow air circulation. Several smallholder farmers do not have such kind of treatment and storage facilities. To reduce post-harvest losses attached to perishability, there is need either for cold room storage or dehydration or drying facilities to prolong shelf life of horticultural produce.

Other horticultural produce is affected by lack of aggregation and cold chain to minimise post-harvest losses and maintain quality.

Fish farmers and small livestock farmers have no access to cold chain facilities to preserve their produce and collectively bulk produce to achieve cost effective economies of scale during transportation and marketing.

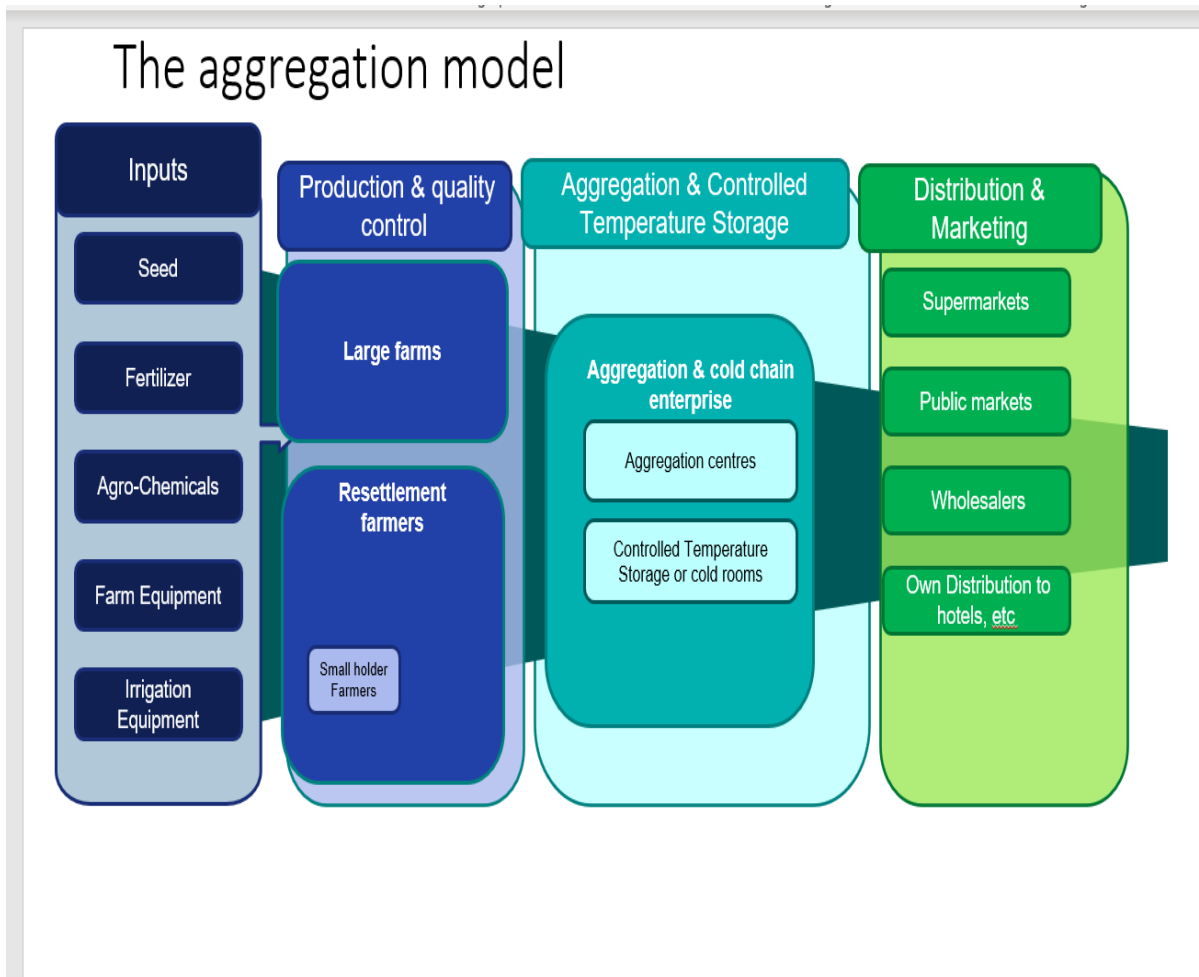
The table below depicts the current state of horticultural productivity in all the province of the country. It is evident that the country produces close to the market requirement, but research shows that 30-50% of the recorded production is lost during marketing.

Area	# of farmers 1								
		Onion	Tomato	Carrot	Garlic	Leafy veges	Peas	Cabbage	Banana
Mashonaland East	250150	39921.42	177573	27544.44	500	95738.72	4070	180635.4	
Manicaland	327491	54438.3	242145	37560.6	1500	130552.8	5550	246321	
Mashonaland West	170218	36292.2	161430	25040.4	100	87035.2	3700	164214	
Mashonaland Central	208589	18146.1	80715	12520.2	300	43517.6	1850	82107	
Masvingo	281095	10887.66	48429	7512.12		26110.56	1110	49264.2	
Midlands	288072	3629.22	16143	2504.04	300	8703.52	370	16421.4	
Matabeleland North	151630	9073.05	40357.5	6260.1		21758.8	925	41053.5	
Matabeleland South	136873	9073.05	40357.5	6260.1		21758.8	925	41053.5	
National Production		181461	807150	125202	2500	435176	18500	821070	280000

C. Model Description

Model description

The aggregation model will be operated by a private sector player who shall be responsible for all capital investments. The new investment shall result in the establishment of cold chain facilities. The private investor shall offer off take services and in turn distribute to all markets. Described below is the diagrammatic presentation of the model.



D. Forecast Market/Demand Narrative

Forecast Market Value US\$								
Estimated sales	Year 1	Year 2	Year 3	Year 4	Year 5			
US\$	96,796,875	111,316,406	128,013,867	147,215,947	169,298,339			
Forecast market volume (units)								
Crop		Onion	Tomatoes	Carrots	Cabbage	Leafy vegetables	Banana	Fish
Quantity (kg)		16,000,000	30,000,000	12,500,000	25,000,000	10,000,000	28,000,000	4,700,000
Buying price US\$		0.55	0.45	1.00	0.20	0.20	0.30	2.50
Cost of sales US\$		8,800,000	13,500,000	12,500,000	5,000,000	2,000,000	8,400,000	11,750,000
Internal costs US\$		2,200,000	3,375,000	3,125,000	1,250,000	500,000	2,100,000	2,937,500
Total costs US\$		11,000,000	16,875,000	15,625,000	6,250,000	2,500,000	10,500,000	14,687,500
Selling price US\$		0.86	0.70	1.56	0.31	0.31	0.47	3.91
Service fees US\$								
Total sales US\$		13,750,000	21,093,750	19,531,250	7,812,500	3,125,000	13,125,000	18,359,375
Internal costs %	25%							
Mark-up 25%	1.25							
Annual growth 15%	1.15							
Cost growth 7%	1.11							
market share		10%	5%	10%	4%	5%	10%	25%
National production tons		181,906	807,150	125,202	821,070	435,176	280,000	18,734
National supply		127,334	524,647	106,421	574,749	304,623	204,000	15,924
National demand		182,000	807,000	130,000	810,000	400,000	320,000	39,585
National gap		54,094	345,353	23,579	235,251	95,377	116,000	23,661

Source: TradeMap
Source: Agritex data

The table above shows national gap after adjusting for post-harvest losses that range from 15-35% and in some crops the losses are higher than 50%. Losses are higher during peak production periods.

Feasibility confidence level		
	Yes/No	Rationale
A technical perspective	Yes	There is adequate front-end work that has been done to test the model. There are existing structures that needs improvement.
A supply perspective	Yes	There are farmers who are currently producing near adequate volumes but are experiencing huge losses
A demand perspective	Yes	There is a sizeable gap to support the project
A legal/ regulatory perspective	Yes	Government supporting and spearheading the formation of the project and in some cases providing land for the establishment of projects
A farmer value perspective	Yes	It reduces post-harvest losses and increases revenue to the farmers
An economic perspective	Yes	Preserves the value of produce and improves to income security of producers. Value of agricultural produce shall increase.

E. Estimated impact

Economic Impact					
Financial forecast	Year 1	Year 2	Year 3	Year 4	Year 5
Units (tons)	126,200	145,130	166,900	195,934	220,724
Forecast revenue US\$ m	96.8	111.3	128	147.2	169.3
Forecast costs US\$ m	77.4	86	95.4	106	117.6
Forecast. profit (EBITDA) US\$	19.4	25.3	32.6	41.3	51.7
Key assumptions					
Ave. Profit margin 20%, Unit sales to increase 15% annually					

Social Impact					
Estimated # of beneficiary small holder farmers (cumulative)	18,000	27,000	54,000	152,000	250,150
Reduction of post-harvest losses (%)	30%	30%	30%	30%	30%
Increase in annual income per farmer (35%)- US\$437 (average tomato farmer)	590	590	590	590	590
Increase in annual income for banana farmers from US\$1250	795	795	795	795	795
Fish and poultry farmers shall have access to blast freezers immediately after slaughter.					
Key assumptions					
<ul style="list-style-type: none"> The company shall secure 7tons of produce per farmer during the first years of operation. 					

- Volume growth is projected at 15% per annum

F. Resource requirements and estimated return

Investment requirements			
Description	Cost	Time period	Comments
Building Machinery, cold rooms, commercial vehicles Support infrastructure (water, electricity <i>et al</i>) Other costs (vehicles, management <i>et al</i>)	US\$9.9m		All establishment costs
Total plant costs			
Working capital	US\$77.4m		Procurement of produce from farmers
Total	US\$87.3m		

Contribution from government			
Land	US\$3m		For project sites country wide
Waive duties and tax	US\$19m		Duties on importation of project vehicles and machinery/equipment
Total value of government's contribution US\$	US\$22m		

F.1 Financial return

Financial return

Aggregation model

Aggregation model financial returns

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Initial Investment	(87,338,500)						
Income		96,796,875	111,316,406	128,013,867	147,215,947	169,298,339	194,693,090
Outflow	87,338,500	77,437,500	85,955,625	95,410,744	105,905,926	117,555,577	130,486,691
Net cashflow	(87,338,500)	19,359,375	25,360,781	32,603,123	41,310,022	51,742,762	64,206,399
Discount rate	7%						
NPV US\$	44,791,042						
Payback period	3years 2 months						
IRR	23%						
ROI		22%	33%	38%	43%	49%	55%

G. Key risks and mitigating factors

Key risks and mitigating actions				
#	Description of risk	Potential impact (L, M, H)	Probability (L, M, H)	Mitigation strategies
Internal business risks				
1	Lack of electricity	H	H	Solar powered infrastructure
2	Ramp up production failing to meet demand	H	L	Use the import window to meet demand
Health, safety, and environmental risks				
1	Heavy vehicles use fossil fuels that has an impact on the carbon on the environment	H	M	Carefully planned to pick up produce.
2	Road network might not be favourable	M	M	State to assist in ensuring that the state of repair of roads is good
Market, regulatory and competitive risks				
1	Demand for produce might be overstated	H	L	Initiate demand creation activities and awareness.
2	Competition might respond in establishing similar facilities and services	H	M	Competitive pricing and timely delivery of services
Social and political risks				
1	Economic and political environment in Zimbabwe might not be palatable to some investors	H	M	Dialogue with government to ensure that investor concerns are addressed