

Figure 2. Integrated development plan for Lumwana area

3.3.4. Pre-feasibility Information Available

Detailed information has now been provided by Lumwana Mine which includes the Social Sustainability Impact Assessment and Baseline Study and Lumwana Business Sustainability. Further investigations are required to ascertain the areas the IDP could target.

3.3.5. Public-Private Partnership

The project has very good potential and prospects for commercializing small-scale farmers through Public-Private Partnership with the Lumwana Mining Company. The mining company is anxious to promote irrigated crop production in the area and create a

sustainable enabling environment for commercializing smallholder farmers. The construction of a township in Lumwana and the 2,000 households expected to flock into the area will create opportunities for business oriented crop production for small, medium and large scale commercial farming.

3.3.6. Market and Agro-processing Opportunities

Market opportunities for vegetables and indeed any food crop mix in Lumwana are enormous. This is underscored by the fact that the current demand for vegetables and fruits has already outstripped supply in Lumwana project area even before construction of the township to house more than 2,000 miners and their dependants is completed. Under the circumstances, it is hard to discern any constraints on the market, suffice it that other complimentary interventions from other sectors are also in the pipeline with a view to cash in on the booming local economy which is likely to unfold as the new copper mine expands its operations to become the largest copper mine in the sub-region.

3.3.7. Required Irrigation Infrastructure

Lumwana Mine, has already constructed a huge water storage facility in the form of a dam, emphasizing its intention to contribute and assist in promoting irrigation alongside its mining core venture in the area. The water storage facility currently measuring 8 km long as throwback and 1km wide is made up of a zoned earth fill embankment, 35 m high and 1,330 m long. Capacity is estimated at 65 million m³ but a proportion for this is required downstream for mining operations. In addition, Lumwana Mine has contributed financially in kind towards the construction of a diversion weir for smallholder farmers outside its area. There is considerable scope in the area outside the mine for more structures on the perennial rivers and the development of irrigation.

Bulk water delivery infrastructure will be made up of the following:

- (i) Water storage facilities, i.e. dams and weirs
- (ii) Pumping stations/ pumps
- (iii) Conveyance and distribution pipelines
- (iv) Siphon systems
- (v) Canals

3.3.8. Water Rights and related Issues

The project area lies in the water shed with a vast network of rivers and streams which are part of the main source of the Zambezi River, about 60 km from Lumwana. The surface water resource potential remains largely untapped. Lumwana Mine has a Water Right for its dam including abstraction of water from any river/ stream in the project area.

3.3.9 Draft Conclusions

The project has good potential for investment both in scale and scope in bulk water delivery infrastructure and commercialization of smallholder farmers through Public-Private Partnership with Lumwana Mine and prospective commercial farmers.

3.3.11 Contacts: Brenda Tambatamba Liswaniso – Lumwana Mine; Joseph Pyele – Lumwana Mine; Mike Bwalya – TSB-MACO; Titus Kalubenji – Kibaya Smallholder

Irrigation Project – Lumwana/ Solwezi; Kashima Shayama – Kanai Farms Enterprises – Lumwana/ Solwezi.

3.4. MWOMBOSHI DAM PROJECT

3.4.1. District and Province

The project is located in Chisamba farm block in Chibombo district in Central Province about 65 Km North of Lusaka off the Great North Road. The road to the project area is good tarred road up to Chisamba.

3.4.2. Main Crop

The main cash crop in the project area among local market orientated farmers is currently fruits and vegetables. Smallholders have been trying hard to diversify into other crops equally suited to light soils such as wheat, maize, citrus and more extensive areas of vegetables but can not do so due to the serious shortage of water in the area.

3.4.3. Project Area

The total project area is about 1,000 ha. The land is under customary or traditional land tenure system for small-scale farmers. There are about 497 small-scale farmers.

➤ The project seeks to construct a 45 million cubic meters capacity dam on the Mwomboshi River, which could irrigate the full 1,000 ha of land for the small-scale farmers.

➤ Project has been provisionally approved by the Water Board and an Environmental Impact Assessment for the proposed dam has been completed 2008. Chief Liteta, in whose chiefdom the proposed dam lie, is very much in favor and supportive of the proposed project.

➤ It is important to note that the construction of the proposed dam will result in the displacement of villages/ settlements and one school along its 12 Km length and 700m width.

➤ Beneficiaries of this project have already put in place compensatory and mitigating measures as a result of the dam. A new school is proposed. Affected communities and households will be adequately resettled within the chiefdom and the Chief has already informed all affected communities and re-assured them of being properly resettled.

3.4.4. Pre-feasibility Information Available

Pre-feasibility report with detailed information on technical, socio-economic and environmental aspects of the project have already been prepared. Enough information is therefore available to proceed with work on the project.

3.4.5. Public-Private Partnership

The project has very good potential and good prospects for commercialising smallholder farmers through Public-Private Partnerships.

3.4.6 Required Irrigation Infrastructure

The project seeks to put up a hydraulic structure in form of a dam to impound water on the Mwomboshi River for irrigated crop production. Irrigation will depend on the preferences of the small holder farmers targeted but it may be possible to trial a centre pivot under group management here. Infrastructure for the proposed irrigation dam project will consist of the following:

- (ii) Dam
- (iii) Pumping stations
- (iv) Pipelines
- (v) Holding pond/s (reservoir)

3.4.7. Market Opportunities Agro-processing Opportunities

Potential market opportunities for a mix of crops that can be grown in the project area are currently stifled due to lack of adequate water for irrigation. Lack of water is the major constraint that has circumscribed crop diversification and increased crop production rather than availability of market opportunities in and around the project area.

3.4.8. Water Rights and related Issues

There has not been any objection towards the project with regards to the proposed construction of the dam on the Mwomboshi River and the Water Board has provisionally approved the project.

3.4.9. Contacts: Chief Liteta; Peter MacSporran-A.A.I.

3.5.MWINILUNGA SMALLHOLDER PINEAPPLE PROJECT

3.5.1. District and Province

Mwinilunga Smallholder Pineapple Project is located in Mwinilunga district about 280 km northwest of Solwezi in Northwestern province.

3.5.2. Main Crops

The main cash crop grown in the area by smallholder farmers is pineapples. Vegetables and bananas are also grown in the area.

3.5.3. Project Area

The project area encompasses several pineapple growing areas in Mwinilunga district including the government operated Ikelenge Pineapple Scheme, which is about 78 km north of the district. About 350 ha are under smallholder pineapple production in Ikelenge alone. Ikelenge Pineapple Scheme, itself, is about 50 ha and with about 400 ha of potential cultivable land. Mwinilunga district has favorable agronomic conditions for pineapples in-terms of rainfall and the acidic sandy loam soils. Pineapples in the district

are seasonally grown under rain-fed conditions. The variety grown is called Smooth Cayenne, which is larger in size, sweet and suitable for canning. Mwinilunga district is not connected to the national grid but electricity in the district is supplied by a diesel generator. A private electricity company called Zambezi Rapids has completed construction and commissioned a hydro-power plant in Ikelenge, which is likely to become a district on its own.

Mwinilunga used to have a pineapple cannery which was sold off in the 90's under the former government's privatization programme and is now defunct with most of the equipment sold or vandalised and the structure no longer usable. In 2004, farmers formed the Mwinilunga District Farmers Cooperative Union, MDFCU, which has since been registered with about 2000 farmers. To date, 54 primary societies for smallholder pineapple growers operate under the umbrella of the MDFCU in Mwinilunga district. The sizes of smallholder farm plots for pineapples range from 0.5 to 15 ha.

3.5.4. Pre-feasibility Information Available

There is currently no technical pre-feasibility information available on the project except for project proposals related to pineapple production, pineapple value chain analysis, and fruit juice processing enterprise. Much of this information has been generated with the help of CORDAID, USAID and SNV.

3.5.5. Public-Private Partnership

Public-Private Partnership arrangements are also very possible with market outlets such as FreshPikt and Revonia in Lusaka, who are already buying small quantities pineapples from smallholder farmers. Due to unrestricted importation of pineapples and packaged fruits and juices into the country, demand for fresh pineapples from FreshPikt, Freshmark and Revonia are currently too low to create positive impact on production. The Netherlands Development Organization (SNV) has also been providing support to pineapple farmers in Mwinilunga in finding markets for pineapples and preparation of various project proposals on pineapples production and related business ventures.

3.5.6. Market and Agro-Processing Opportunities

Market opportunities for pineapples in Mwinilunga are constrained mainly by lack of a cannery in the district and the long distance from urban areas such as the Copperbelt and Lusaka. In spite of favorable agronomic conditions such as rainfall and soils, pineapple production is also circumscribed by the same factors. Soweto market in Lusaka, which to all intents and purposes, is the largest open market for vegetables and other agricultural produce in Zambia is about 650 Km from Mwinilunga. Although transportation costs for pineapples from Mwinilunga to the market are prohibitive, farmers have little option but to offload the crop on the market. According to the MDFCU, Revonia, in Lusaka, seem to be the only company with a reasonably good offer the farmers and buying at K1000 per kg. The best crop of pineapples is harvested from November to February as the main season while the minor season with lower yield and quality is harvested from June to September.

3.5.7 Required Irrigation Infrastructure

Areas where pineapples are grown in Mwinilunga cover a radius of about 80 km, extending from Mwinilunga to Ikelenge. However, several specific sites can be earmarked for irrigation infrastructure investment in the district upon satisfying the requirements for the IDP. The randomly scattered nature of smallholder pineapple farms due to sparsely populated village settlements makes it difficult to target a particular site for bulk water irrigation infrastructure. However, the extensive network of perennial rivers and streams in the area, may also call for targeting several sites in the district for infrastructure such as small earth-fill dams, weirs and canals in-order to attain the scale and scope of investment envisaged under the IDP. At present, all of the pineapples are grown entirely under rain-fed conditions. Water delivery irrigation infrastructure may therefore consist of the following;

- (i) Small earth-fill dams
- (ii) Weirs
- (iii) Canals
- (iv) Provision of electricity supplies
- (v) Access roads

3.5.8 Water Requirements

Water requirements for irrigation in the project area can be evaluated on the basis of the Season Irrigation Requirement with respect to the available water source/s. Land and water are not limiting factors to the overall pineapple production in the district. Assuming that the water source supply in the selected sites would be earth-fill dams and/or weirs, the water volume and flow rate must exceed the irrigation design capacity and seasonal irrigation requirement for the intended smallholder farm-lands or plots. Thus, smallholder farm-plots intended for irrigation will influence the sizing of infrastructure to meet irrigation seasonal requirement for each site in the project area.

3.5.9 Water Rights and related Issues

All cultivation and production of pineapples in the project area in Mwinilunga is done under rain-fed condition. Therefore, farmers have had no reason to apply for any Water Rights. The amount of surface water resources in form of rivers and streams in Mwinilunga district is enormous and unexploited. Granting of water rights would most certainly be straight-forward in so far as infrastructure development for irrigation is concerned.

3.5.10 Draft Conclusions

The project has potential for investment although the scale and scope for investment, particularly in bulk water delivery may be on the lower side for the IDP with high development costs and relatively low value produce. The scale and scope for investment in the district can fit in line with the requirements of the IDP if infrastructure such as small earth-fill dams, weirs and canals could be built in several sites within the project area.

3.5.11 Contacts: Mr. Julius Musesa – MDFCU, Board chairman; Etah Manda – SNV (Netherlands Development Organization.), Trust Hambozi – Extension Officer; Mrs

Nevia kahanji – Vice Chair lady-MDFCU; Mr. Keith Mtonga – MDFCU Agri-business manager; Augustine Mupuchi – MDFCU Board Member.

3.6. MUSANJE IRRIGATION PROJECT

3.6.1. District and Province

The project is located in Kafue district in Lusaka province but it is closer to Chirundu, a border district town with Zimbabwe. The road from Lusaka through Kafue town up to Chirundu border is good-tarred road while from Chirundu to the project area, the road is good gravel road.

3.6.2. Main Crop

The main cash crop is Bananas. Small scale farmers grow small amounts under rain fed conditions and also grow other crops such as winter maize and vegetables. Some small scale irrigation from the Zambezi river (using small pumps) is also carried out.

3.6.3. Project Area

The area is about 150 Km from Lusaka. The small-scale farmers in the area own 860 ha of land on title deed of which only about 15% is utilized. Individual plots for each farmer range from 2 to 10 ha and much of the land is part of the Zambezi riverfront. On the other hand, there is one commercial farmer with a 60 ha field of banana adjacent to the undeveloped smallholder farmers' land and intends to expand to 100 ha. The project area has good climate for bananas², abundant water source from the Zambezi River downstream of the Kariba dam and the soils are good. There are currently 375 households in the area but only 40 are registered under an association for small-scale farmers called Musanje Farmer Group Association. The association is registered with the Registrar of Societies.

3.6.4. Pre-feasibility Information Available

There is currently no pre-feasibility information available and /or prepared by the stakeholders on this project. As a project identified for potential investment, time may have to be given to the project proposers and stakeholders to prepare pre-feasibility information and related documentations based on the list of requirements circulated in June 2007 by the First Phase Identification mission.

3.6.5. Public-Private Partnership

The project has very good potential and prospects for commercialising small-scale farmers through Public-Private Partnership with a local commercial farmer who is interested in assisting his neighbouring small scale farmers in establishing marketing links and in the provision of inputs and advice.

3.6.6. Required Irrigation Infrastructure

Virtually all the land and the fields under irrigated crop production is within the proximity of the Zambezi River. The small-scale farmers are carrying out minimal

² But with risks of banana diseases in the rainy season.

irrigation for winter maize and vegetables using treadle pumps and buckets. Hence, water delivery irrigation infrastructure will consist of the following;

- (i) Pumping station
- (ii) Conveyance pipeline and filtration system
- (iii) Micro-jet sprinklers or drip irrigation

This is a newly identified project and therefore no pre-feasibility study of any kind has been done.

3.6.7. Market Opportunities and Constraint

The market for bananas is Soweto market and Freshmark in Lusaka. At-least 30–40 tons of bananas per week are offloaded on Soweto market alone. Very often traders from Lusaka come to Musanje to buy bananas and vegetables for re-sale. There are no discernible constraints to irrigation except that wildlife, particularly elephants, destroys crops when they cross the Zambezi River from Zimbabwe. Thus, electric fencing of the fields would be the solution and this could be an added cost to the project.

3.6.8. Water Rights and related Issues

Both large and small-scale farmers have no water rights in the project area. However, they are allowed to abstract water without limitation under the current Water Act since they are on land adjacent to the portion of the Zambezi River, which is part of an international shared water course.

3.6.9. Contacts: J. Mukankaula – Chairman for smallholder farmers’s association; Rabson Kapumba – vice chairman; Jackson Sindoga – secretary; and Brighton Sindoga – Treasurer.

3.6.10. Draft Conclusions

The project has potential for investment although the scale and scope for investment, particularly in bulk water delivery may be on the lower side for the IDP. If the time line for the drafting and formulation of the project document and the absence of any pre-feasibility information and documentations do not preclude the project from further consideration, the project has the investment potential for further consideration under the IDP.

4.0. LUSAKA PERI-URBAN SMALLHOLDER IRRIGATION PROJECTS

4.1. CHIPAPA DAM SMALLHOLDER PROJECT

4.1.1. District and Province

The project is located in Kafue district in Lusaka Province about 35 Km south of Lusaka in Lusaka Province. The site is a few kilometers just before Kafue and accessed by a small gravel road.

4.1.2. Main Crop

The main crops grown are green beans, green pepper, okra and cabbage. During the rainy season, the fields are planted with maize under rain-fed cultivation.

4.1.3. Project Area

The project area encompasses potential irrigable traditional land of about 100 ha. However, only 10 ha of the available arable land are actually used for crop production due to limited amount of water from the dam. There about 120 farmers in the project area most of whom are females and widowed. Individual or family plot sizes range from 0.1 to 0.5 ha. The project is situated on traditional land and therefore not on titled land. Nevertheless, the farmers have been working on the land and using the dam for irrigation without hindrance under an association called Chipapa Dam Garden Committee. Farmers in the area have been conducting small-scale commercial irrigation activities quite successfully through their committee. Transportation and sell of vegetables, mainly at Soweto market in Lusaka, are also arranged through the committee. Operation and maintenance of the dam is also done in a participatory way through the committee despite the fact that the majority of farmers are women and most of whom are widows. Thus, a good number of households in the project area are headed by females. Electricity is within reach of the project area. Work to extend electricity power supply to a school and a clinic in the project area is currently underway. This would provide use for pumps as an alternative means of delivering irrigation water in the near future although gravity delivery method is currently and successfully employed.

4.1.4. Pre-feasibility Information Available

Chipapa Dam Smallholder Vegetable Project is a newly identified smallholder vegetable scheme in Lusaka province for the IDP. There is no pre-feasibility information, in line with the needs of the IDP, available on the site except for technical information on the dam.

4.1.5. Public-Private Partnership

These farmers are already practicing commercially oriented irrigated crop production, albeit on a small-scale, but enough to ensure household food security and generate income for subsistence. As a smallholder vegetable scheme, economies of scale for provision of bulk water infrastructure and farm mechanization, may not be high enough for investment on a scale and scope envisaged under the IDP but the project can be a good demonstrative model for commercialising smallholder farmers.

4.1.6. Market Opportunities and Constraint

All the vegetables grown in the Chipapa Dam Vegetable project area are sold in bulk at Soweto market in Lusaka. The vegetables are transported in sacks or boxes using local pick up trucks and buses which are hired for the purpose. There are a lot more farmers wanting to join the scheme but cannot do so due to constraints on the water source in-terms of insufficient storage capacity of the dam, short canal length and the resultant smaller irrigation command area. Increasing the capacity of the dam to store more water can allow for more land, beyond the current 10 ha, to be irrigated and thereby taking up more farmers into the scheme.

4.1.7. Required Irrigation Infrastructure

The project seeks to rehabilitate and increase the capacity of the dam and extend the main canal so that much more available arable land could be irrigated. The dam was initially constructed in the 1970's but over the years it has reduced in capacity due to siltation and lack of maintenance. It is a small dam being about 11meter's high from the foundation and/or having a reservoir volume of less than 3 million cubic meters. A dam committee or Water User Association is currently in place to oversee all operation and maintenance activities in the scheme. Irrigation water delivery infrastructure will be made up of the following:

- (i) Dam rehabilitation
- (ii) Raising the height and spillway of the dam from 9m to 15m.
- (iii) Repair of the intake chamber, main outlet pipe and valves.
- (iv) Repair and extension of main canal up to 800m.

4.1.8 Water Requirements

Water requirement for irrigation in the project area is evaluated on the basis of the Season Irrigation Requirement with respect to the available water source. The total project area currently irrigated is only 10 ha. The dam is the water source in the project area for both irrigation and livestock watering. Hence, it must have sufficient capacity to store water enough to meet both the consumptive water use for livestock and irrigation. Cattle are the major livestock reared in the area and during acute dry seasons, water in the dam is preserved for livestock use while all irrigation activities are halted. In estimating the seasonal irrigation Requirement, an assumed figure of 40 litres per day pay cattle may be used to account for the consumptive water use of cattle in the project area.

4.1.9. Water Rights and related Issues

There are no Water Rights obtained on the water stored in the dam. The Water Act recognizes livestock watering as a primary water use, while irrigation is secondary. Given the multiple use of the water from the dam, which also includes livestock watering, the question of obtaining Water Rights for the dam has never arisen, especially that the dam is technically small and the scheme itself is on untitled traditional land.

4.1.10 Draft Conclusions

The scale and scope for investment in the Chipapa Dam Smallholder Vegetable Scheme is lower in-terms of economies of scale for infrastructure and agricultural mechanization. However, the demand-driven element and proximity to the urban market in Lusaka are the main comparative attributes that have enabled the scheme to thrive in-spite of the constraint on water.

4.1.11 Contacts: Steven Moyo – Agricultural Assistant in Chipapa, Isaac Kazadi – Extension officer in Chipapa, Miss. Ana. Chibale – Chipapa Dam Committee.

4.2. KATOBA DAM SMALLHOLDER PROJECT

4.2.1. District and Province

The project is located in Chongwe district in Lusaka Province about 50 Km south-east of Lusaka in Lusaka Province. The access road to the project area/ site is a good gravel road about 50 km from Chongwe passing through Chalimbana Farmer Training Institute. Two small earth dams in the area are currently used for irrigating small areas of fruit trees and vegetables.

4.2.2. Main Crop

The main crops grown are Cabbage, rape, tomatoes, green beans, and green maize. During the rainy season, the fields are planted with maize under rain-fed cultivation.

4.2.3. Project Area

The project area encompasses potential irrigable traditional and state land of more than 500 ha. There are actually two dams in the area, namely Katoba and Kasenke dams, which are within a kilometer of each other and both of which are used by smallholder farmers for irrigation and livestock watering. Katoba dam is larger (but below 10m high) and in better condition. Kasenke dam recently breached and has been badly repaired. Both basins are silted. Both dams require rehabilitation.

At the peak of the dry season, all irrigation activities are stopped in-order to preserve water in the dam for cattle. The area has plenty of arable irrigable land which is only cultivated during the rainy season due to insufficient water in the two dams. There about 150 farmers in the project area and about a dozen of them own motorized pumps but which are rarely used for pumping water for irrigation due to insufficient storage capacity of the two dams. The average individual or family plot size is about 1 ha. There is no registered farmer group or water user association in the area but farmers are able to regulate their own irrigation and related water use activities. Operation and maintenance of the dams is done on a participatory basis by all farmers. This underscores the element of demand-driven approach to irrigation in the area. The project area is about 35 km from the nearest electricity power line.

4.2.4. Pre-feasibility Information Available

Katoba Dam Smallholder Vegetable Project is a newly identified smallholder vegetable scheme in Lusaka province for the IDP. There is no pre-feasibility information available in line with the needs of the IDP on the site except for technical information on the dams.

4.2.5. Public-Private Partnership

These farmers are also practicing commercial irrigated crop production, albeit on a small-scale, but sufficient for their sustenance, food security and income generation. As a smallholder vegetable scheme, economies of scale for provision of bulk water infrastructure and farm mechanisation, may not be high enough to attract investment on a scale and scope envisaged under IDP. However, business oriented irrigated crop production is one of the main source of income and livelihood among the local population. Irrigation in the scheme has been sustained with little external assistance for

operation and maintenance of the dams owing to the high interest in irrigated crop production by farmers.

4.2.6. Market Opportunities and Constraint

Virtually all the vegetables grown in the project area is sold in bulk mainly at Chilenje and Bauleni markets in Lusaka. Transportation and selling of vegetables are done individually. Small vans or light pick-up trucks are hired to ferry vegetables in bulk to the markets. The vegetables are transported in sacks or boxes and sold in bulk at the market. There are a lot more farmers wanting to join the scheme but cannot do so due to constraints on the water source in-terms of the insufficient storage capacity of the dams and consequent smaller irrigation command area.

4.2.7. Required Irrigation Infrastructure

The project seeks to rehabilitate and increase the capacity of the dams so that more available arable land could be irrigated. The dams were initially constructed in the 1970's but over the years, siltation and a lack of proper maintenance have taken their toll on the capacity and condition of the dams. Both Katoba and Kasenke dams can be classified as small dams being less than 15 meters high from the foundation and/or having respective reservoir volumes of less than 3 million cubic meters. Irrigation water delivery infrastructure will be made up of the following:

- (i) Dam rehabilitation
- (ii) Raising the height and spillway of the dams.
- (iii) Repair of the intake chamber, main outlet pipe and valves.
- (iv) Construction of main and distribution canals.

4.2.8 Water Requirements

Water requirement for irrigation in the project area is evaluated on the basis of the Season Irrigation Water Requirement with respect to the available water source/s. These sources are the dams which are providing water for both irrigation and livestock watering. Like the Chipapa dam, the two dams must each have sufficient capacity to store water enough to meet both the consumptive water use for livestock and irrigation. Cattle are also the major livestock reared in the area and during acute dry seasons, water in the dams are preserved for livestock use while all irrigation activities are halted. In estimating the seasonal irrigation Requirement, an assumed figure of 40 litres per day pay cattle may be used to account for the consumptive water use of cattle in the project area.

4.2.9. Water Rights and related Issues

There are no Water Rights obtained on the water stored in the dams. The Water Act recognizes livestock watering as a primary water use, while irrigation is secondary. Given the multiple use of the water from the dam, which also includes livestock watering, the question of obtaining Water Rights for the dam has never arisen and especially that both dams are technically small and the scheme is on untitled traditional land.

4.2.10 Draft Conclusions

The scale and scope for investment in the Katoba Dam Smallholder Vegetable Scheme is lower in-terms of economies of scale for infrastructure and agricultural mechanization. However, the demand-driven element and proximity to the urban market in Lusaka are

the main comparative attributes that have enabled the scheme to thrive in spite of the constraint on water.

4.2.11 **Contacts:** Fridah Chipambala, – Agricultural Assistant in Katoba, Bibi Chilambe – Smallholder Farmer.

5.0. LOG FRAME FOR POTENTIAL IDP PROJECTS

Project	Strengths	Weaknesses	Opportunities	Threats
1. Kalungwishi Sugar	Integrated sugar project	Further investment in factory capacity is needed	Proximity to lucrative regional markets. Local market available	Need to establish a local marketing agreement to stabilize local sugar price
	Probably a cheap system to install		Good contacts with buyers in DRC and Tanzania and great lakes region	Excess sugar might have to be sold in the EU – at much lower prices
	Sulphur free sugar for niche markets		Good traditional land available for smallholder farmers	
2. Kanakantapa	Good natural dam site adjacent to the scheme.		Proximity to lucrative markets in Lusaka	No organized or established marketing arrangements
	Shorter distance to convey water to storage and the fields.		10,000 ha available on title with farmers resident in the scheme	
3. Lumwana Mine Smallholder Vegetable Project.	Considerable and planning preparation has been undertaken.		Miners and their dependants should provide market within Lumwana	Plans dominated by the mining company.
	Strong land development coordinating committee is in existence and working.	Soils are acidic	Proximity to Copperbelt and DRC markets	
	Large dam already constructed. Prospects for other sites nearby.		Market provides crop diversification opportunities.	
4. Mwomboshi	Good dam-site location and straight forward irrigation system		Close to Lusaka markets with good road infra-structure	
	Considerable number of small-farmers	Local farmers are traditionally livestock owners with some rain-fed crops	Possible links could be made with commercial beef producers – ZAMBEEF is based in	

			Chisamba.	
	Compact site	Only a few small-farmers have experience of irrigation	Some small-commercial farmers have demonstrated potential to supply local horticultural markets	
	Studies completed.	Soils not the best for irrigation – a bit too sandy	Good potential for livestock	
	The promoters have already established accompany and invested a significant amount of their own funds promoting the plan		Possibility of trialing a Chiansi model here for centre pivot irrigation of wheat and other crops under group management.	
5. Mwinilunga Smallholder Pineapple Project.	Abundant surface water resources in form of rivers and streams.	Distance from markets is prohibitive and limits crop diversification opportunities	Lumwana mine and DRC should provide market for pineapples.	Plans dominated by one crop – pineapples.
	Farmer registered cooperative is formed.	Lack of cannery undermines production		
	Good soils for pineapples.	Not connected to national grid.		
		Not so good road infrastructure.		
	Farmers well experienced in growing pineapples			
6. Musanje Smallholder Banana Project.	Small-farmer driven	Markets and input suppliers in Lusaka for PPP.	Good and growing demand for bananas	Climate and distance from market limits crop diversification opportunities
	Very active one large commercial farmer nearby	Very reliant on one crop.	Proximity to Zimbabwe should provide market opportunity	
	Active smallholder farmer association.	Distance from Lusaka add to marketing costs.		
		Would require considerable support for crop diversification		

7a. Chipapa Dam Smallholder Vegetable project.	A farmer cooperative in existence and working.	Water source is inadequate and limits production. Small dam size.	Good market opportunity in Lusaka at Soweto market.	
	Farmer-driven and mostly females who are heads of their households.			
	Farmers have experience of horticultural production.			
7b. Katoba Dam Smallholder vegetable Project.	Farmer-driven	Inadequate water source. Small dams	Good market opportunity in Lusaka.	
	Smallholder farmers have experience of horticultural production.	No cooperative or association formed.		

ANNEX 1. SUMMARY TECHNICAL DATA FOR IDP POTENTIAL PROJECTS

Project	District & Province	PPP	Project Area (ha)	Small-holders	WUA/ Water Management Entity.	Main Crops	Irrigation system	Water source	Other intervene programs	Distance to nearest urban	Project status	Required civil works	Comments
1. Kasama Sugar	Kasama Northern	Kalungwish Sugar Estate	200 Scf	120+	Nil	Sugar cane	Overhead, canals, furrows	Dam	Nil	45 Km	7 years old	Dam, pump station, pipelines, canals	Recommended and highly rated.
2. Kanakantapa	Chongwe -Lusaka	Nil	1,000+ha S/Mcf	300	Exist & registered	Vegetables & field crops	Overhead, surface	Dam	GRZ poverty reduction programs	50 Km	Old	Dam, pump station, pipelines and canals,	Recommended and highly rated.
3. Mwomboshi Dam	Chisamba Central	Lusaka markets and shops. AAI/Cjhiansi trial	700-1,000 ha Scf	497	Exist & registered	Wheat, tobacco, early maize soy beans	Overhead sprinklers, & surface irrigation.	Mwomboshi River/Dam	Nil	70 Km	New	Dam, pumps stations pipelines,	Recommended and highly rated.
4. Lumwana	Solwezi-Northwes tern.	Lumwana Mine	1,000ha Scf LMC lcf potential.	500	Nil	Vegetables & pineapples	Overhead & Surface irrigation/ furrow	Dams/weirs	SNV USAID	50Km (Local market)	New	Dam, pumps, pipelines, canals, siphons & weir	Recommended Highly rated
5. Mwiniilun ga - pineapples	Mwiniilun ga - Northwes tern.	Nil	700 ha Scf	1000	Exist & registered cooperative	Pineapples	Surface irrigation, drip system	River and streams. Rain-fed	SNV	400 Km	Old	Dam, weirs, canals, pumps.	Not recommended
6. Musanje	Kafue/ Chirundu Lusaka	Lusaka markets and local farmer	860 ha Scf	375	Exist & registered	Bananas	Micro-jet sprinklers/ drip system	Zambezi River		160 Km	New	Intake facility, pumps.	Recommended
7a. Chippapa dam smallholder.	Kafue - Lusaka	Nil	10 ha Scf Nil Lcf (100 ha potential)	120	Exist & registered	Vegetables,	Surface irrigation, portable overhead	Dam,	Zamsif, US-Aid, Hipc funds, RIF	35 Km	Old scheme	Dam, canals, pumps & pipelines	Recommended
7b. Katoba Dam smallholder	Chongwe -Lusaka	Nil	100 ha Scf Nil Lcf.	150+	Nil	Vegetables	Surface irrigation, portable overhead	Dams - Katoba & Kasenke	RIF	110 Km	Old scheme	Dam, canals, pumps & pipelines	Recommended

PPP = Public Private Partnership; WUA = Water User Association; Scf = Smallscale commercial farmers; Lcf = Large scale commercial farmer
 SNV = Netherlands Development Organization, RIF = Rural Investments Fund.

訪問先	USAID (MATEP Project)
日時	2009年3月11日(水) 16:00~17:00
場所	USAID MATEP Project Office、ルサカ市
出席者	(先方) Mr. Scott Simons, Director, MATEP (当方) 升村、Chibbamulilo
文責	升村

1. 訪問先の概要

USAID は政府への支援ではなく、農業諮問フォーラム、CLUSA（米国協同組合連盟）、ZNFU（ザンビア全国農民連合）などの NGO を通じた民間セクターへの直接支援を行っている。MATEP プロジェクトは USAID が実施しているプロジェクトのひとつであり、主として輸出業者への財務的、技術的な支援活動を行っている。

2. インタビュー内容

- (1) MATEP (Market Access, Trade and Enabling Policies Project) は農産物の輸出振興（近隣諸国及び海外諸国向け）を目的としたプロジェクトであり、期間は 2005 年から 2010 年までである。プロジェクトの目的は農産品の輸出及び観光の振興である。輸出対象品は園芸作物、花卉、パプリカ、蜂蜜、コーヒー、畜産物、種子、落花生、綿花、キャッサバ、蜂蜜、木材製品などである。
- (2) 輸出対象国は近隣諸国（南アフリカ共和国、コンゴ民、ナミビア等）並びに欧州、米国、アジアの諸国である。輸出業者に対して財務的、技術的な支援活動を行っている。アフリカ地域諸国のなかでは輸出入取引において南アフリカが最大のマーケットであり、次いでコンゴ民が重要である。
- (3) 販路開拓の活動として、ザンビアの輸出業者と海外の輸入業者との接触機会を設けるための貿易展示会の開催（南アフリカとザンビアで開催）、輸入業者をザンビアに招いての商談会などを実施した。コッパーベルト州で開催した展示会は主としてコンゴ民向けの輸出を目的とした。
- (4) 海外マーケット情報の収集、輸出品の品質改良（品質基準の検討等）、価値連鎖分析（農産物の輸送コスト削減方策の検討等を含む）に関する研修を実施した。
- (5) 価値連鎖分析の一環として都市部住民の食料消費調査を実施し、主な都市住民世帯による食料品購入費（品目、数量、価格）について聞き取り調査を行った。
- (6) 園芸作物に関しては中小業者による価格と供給量に関する情報整備のため、価格動向と取引量に関する調査を実施した。特にトマトに関する価値連鎖分析を行い、ザンビア全国農民連合（ZNFU）との連携により、園芸作物の価格と供給量に関する携帯電話を利用した情報伝達システムを開発した。
- (7) 野菜類の加工業者（瓶詰め、缶詰業者）、蜂蜜、皮革、落花生、有機コットン、パプリ

カ、養鶏業者などに対し融資を行い、それぞれの活動を支援した。

- (8) 上記の展示会、商談会の成果として Freshpikt 社（食品加工業者）が缶詰食品の成約（年間 30 万トン）に至り、African Joy 社は売り上げを 40%増加し、African Spice 社は米国において香辛料製品の販路を開拓することができた。

3. 所感

民間の輸出業者を対象とするプロジェクトであるが、プロジェクトの内容はアグリビジネス、マーケティングに関連するものであり、その手法はマスタープラン調査においても参考になると思われる。

4. 入手資料

MATEP プロジェクトの概要書

訪問先	アフリカ開発銀行 (AfDB)
日時	2009年3月11日(水) 16:50~17:30
場所	Zambia Country Office, Lusaka
出席者	(先方) Lewis M. Bangwe, Agriculture Specialist (当方) 高橋、近藤
文責	近藤

1. 訪問先の概要

アフリカ開発銀行は、1971年以來、合計約9.8億ドルの投資をザンビアに対して行っている。2008年7月現在、AfDBのザンビアに対する投資は約2.2億ドルで、主な投資分野は、ザンビア政府の優先順位とリンクし、貧困削減、水・エネルギー供給、農業、インフラ開発となっている。なお、日本の対ザンビア経済協力額は、2005年時点で約1.3億ドルである。

2. インタビュー内容

一般

- 1) 農業リスクには、3~4週間雨が降らないことによる早魃、洪水、土壌浸食、施設被害がある。
- 2) 農業の問題は、低い生産性と不十分な普及サービスである。
- 3) 高コストの灌漑は、流通ポテンシャルがあることにより、持続可能な発展が可能になる。

灌漑関連プロジェクト

- 4) AfDBの灌漑関連プロジェクトには、Nationwide Irrigation Potential Study と Small-scale Irrigation Project (SIP) がある。

Nationwide Irrigation Potential Study

- 5) 2009年3月末にコンセプトノートが作成された。コンセプトノートは、内部の評価の後にステークホルダーに説明が行われ、その後公開される。
- 6) 新規開発及び既存スキームを調査の対象とし、参加型の調査を行う。
- 7) 調査にはGISを用い、水資源量、灌漑タイプなどを踏まえてインベントリーを作成する。
- 8) 本調査の後にF/Sを行い、それに基づいて灌漑投資を策定する。

Small-scale Irrigation Project (SIP)

- 9) 今月(2009年3月)、フィンランドとの締結により、プロジェクトは2年間延長されることになる。
- 10) プロジェクトはSinazongwe、Mazabuka、Chongweの3郡で実施中である。ダムを除く施設の設計は完了している。また、入札図書の実成も完了している。

- 11) Sinazongwe 郡：4 サイト、合計約 700 ha 弱で灌漑開発を実施中である。リハビリは約 50% 完成した。ポンプを 3 カ所設置して取水を行う。
- 12) Mazabuka 郡：Nega-Nega Settlement Site で 600 ha 程度の灌漑開発を実施中である。カフエ川からポンプ取水を行う。約 50% は完成した。溜池は完成した。
- 13) Chongwe 郡：Kanakantapa Settlement Site で 600 ha 程度の灌漑開発を実施中である。2,500 万 m³ のダムを建設する予定である。なお、別の 500ha をフェーズ II として、世銀に実施するように交渉している。ダム設計のためのコンサルタント選定を行っている。

3. 所感

世銀は Irrigation Development Project を 2010 年の末から始めようとしている。また、アフリカ開発銀行は SIP を実施中であり、Nationwide Irrigation Potential Study を計画中である。このように、世銀とアフリカ開発銀行は中・大規模の灌漑開発を推進している。

一方、大多数を占める小規模農民のほとんどはこれらの開発から取り残されることになる。現在、政府は小規模灌漑開発を実施しているがさまざまな問題を抱えており、政府のものとは別の小規模灌漑開発モデルが必要である。

4. 入手資料

なし

訪問先	Chanyanya Irrigation Project (Chiansi Irrigation Scheme 開発の一部)
日時	2009年3月12日(木) 10:00~13:00
場所	Chanyanya, Chikupi Ward, Kafue District (MACO 普及体制上は Chikupi Camp, Mungu Block)
出席者	(先方) Senior Agriculture Officer; Block Extension Officer; プロジェクトの参加農民 (当方) 近藤、升村、中村、松下所員
文責	中村

1. 訪問先の概要

InfraCo [DfID、Sida、スイス、アイルランド、オランダ、オーストリア、アイルランド等のドナーが出資する Private Infrastructure Development Group (PIDG) 基金によって設立されたインフラ整備組織。一応体裁は民間企業] の融資・計画で整備する新規の大規模スキームの一部に訪問した(整備予定図を別添)。現在も整備中で稼働を始めているが(予定では2006~2007年で完成するはずだったが遅延)、スキームの全体規模は2,000ha(うちサトウキビ1,500ha、冬小麦500ha)で、総工費は2,370万米ドル。InfraCoの発表によれば、うち50%を大規模商業農家、50%を小規模農家のグループが運営する。現地踏査では後者の一部(センターピボット式160ha、スプリンクラー式60ha)を運営する予定の小規模農家グループに聞き取りを行った。

2. インタビュー内容

農民グループからの聞き取り(注意:灌漑規模等の情報に公式発表との齟齬あり)

【灌漑施設】

- InfraCoの融資・計画と、民間サービスプロバイダー(契約栽培の仲介として灌漑スキームの操業・維持管理、トラクターのオペレーション、技術指導、種苗・肥料・農薬等のインプットの供給を行う民間業者) Agricultural Advisors International. Ltd (AAI)の仲介によって、グループの参加農家が有する農地160haにセンターピボット式灌漑を設置中。冬小麦、大豆を作付け予定。
- これに加え、センターピボット灌漑区画の横に60haのスプリンクラー灌漑を設置し、野菜(乾期)と自給作物(雨期 天水)を生産予定。
- 水源はカフエ川につながるラグーン(巨大な沼地 Chanyanya Lagoon)。
- センターピボットが走行できるように、圃場はブルドーザを用いて整地した。
- 本地区には洪水被害がある。

【農民組織】

- このスキームには155農家が参加し、協同組合を結成して管理主体とする。

- 組合の経営に関しては AAI と MACO (AAI が MACO のオフィサーを外部講師として備上) がサポートし、農家経営、帳簿付け、農業機械のメンテナンス等の技術トレーニングを農民に提供。
- 同スキームで大規模商業農家が運営する区画に関しては、近隣の製糖会社 (Kafue Sugar) との契約栽培によるサトウキビ生産を選んでいる。しかしながら、契約栽培は「安く買い叩かれる」ため、グループが運営するスキームでは契約によらず冬小麦 (乾期) や大豆 (雨期) を生産することとした。←グループに販売経路に関する明確な戦略はない。作れば売れると思っている。AAI が販路を斡旋する場合、追加で手数料を払うことになるので契約栽培と大差なかろうが、その思慮が足りない。
- 160ha+60ha の整備に係る融資総額は 200 万米ドル。これを農民がスキームでの生産開始から 11 年のローンで返済する。年利 5% で貸し付け (市中銀行の 1/3 の利率)。InfraCo の提示した返済計画によれば、返済期間中、年間収益の 75% を返済に充て、25% が農家の儲けとなる。←しかし、AAI へのサービス手数料は 25% の儲けから支払うことを考えると、向こう 11 年は農家の利益はほとんど出ない。耐えられるのか。

InfraCo についての情報 :


<http://www.infraco.com/portal/hgxpp001.aspx?40,3,56,O,E,0,>

- DfID、Sida、スイス、アイルランド、オランダ、オーストリア、アイルランド等のドナーが出資する Private Infrastructure Development Group (PIDG) 基金によって 2002 年に設立されたインフラ整備組織。民間企業としての格付け。
- ドナー政府の途上国開発の一環であるため、返済に焦げ付きが出そうなハイリスクの案件もあえて手がける。
- 現在、事業展開しているのは、このザンビアの 1 件のほかに、ウガンダ 2 件、ガーナ、マダガスカル、カーボベルデ各 1 件。セクターは、エネルギー (発電所)、水 (上下水道、灌漑)、輸送インフラ (道路、水上輸送)。今後はアフリカ圏のみでなく南・東南アジア圏でも事業展開を計画。

AAI についての情報 :

<http://www.buyinafrica.com/index.pdf>

- ザンビアのコンサルタント業者で、主に工芸作物を原料として輸出産品を製造する企業と生産者との契約栽培におけるサービス提供で利益を上げている。

	<p>写真 1 : InfraCo が計画した Chiansi Irrigation スキーム (約2,000ha) の全体図 点線で囲った部分が聞き取りした小規模農民グループが主体となる Chanyanya Irrigation Project のスキーム。センターピボット式 (写真 2、3を参照) の圃場が 4 つある。 詳細の計画地図を別添する。</p>
	<p>写真 2 : センターピボット式灌漑 (上空から) 全長 400~500m に及ぶタイヤ付きの散水管 (写真 3) を中心軸で回転させ灌水するシステム。このため圃場が円形になるのが特徴。一つの円の大きさが 40ha ほどにもなる。ザンビアの大規模商業灌漑の方式として最も一般的。</p>
	<p>写真 3 : センターピボット式灌漑 (地上から) Chanyanya Irrigation Project のもの。</p>
	<p>写真 4 : Chiansi Irrigation スキームの水源となるラグーン カフェ川に接続。水深は 1 m 程度と浅い。</p>

営農に係る観察：

- 灌漑施設は未だ稼働を開始していないが、予定区画では天水でのメイズ栽培が一部で始まっていた。InfraCo が農民へのインセンティブとして 60ha 分のメイズ種子（Panar 社のハイブリッド中生種）と肥料を無償供給（7万米ドル）したそうである。
- 植栽密度、肥培管理の状況は適正（肥料は多投入気味）であり、作況は良い（トラクター耕起）。
- スキームに関与しない周辺農家も観察したが、播種のタイミング、植栽密度や除草などの管理状況はおおむね適正であった。
- 同地域はザンビアに多数存在するダンボ地（浸食性の低湿地帯）ではない平坦な地形だが、巨大な沼地や小川（雨期のみ。ワジ）が多く存在し、地域の地下水位はおおむね高い。また、近隣に鉄工所（操業中）、肥料工場（窒素肥料製造。現在は操業停止）が存在し幹線道路までのアクセス道路網も状況が良いため、マーケットアクセスは非常に良い。このため浅井戸からの足踏みポンプ灌漑や、川からのバケツ灌漑による零細規模の野菜栽培（トマト、インプア）が盛んであった。
- 零細灌漑をする野菜圃場の土壌は粘質・膨張性の高いコットンソイルに近く、牛耕を導入していない手耕作の同地では扱いつらさがある。灌水の手間も合わせると、野菜のような集約栽培の場合、1世帯当たり耕作規模は、足踏みポンプ灌漑（浅井戸1基ポンプ1基）で0.5ha未滿、バケツ灌水だと数アールが限度かと考えられる。
- 零細規模で生産した野菜は生産者がそのまま幹線道路まで運搬し仲買・小売りに引き取られる。
- 野菜栽培についても、育苗、植栽密度、肥料投入の状況はおおむね適切であった（「儲けがなくてインプットに金をかけられない」と言いつつも零細農家ですら肥料の投入をできるだけやっているのは Fertilizer Support Program があるからなのか）。



写真5：一般農家のメイズ作付け
適正な植栽密度での作付けがなされている。




写真6：浅井戸からの足踏みポンプ灌漑
雨期で水位が高いこともあるが、地下 1.5m 程度に水位が来ており、水深も数 m あった。この農家は 2 基の浅井戸で 1ha 程度の作付けをしていた（大半は補助的な灌漑で済むカンキツ、バナナ、グアバ等の果樹や生食用メイズ、サトウキビ等。恒常的に灌水が必要な野菜は数アール）。



写真7：上記の灌漑農家の畝間灌漑（収穫直後につき作物なし）
畝間灌漑は大量の水を汲み上げる必要があり、足踏みポンプ（ホースで灌水）でこの方式は限界がある。この農家は基本的に天水で栽培されるメイズの播種時期を天水栽培のタイミングよりも微妙に前後させて播きつけ、雨のない期間のみを補助灌漑でしのごというやり方でポンプアップの労働負担を削るとともに、生食用メイズ（一般の乾燥メイズよりも商品価値、収益性高い）として値の高い端境期をねらって出荷する知恵を持っていた。



写真8：バケツ灌漑
小川沿いでは夫婦 2 人が数アールの規模でトマトを作付けしていた。小川は乾期の間干上がるが、川底を少し掘るだけで水が出るため通年の栽培が可能。この小川沿いに、同じような零細規模で野菜畑が続いている。

	<p>写真9：トマトの定植床の中耕 コットンソイルのため灌水をした後、太陽で表土が乾燥すると硬くしまる。そこでこまめに表土を破碎して生育を促している。追肥や支柱立ても一般的に行われており、ローカル市場に並ぶトマトの質は総じて良かったのが印象的である。</p>
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3. 所感

灌漑整備の規模の観点から本スキームは本格調査のスコープから外れるが、小規模農家の巻き込みについて良かれ悪しかれ学ぶべき点が多いと思われるため、本格調査でも定期的に状況をフォローすべきである。

スキームの大半を占める大規模商業農家については基本的に企業体であり、経営体質や実績に基づいて、焦げ付きのリスクが低い農家に選択的に融資することができよう。しかし、今回聞き取りをしたような小規模農家の集合体については、ビジネス経営の感覚に欠けており（聞き取りでの非常に安易でアバウトな営農方針、返済計画から明白）、借金回収は難航するものと思われる。

懸念されるのは、エージェントとして小規模農家を仲介するサービスプロバイダーの存在により農家が灌漑の管理、生産、マーケティング、出荷等の経営全般においていつまでも自立できない（悪く言えば、単なる農業労働力として隷属する）状況に陥ることである（こうした状況は、契約栽培と民間プロバイダーの関与が盛んであるケニアにおいてよくあることだったため）。（中村）

- 農民は、ローンを返したら施設は自分のものになると期待しているが、問題は農民が施設の更新費を準備できるかどうかである。（近藤）

4. 入手資料

特になし