



Government of Zimbabwe

Commercial Irrigation and Small Holder Solar Powered Borehole Programme

Investment Brief

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Investment Brief: Irrigation

Investment Opportunity: Irrigation Schemes Development and Solar Powered Borehole Irrigation for Small Holder Farmers

Investment Summary

Problem	The effects of climate change has created conditions whereby farmers are experiencing periodic droughts, poorly distributed rainfall patterns and flash flooding. This has caused frequent crop failures, thereby threatening household and national food security status. Notwithstanding, the country has abundant unutilised stored surface water and cleared irrigation land, that if developed into fully or partially irrigated land, would transform agricultural production in the country.		
Solution	Private sector could develop 76 180hectares of land by employing the Build-Operate-Transfer (BOT) concept. The private sector shall create private partnerships with local farmers, develop irrigation land around selected national dams that are in 10 micro regions. The model shall include both state land, private land, and communal land. Where communal land or state land is involved, the benefitting small holder farmers shall be employed by the private investor representing a skills transfer process. Turning to communal farmers, the government shall drill boreholes on 35 000 homesteads and invite development sector and private investors to invest in smart water utilisation programmes whereby each borehole shall be equipped with solar powered pumps and use micro irrigation for water conservation purposes.		
Investment Outlay	Private Sector	Commercial Irrigation Development	US\$424million
	Impact funders/Development Sector	Development of Communal Irrigation Schemes and Boreholes	US\$284million
	Public	Drilling 35 000 boreholes	US\$35million
Product /Services	Commercial Irrigation Development	Investor shall have private and public partnerships under the context of Build-Operate-Transfer	
	Communal Irrigation Schemes	Operate on a commercial basis, smallholder farmers employed and receiving dividend	
	Borehole/Underground Water Development	Horticulture development for small holder farmers	
Forecast initial market/demand	Commercial Irrigation	76 150 ha	
	Communal Irrigation Schemes	15 900ha	
	Underground/borehole	17 500ha	
Scale/Micro regions	In all major agricultural production regions. Mashonaland West, Mashonaland East, Mashonaland Central, Manicaland, Midlands, Masvingo, Matebeleland North and Matebeleland South		
Profitability Indicators	Commercial Irrigation and Communal Irrigation Schemes		Underground/Borehole
	IRR 12% NPV US\$112.5million ROI 30% 5 year average PBP 4 years 4 months		Cost per beneficiary- US\$8 114 Incremental income per beneficiary- US\$814 for horticulture farmers and US\$1 107 for maize farmers
Socio-Economic Impact	Smallholder Farmer Support	Number of farmers reached- estimated at 70 000 farmers.	
	Poverty Indicators	Income: A small holder maize farmer has diversified income from maize and other low value crops whilst increasing the average annual income to US\$1 251 per farmer.	
		Food Security: Crop failure rate shall be reduced to negligible levels whilst the additional income allows the farmers to procure food stuff. This improves their resilience and food security status.	
Efficiency & Output Indicators	Production and productivity: Irrigation affords farmers to diversify cropping, produce all year round and minimises crop failure. Use of renewable energy or clean energy like solar protects the environment.		

Environmental Impact		
Enabling environment	Investment Approval and licencing	Government, through the Zimbabwe Investment Authority to facility a stop shop investment approval and licencing process, timely granting of water rights and approval of the BOT agreement
	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 National Authority to assist in ensuring that the investor's water rights application and approval is done in time. The investor's project to be treated as a national project or placed under export processing zones to enjoy tax holiday and exemption from duty and other taxes.

A. Introduction

The country has a total of 9 818 dams country wide with a total holding capacity of cubic metres. There is potential to develop commercial irrigation schemes that would guarantee adequate food production and mitigate against the adverse weather impacting agricultural production. The table below highlights the distribution of dams in Zimbabwe.

Province	Total Number of Dams	Capacity of Dams (m ³)
Harare	75	13 272
Manicaland	679	148 656
Mashonaland East	1363	292 378
Mashonaland Central	763	691 113
Mashonaland West	1413	1 334 765
Matebeleland North	611	190 498
Matebeleland South	2243	873 271
Midlands	1620	2 098 731
Masvingo	1044	2 339 527
Bulawayo	32	9 785
Total	9818	

Source: *Zimbabwe National Water Authority*

The country has approximately 216,000 hectares of equipped irrigation land of which 171,000 is functional. Of the functional irrigable land, nearly 60,000ha is under plantations, thus leaving 111,000ha under cropping potential. The country has an ambition to reach 350,000ha under irrigation.

B. Context analysis

*	Situation Analysis:																																																																				
	<p>Zimbabwe, with more than 10 000 dams/water bodies, is the country with most dams in Sub-Saharan Africa, yet the country continues to be affected by climate change that has increased the incidences of drought seasons and seasons with inconsistent rainfall distribution patterns. This has led to many failed agricultural seasons whereby crop performance was poor and livestock losses have been encountered by all classes of farmers.</p> <p>The country is not food secure and relies on imports from neighbouring countries. The country imports grain and oilseeds from countries like Ukraine, Zambia, South Africa yet has water reserves countrywide that if utilized to full potential, will result in the country being self-sufficient in cereal production. Small holder farmers are the most vulnerable as nearly 100% of their farming activities are reliant on natural rain, yet with the increased prevalence of drought years, crop failure has negatively affected the food security status of the vulnerable communities and the country at large.</p> <p>Potential Irrigation Expansion Capacity</p> <table border="1"> <thead> <tr> <th>Name of dam</th> <th>Province</th> <th>District</th> <th>Capacity</th> <th>Potential irrigable area(ha)</th> </tr> </thead> <tbody> <tr> <td>Tugwi Mukosi</td> <td>Masvingo</td> <td>Chivi & Chiredzi</td> <td></td> <td>40 000</td> </tr> <tr> <td>Marovanyati</td> <td>Manicaland</td> <td>Buhera</td> <td></td> <td>1 250</td> </tr> <tr> <td>Muchekeranwa</td> <td>Mashonaland East</td> <td>Marondera & Makoni in Manicaland</td> <td></td> <td>14 00</td> </tr> <tr> <td>Muzhwi</td> <td>Masvingo</td> <td>Masvingo</td> <td></td> <td>4 000</td> </tr> <tr> <td>Mazvikadei</td> <td>Mashonaland West</td> <td>Zvimba & Makonde</td> <td></td> <td>5 000</td> </tr> <tr> <td>Mutirikwi</td> <td>Masvingo</td> <td>Masvingo</td> <td></td> <td>3 000</td> </tr> <tr> <td>Biri</td> <td>Mashonaland West</td> <td>Zvimba & Makonde</td> <td></td> <td>4 000</td> </tr> <tr> <td>Lilstock</td> <td>Mashonaland Central</td> <td>Bindura, Mazowe & Mt. Darwin</td> <td></td> <td>7 000</td> </tr> <tr> <td>Ruti</td> <td>Masvingo</td> <td>Masvingo & Buhera</td> <td></td> <td>3 000</td> </tr> <tr> <td>Manyuchi</td> <td>Masvingo</td> <td>Mwenezi</td> <td></td> <td>5 000</td> </tr> <tr> <td>Acadia</td> <td>Mashonaland Central</td> <td>Bindura</td> <td></td> <td>2 500</td> </tr> <tr> <td>Total</td> <td></td> <td></td> <td></td> <td>76 150</td> </tr> </tbody> </table>				Name of dam	Province	District	Capacity	Potential irrigable area(ha)	Tugwi Mukosi	Masvingo	Chivi & Chiredzi		40 000	Marovanyati	Manicaland	Buhera		1 250	Muchekeranwa	Mashonaland East	Marondera & Makoni in Manicaland		14 00	Muzhwi	Masvingo	Masvingo		4 000	Mazvikadei	Mashonaland West	Zvimba & Makonde		5 000	Mutirikwi	Masvingo	Masvingo		3 000	Biri	Mashonaland West	Zvimba & Makonde		4 000	Lilstock	Mashonaland Central	Bindura, Mazowe & Mt. Darwin		7 000	Ruti	Masvingo	Masvingo & Buhera		3 000	Manyuchi	Masvingo	Mwenezi		5 000	Acadia	Mashonaland Central	Bindura		2 500	Total				76 150
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C. Model description

*	Describe the solution
	<div style="border: 2px solid black; padding: 20px;"> <h3 style="text-align: center;">Model description</h3> <div style="display: flex; justify-content: space-between;"> <div style="border: 1px solid black; padding: 10px; width: 60%;"> <ul style="list-style-type: none"> • Private investor identifies attractive land for the development of irrigation infrastructure and commercial production of crops • Private investor enters a build- operate-transfer or build transfer agreement with the state, agree on the tenor of the agreement (time period that allows investor to recover money invested and profit). • Private investor develops irrigation infrastructure on the piece of land, commence crop production. • Development includes pump houses, irrigation lines, centre pivots or drip irrigation. • Private investor operates on the farm for an agreed period until investment and profits have been recouped. • At the conclusion of the agreement, hand over all developments to the state. • Where small holder farmers are the beneficiaries of irrigation development project, apply the same but, the SHF farmers work on the farm as both workers and co-owners. Receive dividend/rental as opposed to the current structure where they own parcelled out small pieces of land.. </div> <div style="border: 1px solid black; padding: 10px; width: 35%;"> <p style="text-align: center;"><u>Role of Government</u></p> <p>Facilitate the commercial agreements between land holders and investor (for small holder farmers)</p> <p>Develop all public infrastructure- main line and pump stations</p> <p>Undertake to protect the investments by ensuring equity and adherence to agreement terms</p> <p>Provide government guarantees to the investors</p> <p>Incentivise investors by offering tax and duty rebates</p> </div> </div> </div> <p>Private investors would provide capital to entities that have technical expertise to run large scale commercial operations, or the private investor could possess technical expertise to run large scale commercial operations. Where the private investor develops irrigation infrastructure for land earmarked for small holder farmers, the same concept shall be employed with the small holder farmers providing labour for the commercial operations. Such an arrangement would allow for skills transfer to small farmers. The small holder farmers would receive rental for the land or dividend from operations.</p> <p>The state shall drill boreholes and secure development funding and loans from international funders to develop micro irrigation powered by renewable energy sources. Small holder farmers are in turn expected to repay the government loans utilizing the proceeds from the improved and irrigation aided agricultural activities.</p>

D. Market and demand narrative

*	The end market of product and service	
	<p>The country has 83 647 ha of potential irrigable land is areas that are suitable for cereal, oilseeds, sugar, and citrus production. There are new dams under construction that shall make it possible to expand the area by an additional xx ha.</p> <p>Zimbabwe has a population of over 15million in 2022 having increased from 12million in 2012. The country has a cereal requirement of 1.8million tonnes for human consumption and 450 000 tonnes for stockfeed. In the last four years, the country has failed to meet its national requirement in all the calendar years except in 2021. The failure is attributed to the impact of drought. The cereal deficit is mainly targeted at maize (the national staple food) and wheat.</p> <p>Citrus production- there is a national annual shortfall of around 23 000tons whilst the international export markets, especially United States of America is continually witnessing the contraction of the citrus production due to the greening disease and adverse weather in the key producing areas.</p>	
	Geographic location of market	Local and export markets into the African continent and EU, China and USA.

Forecast new area under production					
	2023	2024	2025	2026	2027
Wheat	6 000	6 000	6 000	6 000	6 000
Sugar cane	7 500	8 000	8 000	8 000	8 000
Citrus		500	1 000	1 000	1 000
Maize/Soyabeans	6 000	6 000	6 000	6 000	6 000
Assumptions/ sources for market sizing	Full development of the 76 150 ha shall take 60 months although average of 15 000ha shall be developed annually. The land developed for wheat shall be used interchangeably with maize and soya beans				

*	Feasibility confidence level		
		Yes/No	Rationale for your response

	A technical perspective	Yes	There is adequate front-end work- dams completed which is 90% of irrigation development
	A supply perspective	Yes	The country has a well-developed supply chain and irrigation expertise to carry out final infield works
	A demand perspective	Yes	There is a sizeable gap to support the project- on the back of climate change and frequent crop failures due to drought
	A legal/ regulatory perspective	Yes	Government supporting and spearheading the formation of the BOT or BT agreements
	A farmer value perspective	Yes	It provides labour, enables farmers to acquire skills and prospect to takeover well developed farms/infrastructure
	An economic perspective	Yes	Lowers the import of the nation, improves food security, increases export earnings, and improves productivity and production efficiencies.

E. Scale and micro regions

Plan description	
Location and rationale for choice	In Masvingo, Manicaland, Mashonaland East, Mashonaland West, Mashonaland Central. These are the provinces in which there completed dams to support the project
Full potential size of market in chosen location	76 150 hectares 35 000 homesteads for small holder farmers

F. Estimated impact

* Economic Impact							
Financial forecast		2023	2024	2025	2026	2027	2028
Projected yield (tonnage)	Wheat US\$ m	13.1	26.2	39.3	52.4	65.5	65.5
	Soyabeans US\$ m	9.7	19.4	29.2	38.9	48.6	48.6
	Sugar cane US\$ m	95	195	290	390	390	390
Forecast revenue US\$ m		117.8	240.6	358.5	481.3	504.1	504.1
Forecast costs US\$ m		82.5	168.4	250.9	336.9	352.9	352.9
Forecast. profit (EBITDA) US\$		35.3	72.2	107.6	144.4	151.2	151.2
Key assumptions							
Wheat yield 6tons/ha, maize 7tons/ha, sugar cane, soyabeans 3tons/ha, citrus will only begin to yield from year 4 (10% year 4, 30% year 5). Price per ton- maize US\$260, wheat US\$410, soyabean US\$540, sugar cane US\$4 000 (12tons of cane = 1ton of sugar)							

* Social Impact	
Number of beneficiaries	70 000 small holder farmers
Incremental area	76 150 hectares
Incremental production	Guarantee against crop failure due to drought
Food security	70 000 households will be food secure. The nation will attain full food security status with potential to export

G. Resource requirements and estimated return

Investment requirements- Commercial irrigation development			
Description	Cost	Time period	Comments
Develop 76 150ha	US\$258m	2years	Cost an average of US\$7 500 to develop 1 hectare of irrigated land

Establish sugar cane & wheat	US\$154m	2 years	Establish 12 000 of wheat & 15 500 of sugar cane
Management capital costs	US\$5m	2 years	Purchase vehicles, and some machinery
Sugar processing plant	US\$7m	2 years	
Total investment cost	US\$424m		

Borehole equipping and development of micro irrigation			
Borehole equipping and micro irrigation	US\$284m		Solar system, irrigation system and pump US\$8 000 per borehole
Borehole drilling	US\$35m		

Irrigation model financial returns (commercial irrigation and communal irrigation schemes)

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Initial Investment	- 424,000,000						
Income		117,800,000	240,600,000	358,500,000	481,300,000	504,100,000	504,100,000
Outflow	424,000,000	82,500,000	168,400,000	250,900,000	336,900,000	352,900,000	352,900,000
Net cashflow	- 424,000,000	35,300,000	72,200,000	107,600,000	144,400,000	151,200,000	151,200,000
Discount rate	5%						
NPV US\$	112,524,441						
payback period	4years 4 months						
IRR	12%						
ROI		8%	43%	43%	43%	43%	43%

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H. 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 agronomy and irrigation skills	H	M	Bring expatriates in the short term
2	Inability to develop irrigation land in time	H	M	Put in place contractual milestones

3	Lack of electricity to run irrigation infrastructure	H	H	Invest in solar energy
Health, safety and environmental risks				
1	Land clearing can destroy the vegetation/forests	M	H	Environmental impact assessment to be conducted and proffer solution
2	Over usage of the stored water capacity resulting in the in quicker depletion of irrigation water	H	H	Water rights to be used in line with stored capacity
3				
Market, regulatory and competitive risks				
1	Individual farmers might respond by developing own farm irrigation infrastructure	M	M	The incidences of drought years requires that all farmers employ the same irrigation, thereby minimizing the competitive risk
2	The water sources might be shared between animals, human, thereby prompting regulatory bodies to prioritize human animal consumption	H	M	Legal water rights and allocations agreement to be put in place
3				
Social and political risks				
1	Economic and political environment in Zimbabwe might not be palatable to some investors	H	M	Government to offer incentives that offsets economic or political risks
2	Small holder farmers might resist the new model of ownership and providing labour	M	M	Government to legislate the new model
3				
Other risks				
1	Public opposition to corporate bodies being awarded the build-operate-transfer agreement	M	M	Government to widely consult and look into national importance of such agreements.
2				

