



Government of Zimbabwe

Rural Agri Industrial Development Centres

Agricultural Mechanisation Programme Investment Proposal

Investment Brief

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Investment Brief: Mechanisation

Investment Opportunity: Tractor Assembly Plant and Mechanisation Centres

Investment Summary

Problem	Farmer productivity being curtailed by constrained practice of mechanised farming activities. The farmer to tractor ratio is 167 farmers to 1 tractor or 540 hectares to 1 tractor per farming season resulting in high hiring fees. Farming activities are being delayed by the unavailability of tractors. Animal drawn power is the alternative but requires more time to complete task. The country imports fully assembled machinery including tractors and are priced beyond the reach of most farmers, in the process reducing the procurement of the machinery.		
Solution	Local assembly of tractors will lower the cost of the tractor by a factor of 32%, thereby making them more affordable to farmers and entities offering hiring services. This development would stimulate production of tractor drawn implements and establishment of mechanisation centres. Farmers will access sustainably priced services and on time- productivity will increase by an estimated 30%.		
Investment Outlay	Private Sector	Tractor Assembly Plant	US\$81million
		Mechanisation Centres/Hubs	US\$101million
	Public	Land, duties and taxes rebates, farmer subsidies	US\$193million
Product /Services	Tractor assembly	Tractors and spare parts	
	Implement Manufacturers	Disch harrows, disc ploughs, sprayers, shellers, trailers, harvesters, seedling planters	
	Mechanisation hubs	Ploughing, planting, chemical spraying, harvesters, shellers, transport	
Forecast initial market/demand	Tractors	32 000 units with an estimated value of US\$544million (first 7 years)	
	Implements	80 000 implements valued at US\$664million (first 7 years)	
	Mechanisation services	US\$285million for the first 5 years	
Scale	Tractor Assembly	1 Plant in Priority micro region (Manicaland)	
	Implements	Expansion of existing plants in Harare, Bulawayo, Gweru, Mutare. New plants in Kwekwe, Chinhoyi, Masvingo, Murehwa	
	Mechanisation centres/hubs	600 centres in all major agricultural production regions. Mashonaland West, Mashonaland East, Mashonaland Central, Manicaland, Midlands, Masvingo, Matebeleland North and Matebeleland South	
Profitability Indicators	Tractor Assembly Plant		Mechanisation Centres/Hubs
	IRR 14% NPV US\$24.8million ROI 25% 5 year average PBP 4 years 7 months		IRR 17% NPV US\$39.4million ROI 36.4% 5 year average PBP 5years
Socio-Economic Impact	Smallholder Farmer Support	Number of farmers reached- estimated at 13 000 farmers in the first year to 493 000 farmers in year 5. Each tractor shall serve 32 farmers in a season. New tractor units shall grow from 400 in year 1 to 15 400 in year 5	
	Poverty Indicators	Income: A small holder maize farmer has increased the average annual income from US\$146.40 to US\$202.00	
		Food Security: Cereal import dependency ratio though decreasing, is still quite high at 42.5% according to the Zimbabwe Food Insecurity Experience Scale (FIES). Mechanisation is expected to increase cereal productivity by between 30-54%	
Efficiency & Output Indicators	Production: Farmers shall be able to plough all production land in time. The expected output is 1.7tons/ha of maize from the current average of 1ton/ha. Research showed that if mechanisation is supported by availing inputs on time, the yield per hectare increased by 54% and income by 38% (Vambe and Khan 2020)		
	Productivity: The national productivity, assuming everything being equal, can increase to over 4 million tons of maize (base being the		

		2020/21 season that produced 2.7million tons of maize). Market Access: The government through the Grain Marketing Board has the capacity to procure all maize production. In addition, grain millers shall have access to the grain produced by farmers.
Environmental Impact		
Enabling environment	Investment Approval and licencing	Government, through the Zimbabwe Investment Authority to facility a stop shop investment approval and licencing process
	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
	Policy Incentives	The Zimbabwe Standard Association to guarantee quality standards. Government to protect the investor by restricting imports(industry protective measures)

A. Introduction

<p>The country has a total land area of 39.6 million hectares and agriculture is practiced on 39.9% of the total land area (15.8 million ha) of which 10.9% is arable (4.31 million ha). There is a total of 1 340 045 farmers actively involved in agricultural production and are classified as follows:</p> <ul style="list-style-type: none"> 1 100 000 small holder farmers who are mostly communal farmers 213 356 small holding farmers 22 072 small scale and A2 resettlement farmers 4 317 large scale commercial farmers <p>Currently, there are just under 8 000 tractors serving 1 340 045 farmers who are farming 4.3 million hectares of land. At the peak of agricultural productivity in 1998, the country had a total of 26 000 tractors that were used mainly used by commercial farmers whereas small holder farmers traditionally rely on animal drawn power to carry out mechanical agriculture activities. Less than 5% of the small holder farmers has access to mechanization services.</p>

B. Context Analysis

Situation Analysis:

Currently, the country has a total of 7 983 tractors of which 5 300 are functional- required to service 239 745 commercial farmers, 1 100 000 small holder farmers who collectively have 4.3million hectares of arable land. The tractor holding figure is down from a high of 26 000 tractors in 1998.

Hereunder is the inventory of select tractor drawn implements in the country:

Machinery	Total units
Boom sprayer	1 049
Disc harrow	2 503
Disc plough	3 911
Fertiliser spreader	528
Lime spreader	256
Multi-crop thresher	266
Precision planter	1 036
Ridger	770
Ripper	1 009
Trailer	3 617

There are a total of 176 combine harvesters and 55 grain driers located on farms.

These implements are expected to serve 1 390 045 farmers spread across the 8 productive regions of the country. As such, there is an acute shortage of machinery to catalyse agricultural production to output levels that would make the nation a breadbasket of the sub-region and continent, let alone ensure food security for the country. Furthermore, the country imports all tractors as completely assembled units at a high cost of US\$25 000 for a 75hp tractor compared to US\$17,000 if the tractors are assembled in-country. There are several companies in the country that have the technical know how to assemble. These companies are currently manufacturing and assembling tractor drawn implements like disc ploughs, disc harrows, trailers et al.

The machinery inventory recorded above supports the production levels depicted in the table below. It is clear that the machinery is grossly inadequate and somewhat explains the low productivity per hectare that is experienced by farmers (e.g. grains consistently yield below one ton per hectare). This has also negatively affected the timeliness at which agricultural activities are implemented by all farmers as most activities are delayed due to machinery shortages.

Agricultural output by selected class of crop

Class of crop	2019		2020		2021	
	Output(ton)	Area(ha)	Output(ton)	Area(ha)	Output(ton)	Area(ha)
Grains	931 844	1 996 729	1 080 144	2 118 639	3 065 140	2 558 088
Tobacco	259 530	132 040	184 042	117 976	200 245	125 176
Oilseeds	203 890	287 386	245 024	418 419	310 343	562 831
Sugarcane	5 562 674	69 970	5 860 931	74 189	5 886 527	74 513
Other	120 649	110 102	186 402	125 943	499 208	172 122

Opportunity

There is inadequate supply of machinery to enable farmers utilise efficient farming practices that enhance productivity. The country lacks manufacturing capabilities that would result in readily available machinery at a competitive price.

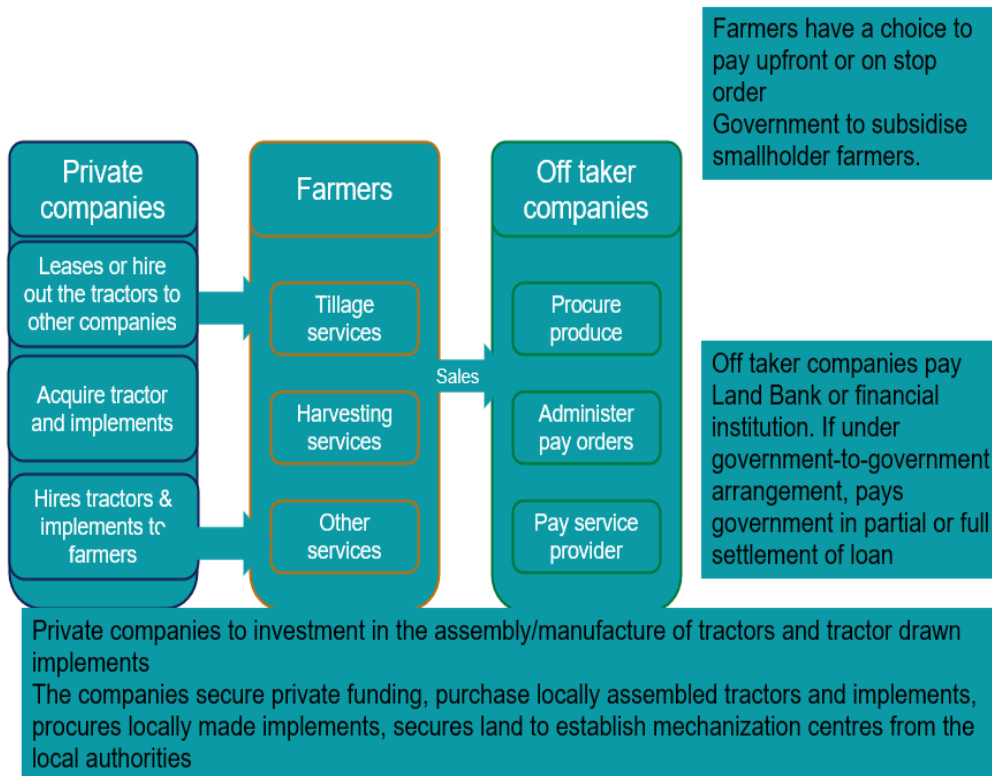
The first step would be to assemble/manufacture tractors and all tractor drawn implements in country. The investment will lower the cost of tractors by over 30%, in the process promoting direct purchases by farmers and enable operators of farm machinery hiring centres to easily access tractors and implements at prices that aids quicker return on investment. All high productive micro regions like Mashonaland East, West and Central and Midlands have suggested that a mechanisation investment project modelled around the creation of mechanisation service centres would increase timely access to farm machinery and implements and stimulate agricultural productivity amongst all classes of farmers. The farmers would access the equipment through either ownership or hiring a service from created mechanisation centres at district and/or ward level.

There are 5 300 functional tractors, and these are servicing 1 340 045 farmers who are tilling more than 4.3million hectares, yet the national requirement is estimated in excess 40 000. In addition, a corresponding number of tractor drawn implements like disc ploughs, disc harrows etc are required to fully mechanise most agricultural activities. Furthermore, the country is importing 600 tractors per annum that are highly priced beyond the reach of the average farmer.

C. Model Description

Model description

Model description



The in-country production of tractors and implements will make the machinery affordable to farmers and mechanization service providers. The capacity growth of service providers shall make machinery accessible to the farmers, thereby performing activities in time.

D. Forecast Market/Demand

Forecast Market Value US\$				
Tractor and Implement sales	2022	2023	2024	2025
Tractors US\$	10 200 000	20 400 000	51 000 000	102 000 000
Implements US\$	4 980 000	10 790 000	37 350 000	99 600 000
Forecast market volume (units)				
# of tractors and implements	2022	2023	2024	2025
Tractors	600	1 200	3 000	6 000
Implements	600	1 300	4 500	12 000
Assumptions/ sources for market sizing	<p>The assembly plant shall take 18months to construct and commission. Initial stocks shall be through importation of fully assembled machinery. Market growth shall be 100% from inception, coming from a low base, and stabilizing at 15% p.a. Private farmers and mechanization service providers shall consume 75% of the plant output The average tractor price is estimated at US\$17 000 per unit Average implements price is estimated at US\$ 8 300</p>			

Feasibility confidence level		
	Yes/No	Rationale for your response
A technical perspective	Yes	There is adequate front-end work that has been done to test the model
A supply perspective	No	Work still to conducted once technical partner identified
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
A farmer value perspective	Yes	It provides labour serving and achieves timeous commencement of farming activities
An economic perspective	Yes	Lowers the cost of machinery, improves access of machinery.

E. Estimated impact

Economic Impact for tractor manufacturer					
Financial forecast	2023	2024	2025	2026	2027
Units	600	1 200	3 000	6 000	
Forecast revenue US\$ m	10.2	20.4	51	102m	
Forecast costs US\$ m	7.14	14.28	35.7	71.4	
Forecast. profit (EBITDA) US\$	3.06	6.12	15.3	30.6	
Key assumptions					
Ave. Profit margin 30%, Unit sales to increase 100% during the first years (coming from a low base) and level out around 15%					

Economic Impact for implements manufacturers					
Financial forecast	2023	2024	2025	2026	2027
Units produced	1 300	3 800	5 500	12 000	
Forecast revenue US\$ m	10.79	31.54	45.65	99.6	
Forecast costs US\$	7.55	22.08	31.96	69.72	
Forecast. profit (EBITDA) US\$	3.24	9.46	13.69	29.88	
Key assumptions					
Major implements and share of sales- disc plough (35%), disc harrow (25%) , planters (15%) and shellers (25%) Price of disc plough US\$2 500, disc harrow US\$ 13 800, planter US\$13 800, shellers US\$7 000 Average price US\$8 300					

Economic Impact for mechanization service providers					
Financial forecast	2023	2024	2025	2026	2027
Tractors Units(new)	400	1 200	3 600	4 600	5 600
Capital tractors US\$ m	6.8	20.4	61.2	78.2	95.2
Tractors Units (cumulative)	400	1 600	5 200	9 800	15 400
Implements units (new)	1 000	3 000	4 800	5 500	6 200
Capital implements US\$ m	8.3	24.9	39.8	45.6	51.4
Implements units (cumulative)	1 000	4 000	8 800	14 300	20 500
Total capital requirements US\$ m	15.1	45.3	101	123.8	146.6
Forecast revenue US\$ m	3.6	19.2	62.4	117.6	184.8

Forecast costs US\$ m	2.8	8.4	25.3	53.3	109.5
Forecast. profit (EBITDA) US\$	0.8	9.8	37.1		
Social Impact					
Estimated # of beneficiary small holder farmers (not cumulative)	12 800	38 400	102 400	115 200	179 200
Increase in productivity (%)	54%	54%	54%	54%	54%
Increase in annual income per farmer (38%)- US\$146.4	202	202	202	202	202
Food security maize yield ton/ha	1.7	1.7	1.7	1.7	1.7
Key assumptions					
75hp tractors- capacity 1000 tractor hours per annum- 200ha per annum/tractor- 75% average tractor capacity utilization					
Services-ploughing, discing, planting, harvesting, shelling,					
<ul style="list-style-type: none"> • Service fee schedule/ha- US\$75 ploughing, US\$60 ripping, US\$50 discing, US\$40 planting • All rates are dry rates (farmer supplies fuel) • Cost of fuel US\$1.75 per litre • Tractors to serve within 5km radius • Consumption per ha- ploughing (20litres), discing (15litres), planting (10litres) 					
Average cost of imported 75hp tractor- US\$25 000					
Average cost of locally assembled tractor- US\$17 000					
Forecast costs include the capital repayment for tractor leases excluding interest					
Profit margin 22% and net profit margin 14%					
The farmer's productivity shall increase by 54% (Vambe and Khan 2020) assuming everything is equal					
The average annual of a farmer who is growing maize shall increase by 38%. The average income will vary depending on the crop mix, higher for those growing high value crops.					
Average annual small holder farmer income is US\$146.40 for maize (World Bank Report- Zimstats March 2017)					
Source of information: Department of Mechanization in the Ministry of Lands, Agriculture, Water, Fisheries and Rural Development					

F. Resource requirements and estimated return

Investment requirements			
Description	Cost	Time period	Comments
Building Machinery Support infrastructure (water, electricity et al) Other costs (vehicles, management et al)	US\$45m		All plant establishment costs
Total plant costs			
Cost of tractors kits	US\$36m		To build 3000 units

Cost of finished tractors and implements	US\$102m		Purchase price for first 3 000 units
Establishment of mechanization centres	US\$9m		600 centres costing an average of US\$15 000 per centre
Total investment cost	US\$192m		

Contribution from government			
Land	US\$1m		
Waive duties and tax	US\$192m		Assuming duty per unit of US\$5 000
Total value of government's contribution US\$	US\$193m		

F.1 Financial return

Financial return							
Tractor assembly plant							
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Initial Investment	(81,000,000)						
Income		10,200,000	20,400,000	51,000,000	102,000,000	115,000,000	120,000,000
Outflow	81,000,000	7,140,000	14,280,000	35,700,000	71,400,000	71,400,000	71,400,000
Net cashflow	(81,000,000)	3,060,000	6,120,000	15,300,000	30,600,000	43,600,000	48,600,000
Discount rate	7%						
NPV US\$	24,775,363.19						
Pay Back Period	4years 7 months						
Internal Rate of Return	14%						
Return on Investment		4%	8%	19%	38%	54%	60%

Mechanization service centres							
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Initial Investment	(101,000,000)						
Income		3,600,000	19,200,000	62,400,000	117,600,000	184,800,000	
Outflow	101,000,000	2,800,000	8,400,000	25,300,000	53,300,000	109,500,000	
Net cashflow	(101,000,000)	800,000	10,800,000	37,100,000	64,300,000	75,300,000	
Discount rate	7%						
NPV US\$	39,446,238						
payback period	4years						
IRR	17%						
ROI		1%	11%	37%	64%	69%	

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 in-country skills	H	M	Bring expatriates in the short term
2	Lack of after sales service infrastructure	H	M	Technical partner to ensure back-up spares are procured.
3	Ramp up production failing to meet demand	H	L	Use the import window to meet demand
Health, safety, and environmental risks				
1	Tractors are diesel powered which is not a clean source of energy, hence emits carbon into the atmosphere	M	H	Minimizing travel distance will reduce the carbon footprint. Discing uses less fuel.
2	Increased traffic accidents	H	H	Drivers to receive defensive driving training
Market, regulatory and competitive risks				
1	Demand for services might be overstated or subdued	H	M	Initiate demand creation activities
2	The forecast demand might not be attractive to potential investors	H	M	Undertake robust market estimation methods including commitment agreements
Social and political risks				
1	Economic and political environment in Zimbabwe might not be palatable to reputable investor	H	M	