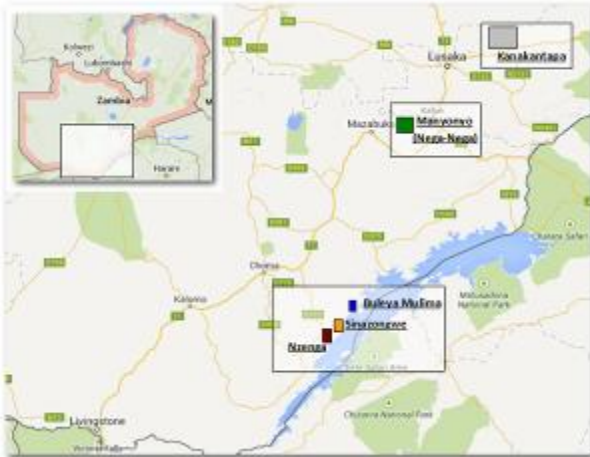


EVALUATION OF THE  
SMALL-SCALE IRRIGATION PROJECT  
(SIP)  
ZAMBIA

Draft report  
Joss Swennenhuis  
April 2015

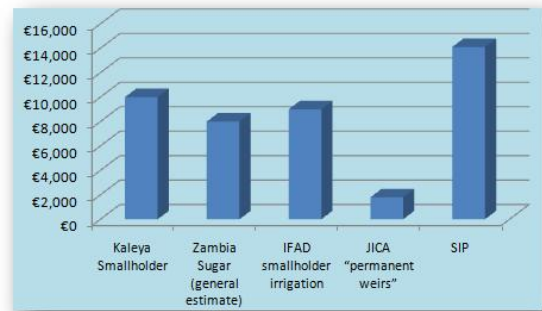
## PICTORIAL SUMMARY



Location of SIP irrigation schemes

This report presents the result of the evaluation of the Small-scale Irrigation Project (SIP) funded by AfDB (€7.4m) from 2003 to 2010 and by MFA Finland from 2010 to date (€9.3m), with €1.9m GRZ counterpart funding. The project is implemented by MAL through a dedicated PIU. SIP has rehabilitated 1 irrigation scheme (Buleya Mulima), developed 3 new schemes (Sinazongwe, Nzenge and Manyonyo) and completed the designs for a 5<sup>th</sup> scheme (Kanakantapa). The total area of the completed schemes is around 840 ha, benefiting 500 households. The new schemes will be centrally managed through a farmer-owned company that employs professional scheme management staff. Markets have been secured for Manyonyo (sugarcane) and Nzenge (Irish potatoes) schemes with first income generating yields expected later this year.

**Construction effectiveness** - The cost and time effectiveness of the scheme construction have been hampered by an inadequate project design, considerable underestimates of scheme construction costs and bureaucratic rules caused by a hybrid procurement and No Objection system that has to comply with both GRZ and AfDB rules. Of the overall budget of €17.8 million, €11.8<sup>1</sup> million, has gone into construction, giving an average construction cost of €14,100 per hectare brought under irrigation, considerably higher than comparable schemes. It translates into a cost of around €23,700 per beneficiary household.



Estimated construction costs per hectare for different schemes

**"Soft" aspects** - SIP has been very successful in developing a management model and in securing markets. Although these aspects were only addressed late in the project, the achievements have been remarkable: an innovative management model and secured markets and loans for production of sugarcane in Manyonyo (Zambia Sugar) and Irish potatoes in Nzenge.

*Contract for the Purchase of 2015 Crop Irish Potatoes  
Dated this 6<sup>th</sup> November, 2014*

**CONTRACT NUMBER TFV- 001**

**BETWEEN**  
*The Seller:*

Nzenge Irrigation Company  
P.O Box 63  
Sinazongwe  
Southern Province  
Telephone: +270 977 458465\*  
Email: [gestham@yahoo.com](mailto:gestham@yahoo.com)  
(Hereinafter referred to as 'Seller')

**And**  
*The Buyer:*

The Director  
Top Fruit and Veg Zambia PTY  
Lusaka, Zambia  
Contact person: Louwtjie Marais  
Phone No: +260961871483  
email: [Marais.topfruitveg@gmail.com](mailto:Marais.topfruitveg@gmail.com)  
(Hereinafter referred to as 'Buyer')

Contract with Top Fruit & Veggies for purchase of Irish potatoes. It includes a minimum price guarantee

<sup>1</sup> This includes already disbursed but not yet used funds

**Impact** - The rehabilitation of Buleya Mulima scheme was completed in 2007. The 0.25 ha plots have since generated good income to the beneficiaries of around €1270 per household per year from selling winter maize, tomatoes, ocra, green beans and other crops to wholesale buyers who come to their village. The potential benefits of the other schemes (where the first crops have yet to be harvested) is also good, with the cost-benefit analysis showing net incomes of around €2,500 per beneficiary per year. With at least double that income possible in Sinazongwe / Nzenga if more than 1 crop per year is planted.



Buleya Mulima is the only scheme managed by an (existing) cooperative. From the scheme income the cooperative is now branching out to other income generating activities like chicken broilers and cattle

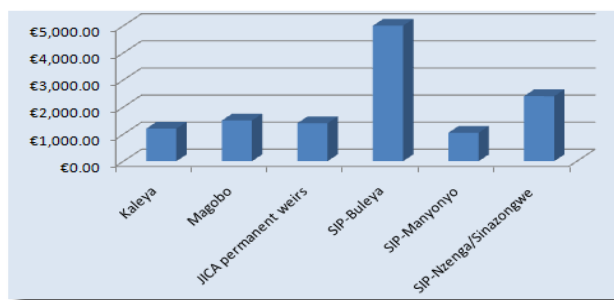


Communities have been mobilised and consulted throughout the project lifetime

**Sustainability** - The sustainability prospects for the developed schemes are generally good. Ownership has been promoted through a continuous community mobilisation effort, and the communities have been directly involved in identifying a scheme selection and beneficiary selection. In spite of this, a social conflict around land issues has arisen in Sinazongwe, where the further scheme development is now on hold.

The management model developed by SIP promises to balance farmer ownership with professional and cost-efficient scheme management.

The business plans show good commercial viability, and initial financial needs have been covered through loans negotiated with FNB (a commercial bank) and through facilitation by Zambia Sugar. Management support provided to the irrigation companies by AMSCO through separate funding from Finland will help ensure institutional sustainability.



Comparison of estimated net profits per ha (for Nzenga / Sinazongwe based on 2 crops per year)



Sustainability is currently hampered by a number of technical issues, in particular in Manyonyo. This is primarily due to the fact that the schemes were not designed for sugarcane and the fact that the technical quality of the designs was not always satisfactory.

<- Good: Lined canals in Sinazongwe and Nzenga

Not so good: leaking earth canals and wrong type and location of control structures in Manyonyo ->





Not ideal: Makeshift control structures in Manyonyo



Siphons at work at Manyonyo



A well constructed reservoir at Manyonyo, but with an outlet that might be too small



Old and new: the old diesel pump at Buleya replaced with an electrical one.



Temporary setback: ZESCO removed transformers recently at Sinazongwe and Nzenga



Impressive pumping station at Manyonyo. Some minor issues with debris / silt entering the foot valves

**Gender and social inequality** – These aspects have not received due attention. While women are included as beneficiaries they are not in any decision-making position in the irrigation committees. Some gender and HIV/AIDS awareness training was provided but has not led to any mainstreaming strategies. The current work by AMSCO presents an opportunity to improve on these aspects.



Men still better off than women ....



Exceptional heavy rains during April visit. Too late for the crops after a 3-week drought spell

**Environment and climate change** – Minor environmental impacts. Climate change evident, and irrigation a key coping strategy for small farmers



Some bush clearing unavoidable for irrigation development

**Project management** – The PIU generally performed well, with delays mostly caused by factors outside their control. Quality assurance of construction work however leaves to be desired, while impressive results were achieved on the soft elements of management and marketing. Some motivational fatigue has been observed. Lack of a clear results framework has hampered results based management.

The Project Steering Committee has functioned in line with its mandate, with the supervision missions proving to be very useful.



The socio-economist (left) and irrigation engineer of SIP during the field visit

## Project level conclusions & recommendations

<p>Achievements</p>	<p><u>Conclusion:</u> When compared with the initial project proposal as described in the appraisal document for the first phase, the project has underachieved when it comes to the number and size of the irrigation schemes to be constructed (hardware) and the time required to do so. However, the initial design was unrealistic both in budget and in time planning, while bureaucratic combined GRZ / AfDB procedures caused many delays.</p> <p><u>Recommendations:</u> The PIU should analyse all outstanding issues and work with all stakeholders to prioritise and resolve the most pressing ones. MAL should appoint Boards for the irrigation companies as soon as possible.</p>
<p>Sustainability</p>	<p><u>Conclusion:</u> Sustainability prospects are good, but require some technical adjustments and continued support to the irrigation companies (possibly beyond support that AMSCO is currently providing).</p> <p><u>Recommendations:</u> The work of AMSCO is crucial and should if needed be extended. The PIU should work closely with Zambia Sugar to resolve technical issues at Manyonyo and also urgently address the remaining technical issues at Nzenga. SIP should support the Nzenga Irrigation Company with the development of markets and related business plans for additional crops for the Nzenga / Sinazongwe schemes. This should be done in close collaboration with ZNFU.</p>
<p>Cross-cutting objectives</p>	<p><u>Conclusion:</u> Gender and social inclusion have not received enough attention.</p> <p>This can still be addressed through AMSCO's work with the companies, including promoting inclusion of poor people in the schemes as labourers.</p> <p>Environmental impacts are minor. Irrigation is a key climate change adaptation strategy.</p> <p><u>Recommendation:</u> The PIU should work with ZEMA on mitigating key outstanding environmental issues at Manyonyo.</p>
<p>Project management &amp; governance</p>	<p>Performance of the PIU and PSC has generally been satisfactory. The main weakness is inadequate technical quality assurance and current motivational fatigue leading to an inclination to not collaborate fully with key stakeholders like Zambia Sugar.</p> <p>The PIU should remain fully committed to SIP until the end and maintain a positive collaboration attitude. The PSC should consider playing an active role in resolving the outstanding issues in Manyonyo. The PIU should closely monitor Nzenga and Manyonyo crop management and yields and resulting benefits and document the lessons learnt.</p>

### Broader lessons for a possible future support programme for the smallholder irrigation sector

1. The "zero option" should not be considered because (i) Development of smallholder irrigation is a key livelihoods diversification strategy and very much in line with Zambian and Finnish development policies; (ii) Irrigation is very important in building the resilience of small farmers against climate change impacts; (iii) A future programme would allow for continued low-level engagement with the schemes developed under SIP, which will increase their sustainability prospects.
2. A future support programme for the development of smallholder irrigation schemes in Zambia should include a sufficiently long preparation phase (1 to 2 years) which allows for a thorough analysis of technical, marketing, management, social and environmental issues at potential sites for irrigation development support.
3. A future support programme should not start with the development of new schemes based on the SIP management model until this model has proven itself. At least one to two years are still needed to assess how well the SIP model will be functioning once the schemes (at least Nzenga and Manyonyo) are actually producing and marketing crops. This will allow all stakeholders to learn crucial lessons that can help avoid or

mitigate any challenges that this management model faces.

4. For effective management and governance of a future support programme,, five issues are considered crucial:
  - a) The right composition of the project management team
  - b) A clear results framework
  - c) Strong accountability and oversight mechanisms (including performance based contracts with clear annual deliverables for all project staff)
  - d) Realistic budget & time planning
  - e) Efficient procurement and financial management procedures
5. Several management models can be considered, each with its advantages and drawbacks. The five issues mentioned above should ultimately be guiding the choice of project management model.

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## Acronyms

AfDB	African Development Bank
AMSCO	African Management Services Company
DPM	District Project Manager
DPP	Department of Policy and Planning (MAL)
ESIA	Environment and Social Impact Assessment
FNB	First National Bank
GRZ	Government of the Republic of Zambia
ha	hectare
HH	household
IDSP	Irrigation Development Support Programme
MAL	Ministry of Agriculture and Livestock
MFA Finland	Ministry for Foreign Affairs of Finland
MIC	Manyonyo Irrigation Company
MSCGT	Mazabuka Sugar Cane Growers Trust
NIC	Nzenga Irrigation Company
O&M	Operation & Maintenance
PIU	Project Implementation Unit
PSC	Project Steering Committee
SIP	Small-scale Irrigation Project
TA	Technical Assistance
T-COBSI	Technical Cooperation project on Community Based Smallholder Irrigation
TSB	Technical Services Branch (MAL)
ZMK	Zambian Kwacha (rebased)
ZNFU	Zambia National Farmers Union



## 1 Introduction

This report presents the results of the evaluation of the Small-scale Irrigation Project – SIP. SIP was funded during a first phase from 2003 to 2009 by AfDB (around €6.7 million), and from 2010 onwards by Ministry for Foreign Affairs (MFA) of Finland (around €9.3 million<sup>2</sup>), with the Government of the Republic of Zambia (GRZ) providing counterpart funding (€1.8 million) during the whole project period, with total disbursed funds amounting to around €17.8 million. The Ministry of Agriculture and Livestock (MAL, previously the Ministry of Agriculture and Cooperatives-MACO) is the Executing agency for the project and has delegated the project management to a Project Implementation Unit (PIU) with dedicated staff.

After a number of extensions, SIP will come to an end in September 2015. This evaluation can therefore be seen primarily as an end-of-project evaluation, although recommendations have also been developed for the remaining few months of implementation.

The overall objective of the evaluation, as per the ToR (see annex I) is to **assess the sustainability and potential for irrigated small scale agriculture in the schemes implemented by SIP, in the context of the agricultural value chains and markets**, with an aim to:

1. Provide the competent authorities of the Government of Finland and the Ministry of Agriculture Zambia with qualified views, conclusions and evidence on the project results, relevance and feasibility of the project design and the implementation methods for reaching the stated objectives.
2. Provide key lessons learnt and give guidance to the competent authorities on future support, or discontinuation of the support after the current phase of the project has been completed;
3. Provide the competent authorities and stakeholders' recommendations for improvements and the future orientation of the project.

The evaluation should also develop recommendations for a possible future support programme to the irrigation sector, including an analysis of the zero option.

The evaluation consisted of an inception phase (desk study, briefing meeting, inception report), field visit to implemented irrigation schemes, meetings with a large number of stakeholders (both in Lusaka and in the field) and two debriefing meetings in which preliminary findings were presented to the Ministry of Agriculture and Livestock (MAL) and to MFA Finland.

The assignment was undertaken by an independent consultant, Joss Swennenhuis, who is responsible for the findings, conclusions and recommendations contained in this report. During the field visit, he was accompanied by two officers from MAL: one from the Technical Services Branch (TSB) of the Department of Agriculture, and one from the coordinating Department of Policy & Planning (which is also responsible for monitoring of projects under the Ministry's responsibility).

The report starts with a short description of the project, followed by detailed findings<sup>3</sup>. The final two chapters present conclusions and recommendations at project level, and broader lessons learnt as input for a possible future support programme to the irrigation sector.

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<sup>2</sup>Total committed amount was Euro 10 million, but not all funds were disbursed and the amount also included a management fee for AfDB.

<sup>3</sup> More detailed than initially envisaged, based on a request by MFA Finland to provide as many details as possible.

A note on the financial numbers:

- If not otherwise explicitly stated, all amounts in this report are in Euros.
- Where USD amounts are at the basis of some calculations, these were converted into Euros at a rate of 1 Euro : 1.35 USD. This is more or less the average exchange rate over the project implementation period.
- Conversion of AfDB's UA currency to Euros is based on information provided by SIP showing USD equivalents of UA amounts. On average 1 UA = 1.55 USD = 1.15 Euro
- The bulk of project construction expenditures took place in the period 2008 to 2014. Average annual inflation during this period was less than 2% for both the USD and the Euro. This is considered low enough to not require recalculation of all expenditures to present-day values. The exception is the expenditures for the rehabilitation of the Buleya scheme, which was completed by 2007. An inflation correction of 1.3 was applied to calculate the cost/ha for Buleya to present day values. In a few other relevant cases inflation corrections were also applied. This is mentioned explicitly in the text.

## 2 Project description

The Small-scale Irrigation Project (SIP) originated from the efforts of the Government of the Republic of Zambia (GRZ) to support the Tonga people who were displaced from the Zambezi valley during the construction of the Kariba dam in the 1950s. As such, the project targeted a number of areas where the displaced people have been resettled, with the objective to increase food production and farm income of the target group in the project area through irrigation. The original project design comprised 3 components: Irrigation Development (including Community Mobilisation); (B) Rural Saving and Credit; and (C) Capacity Building.

The first phase of SIP formally started in 2002, with funding (loan + TA grant) provided by the African Development Bank (AfDB) and by GRZ as counterpart funding. The initial appraisal report proposed to develop 6 irrigation schemes (5 in Southern Province, 1 in Lusaka province) with a total irrigation area of 1,890 ha, targeting 1,650 households, in a 6-year period.

At the start of the project, feasibility studies for the proposed sites were not yet available, and the first few years of the project were therefore used to contract companies to develop these studies and design the irrigation schemes, while at the same time creating awareness amongst communities through a community mobilisation effort. From the results of the technical studies it soon became clear that the original project budget of UA 8.04 million (around Euro 10 million at current exchange rates) fell considerably short of the amounts required to develop all proposed schemes.

After the Mid Term Review (2007) it was therefore decided to only implement 3 schemes: Buleya Mulima (rehabilitation only), Nzenga and Sinazongwe (both around 100 ha) and Nega-Nega (595 ha). For a fourth scheme, Kanakantapa, the project only developed the design but it will not be implemented under the project due to the high dam construction costs. See map below. It was also decided to cancel the credit component and use the funds for the construction of the irrigation schemes.

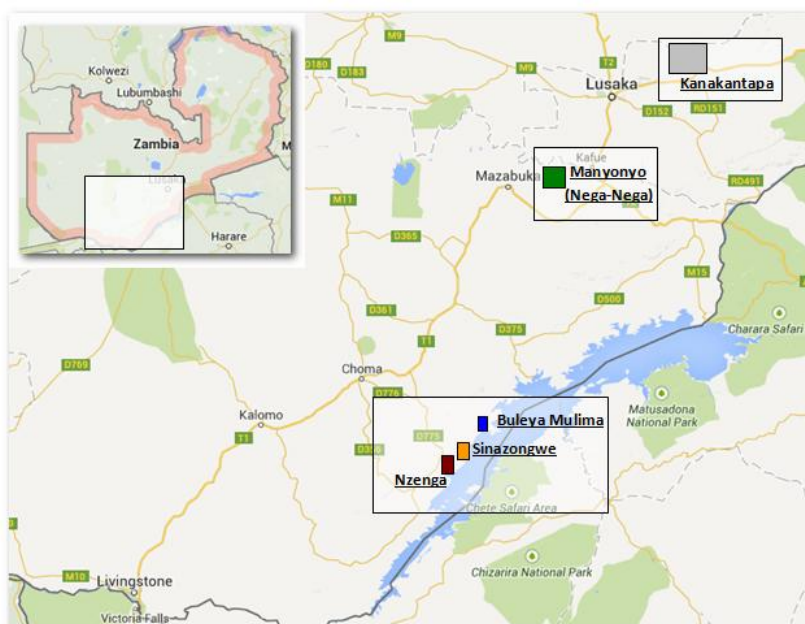


Figure 1 - Map showing approximate location of irrigation schemes

The Mid Term Review also proposed to extend the project with 2 years to 2009. However, it soon became clear that neither the additional time nor the available financial resources were sufficient to complete the revised list of activities by the end of 2009. In December 2008, the Government of Finland therefore agreed to provide additional funding to the tune of Euro 10 million for the continuation of project activities beyond 2009 and in particular to allow for completion of the irrigation schemes Sinazongwe, Nzenga and Nega-Nega<sup>4</sup>. The Finnish funds were channelled through the Finnish Trust Fund at the AfDB and the latter continued to manage the project funds (of the Euro 10 million funding, Euro 500,000 was set aside for AfDB management fees).

At the time of this evaluation (March / April 2015), the Finnish funded second phase had been extended several times because of further delays in implementation, with the last and final extension seeing the project end in September 2015. While the main construction works have been completed, land levelling is still ongoing, and much of the supporting infrastructure such as offices, sheds and some roads has not yet been constructed. It is unlikely that all planned infrastructure will be completed by September, due to lack of time, lack of funds and the AfDB rules that no new expenses can be approved in the last 6 months of a project.

From the start, SIP has been managed by a Project Implementation Unit (PIU), on behalf of the Ministry of Agriculture and Livestock (MAL). Two members of the PIU, the coordinator and the irrigation engineer, have been with the project the whole time, while the current socio-economist was recruited during the second phase of the programme (in October 2012). At district level, the project is coordinated by a District Project Manager.

It was halfway during the second phase, in 2012, that the project shifted from a purely technical construction approach to a more holistic approach that also looks at scheme management and marketing issues. SIP has developed an innovative model to this effect, which is based on the registration of a company which is responsible for both the scheme management and the marketing. The scheme beneficiaries are the shareholders of the company and as such the recipients of the net profits that are generated through production and sale of crops grown in the schemes. Additional income can be generated by way of providing unskilled or semi-skilled labour in the scheme. Two such companies have been registered: Nzenga Irrigation Company (NIC) for Sinazongwe and Nzenga schemes, and Manyonyo Irrigation Company (MIC) for the scheme in Nega-Nega (now generally referred to as the Manyonyo scheme). The latter currently has a management team of 2 (scheme manager, agronomist) while the former only has a scheme manager. To support the development of these companies into effectively managed and governed entities, the Embassy of Finland has, with funding from the Fund for local cooperation, contracted AMSCO (African Management Services Company) under a 1-year contract (Jan 2015 – Jan 2016).

At the time of this evaluation, Manyonyo scheme was partly in operation (95.5 ha planted), growing sugar cane that is sold to Zambia Sugar. The Nzenga scheme was awaiting approval of a loan from First National Bank (FNB) to allow the start of planting of Irish potatoes for which SIP, with support from the Zambian National Farmers Union, has facilitated a contract with a buyer (Top Fruits & Veggies). The Sinazongwe scheme has been put on hold because of conflicts within the proposed group of beneficiaries, while Buleya Mulima was temporarily not in use because receding waters of Lake Kariba had left the pumps dry, but it is otherwise in full use.

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<sup>4</sup> Initially Kanakantapa scheme was also to be covered under the Finnish grant but the construction costs for the proposed dam were too high to be covered by the Finnish funding.

## 3 Detailed findings

### 3.1 Achievements

#### 3.1.1 Introduction

SIP is lacking a clear results framework against which performance can be measured (see also section 3.5). Therefore this assessment of SIP's achievements is based on comparing the actual situation with intended quantitative and qualitative results described in the main reference documents: the appraisal document for the AFDB/GRZ funded first phase of SIP and the programme document for the Finnish/GRZ funded second phase. The actual situation has been derived from progress reports, meetings with all stakeholders and verbal feedback provided by SIP and the Finnish Embassy.

As already mentioned, the third component on credit / savings was cancelled at an early stage, so the assessment looks at achievements for the development of the schemes (the hardware) and achievements relating to capacity building, community mobilisation, marketing and management (the software). This is followed by an assessment of the (potential) impact of the schemes.

*Annex II provides a summary of the main achieved versus expected results. Annex III provided an overview of the characteristics of each scheme.*

#### 3.1.2 The hardware – Construction of irrigation schemes

The initial appraisal document proposed to develop 6 sites (5 in Southern Province, 1 in Lusaka province) with a total irrigation area of 1,890 ha, targeting 1,650 households, in a 6-year period i.e. from 2002 to 2008. By the end of 2009 (one year after the original project end date), the only completed infrastructure was the rehabilitation of the Buleya Mulima scheme (46 hectare<sup>5</sup>). For the second phase with MFA Finland funding, the targets were adjusted, with a total of 1,413 hectares to be put under irrigation through development of 4 schemes (Nzenga, Sinazongwe, Manyonyo (Nega-Nega), Kanakantapa), targeting over 997 HHs.

At the time of the evaluation, the main construction works at Nzenga, Sinazongwe and Manyonyo had been completed, totalling 793 ha, with approximately 500 households<sup>6</sup> as potential beneficiaries. Of this total area, 95.5 ha had actually been planted (sugarcane in Manyonyo), with planting in the rest of the areas being held up by a combination of factors (see section 3.2). It was decided not to develop the largest scheme, Kankantapa, because the cost of building the dam alone would amount to between 11 and 18 million Euro and that level of funding was not available.

#### Effectiveness

Considering the project has been running for over 10 years and has invested a total amount of around Euro 17.8 million, the rehabilitation of a 46 hectare scheme, construction of 3 schemes with a total of 793 ha and design (but not implementation) of a 5<sup>th</sup> scheme does not seem a very cost-effective and time-effective operation. It also doesn't contribute significantly to the proposed national targets of expansion of small-scale based irrigated land from around 4,000 ha (in 2013) to 17,500 ha in 2016 (a target pronounced by the late President Michael Sata in 2013).

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<sup>5</sup> The totally fenced area is 71 ha, but the remaining 26 ha is not under irrigation due to insufficient water availability.

<sup>6</sup> around 100 HHs in both Sinazongwe / Nzenga (1 ha / HH), around 150 HHs in Manyonyo (4 ha / HH), and around 150 HHs in Buleya Mulima (0.25 ha / HH)

Regarding the cost-effectiveness: when counting all costs (goods, works, services and operational costs), the cost per hectare is around Euro 21,000<sup>7</sup>. When only considering cost of construction work, this goes down to between Euro 10,800 and Euro 14,100 per hectare<sup>8</sup>. This compares unfavourable with estimated development costs of some other irrigation schemes in Zambia, as illustrated in table 1. It is also much higher than the originally estimated costs of around Euro 4,000/ha during appraisal, and the revised cost estimate of Euro 8,920/ha of the Mid Term Review in 2007 (both amounts at present day prices i.e. corrected for inflation).

Table 1 - Comparison of irrigation development costs

Scheme	When developed	Scheme size	Scheme type	Total cost / ha (Euro)	Construction cost / ha (Euro)
Kaleya scheme	1980s	2,500 ha	Furrow irrigation - pumps	approx. 12,500	approx. 10,000
Zambia Sugar (general estimate)	-	Large (commercial)	Central pivot - pumps	7,000 to 9,000	7,000 to 9,000
IFAD smallholder irrigation – Zambia	1995-2001	Total area 657 ha (of which 17 rehabilitation)	Furrow irrigation - ?	?	?
SIP	2006-present	Total 839 ha (of which 46 rehabilitated)	Furrow irrigation - pumps	22,000	10,800 to 14,100
JICA T-COBSI “permanent weirs”	2009-present	up to 50 ha	Furrow irrigation - gravity	approx. 2,000	approx. 1,800

While it remains difficult to compare different type of schemes, SIP’s cost per hectare are definitely on the high side. Comparison with the JICA scheme is not so much to analyse cost effectiveness (the JICA schemes are very simply gravity-based schemes so have a very different cost structure than the other schemes in the table), but to emphasise the fact that other, considerably less costly, options for small-scale irrigation are available, and should be taking into consideration when developing new schemes, especially in areas where market potential is limited.

A comparison of effectiveness between the SIP schemes is provided in table 2, based on data on construction expenditures per scheme provided by SIP (so not including projected expenditures from the disbursed but not yet used funds). The main discrepancy is with the Sinazongwe and Nzenga schemes: while they are very similar schemes, the cost/ha for Nzenga is more than 2.5 times the cost/ha at Sinazongwe. This seems unlikely and might be due to the fact that some construction contracts covered works in both schemes but with the expenditures allocated to one scheme only. The table therefore also includes a row for the combined Sinazongwe/Nzenga data. The high average construction costs for these 2 schemes should mainly be attributed to the fact that all canals are lined, an investment that will pay itself back in the long term through higher irrigation efficiency levels and hence lower operational costs.

<sup>7</sup> This also includes costs such as the design of Kanakantapa dam/scheme, which has not been implemented

<sup>8</sup> Lower amount is based on current level of expenditure; higher estimate is based on assumption that all disbursed but not yet used funds will be used for construction works.

The high (inflation corrected) cost/ha for Buleya can be explained by the fact that it is a very small scheme, yet requiring high equipment investments to be able to pump water from the inlet channel to the scheme.

Table 2 - Construction cost comparison between SIP schemes

SIP Scheme	Scheme size	Scheme type	Construction cost / ha (Euro)
Buleya	46 ha	Furrow irrigation – rehabilitated; earth canals; pumping direct into scheme	15,593
Sinazongwe	100 ha	Furrow irrigation – new, with lined canals and lined reservoir	8,751
Nzenga	98 ha	Furrow irrigation – new, with lined canals and lined reservoir	23,762
Sinazongwe / Nzenga combined	198 ha	Furrow irrigation – new, with lined canals and lined reservoir	16,181
Manyonyo	595 ha	Furrow irrigation, new with earth canals (except one) and 3 lined reservoirs	10,171

In terms of cost per beneficiary household, the overall numbers for SIP show an average cost of around Euro 35,500 / HH if all costs are considered, and between Euro 18,100 and Euro 23,700 / HH<sup>9</sup> when only construction work is considered. Comparisons with other schemes were not possible, for lack of reliable data on beneficiary numbers and/or because some of the other schemes combine smallholder irrigation and large-scale commercial irrigation in one operation.

The key factors that contributed to the relatively low effectiveness of the development of the SIP schemes are **design, budget and bureaucracy**.

**Design** - The fundamental design elements of the SIP irrigation schemes were determined during the appraisal phase. These designs do not seem to have been based on a thorough market/value chain analysis, nor on an assessment of different potential management models for the schemes. Furrow irrigation with farmers irrigating their own plots are the basic parameters on which the designs were based. The highly technical approach to developing an irrigation scheme was neither questioned by the PIU (at the time not including any staff with an economic / agribusiness background) nor by the PSC. Even as late as during the formulation of the programme document for the Finnish funded second phase in 2010, marketing and management aspects received little to no attention with for example the responsibilities listed for the PIU not referring at all to marketing and management.

*More details on technical design issues in section 3.2.2*

**Budget** - The required budgets for the construction of the proposed irrigation schemes has been consistently underestimated. This has led to a constant scaling down of the number and size of schemes to be developed, to required shifts in budget allocations for the different project activities and to related delays in implementing the schemes. The original appraisal document had budgeted around Euro 4.2 million for the construction of the 6 schemes totalling 1,890 ha. In reality, the project will spend around Euro 11.8 million for a total of 839 ha of land brought under irrigation, with some construction / land preparation work still to be completed (see table 1). In other words, the costs for construction were underestimated by around 80%. The main reason for this high variation between budget and actual costs

<sup>9</sup> See footnote 8

lies in the fact that the project started before any full feasibility studies had been undertaken. The budgets developed during appraisal stage were therefore based on very limited data. Once the scheme designs had been developed, it became clear that the actual construction costs were much higher than anticipated. The AfDB in fact indicated that it normally only comes in for infrastructure funding after bankable feasibility studies with detailed budgets have already been completed.

Further cost increases occurred in particular for Manyonyo when it was decided to grow sugarcane, which requires design adaptations such as a larger road network, higher capacity of the water supply infrastructure and a specific field layout.

Table 3 - Overview of budgets and disbursements to SIP (all amounts in Euros)

Category	AfDB	MFA Finland	Total
Works	(loan)		
Budgeted	4,707,407	7,494,156	12,201,563
Disbursed	4,165,285	7,669,116 <sup>10</sup>	11,834,401
Goods	(loan)		
Budgeted	631,481	80,086	711,567
Disbursed	346,676	49,032	395,709
Services	(loan + grant)		
Budgeted	1,228,519	595,953	1,824,471
Disbursed	809,418	301,204	1,110,622
Operational costs	(loan)		
Budgeted	378,889	1,329,806	1,708,695
Disbursed	1,324,767	1,280,648	2,605,415
Total budgeted	6,946,296	9,500,000	16,446,296
Total disbursed	6,646,147	9,300,000	15,946,147
Disbursement ratio	95.7%	97.9%	96.9%
GRZ counterpart funding			1,816,084
Total disbursed - Euros			17,762,231

**Bureaucracy** - Almost all stakeholders interviewed for this evaluation made mention of the bureaucratic procedures involved in procurement of goods and services and in obtaining approval of changes to the project. Procurement was done by MAL but was following AfDB procurement rules and was subjected to AfDB “No objection” procedures. This hybrid model for procurement has led to procurement delays of up to 2 years. Whether the problem lies largely with the AfDB rules, or with the limited procurement capacity in MAL (an issue acknowledged by MAL itself), or with the GRZ requirement to have major procurements approved by the Ministry of Justice, or with lack of a dedicated procurement specialist in the PIU is difficult to tell. It is however clear that the procurement problems and “No Objection” requirements are the main cause for the low time-effectiveness of SIP. The problem at AfDB level is aggravated by the fact that that projects funded from trust funds (like in this case Finnish trust funds) are not using AfDBs standard

<sup>10</sup> Based on the assumption that the balance of disbursed funds will all be used for Works.



automated project management software (SAP), but are managed separately, which leads to more back and forth with AfDB head quarters.

The most recent example of a seemingly unnecessary long delay is the time it took for AfDB to approve a final extension of the programme from November 2014 to September 2015 that was agreed at PSC level. The request was submitted to the AFDB on 28 November 2014, but the No Objection was only received on 19 February 2015. During that period of delay, SIP could not progress with urgent issues such as procurement processes and variation orders. With the AfDB rules stipulating that all expenses need to be committed 6 months before the end of the project, it meant that SIP only had from 19 February to end of March to get approval for new expenditures or for variation orders on existing contracts. Given the slow procurement process, this period was very short and this means for example that office blocks can likely not be constructed at the schemes even if available funding amounts would have allowed it.

### 3.1.3 The software – Capacity building, community mobilisation, marketing and management

Much of the community mobilisation was undertaken during the first few years of the project through a concerted effort of the SIP PIU and staff from MAL. The mobilisation included awareness building and involving beneficiaries in the design of the schemes. At all schemes, the beneficiaries confirmed that multiple meetings were held and that they were involved in important scheme design aspects such as deciding on the size and location of the schemes. However, they also expressed their disappointment with the long delay between the first mobilisation efforts and the actual construction / completion of the schemes. It has made the communities somewhat weary of the project and of all the promises it has made and not been able to keep. These sentiments are likely to be overcome once the schemes start producing revenues for the farmers, so it is vital that this happens as soon as possible.

Capacity building under the first phase of the project focused on building the knowledge and capacity of the executing agency MAL (both at national and district level), through training in areas such as community development, irrigation design, marketing, crop management, project management and M&E. According to the MTR, a total of 170 people were trained against a target of 104, but a qualitative analysis of these capacity building efforts (held between 2003 and 2007) was not undertaken.

Training of farmers was also foreseen in the first phase but only really took off in the 2<sup>nd</sup> phase, in particular after the recruitment of a socio-economist for the SIP PIU. Through collaboration with a.o. the Zambia Development Agency training sessions were provided on a series of subjects such as "How to be a successful farmer", "Success in irrigation farming", "Contract farming", "Productivity in farming" and "Basic record keeping for a farming business", as well as on cross-cutting issues HIV/AIDS and gender (see section 3.3.1). A total of around 240 farmers were exposed to these trainings (some to all, some to only a few). Based on an analysis of the training material and feedback received from the beneficiaries, it appears that, while the trainings were useful as a first exposure to these issues, much more investment in capacity building would be required for farmers to fully grasp the issues discussed. It will be important for farmers to have a good understanding of the technical, management and marketing aspects of the irrigation schemes if they are to play an effective role in the scheme management model, e.g. as Board members.

As mentioned earlier, management and marketing aspects were not prominent in the original project design nor in the programme document for the Finnish funded 2<sup>nd</sup> phase. However, it is arguably in these two areas that SIP has achieved its most impressive results, especially considering these aspects only received due attention after the addition of a socio-economist to the PIU (on instigation of the Finnish embassy).

On the marketing side, the main achievement has been the securing of markets for Manyonyo (sugar cane) and Nzenga (Irish potatoes). Sugar cane will be bought by Zambia Sugar (at a fixed price that it pays to all its outgrowers) while Irish potatoes will be bought by a South African company Top Fruits & Veggies, through a deal facilitated with the help of the Zambia National Farmers Union. The related business plans developed for Nzenga and Manyonyo were of such good quality that First National Bank (FNB) has been found prepared to provide loans for the initial costs of inputs and scheme management (staff salaries) related to the first season of these crops, without there being any physical collateral to secure the loan.

SIP has also been able to develop a very promising management model for new schemes, based on a farmer-owned company with professional staff that manages the scheme on behalf of the beneficiaries. More on this in section 3.2.3.

#### 3.1.4 (Potential) impact

At the time of the evaluation, actual benefits for the target group in line with the project purpose of increased food production and farm income were only achieved in the 46 ha Buley Malima scheme, which is managed by a farmer cooperative. The 140 to 150 farmers in this scheme grow a variety of crops such as tomatoes, okra, green beans and maize, which are mostly marketed by selling to buyers from outside who come to the area. The farmers earn an average of ZMK 10,000 / year (around Euro 1270) off their quarter hectare of land. The income is partly invested in income generating activities such as cattle and buying fertilizer, and partly used to pay for school fees, food, house construction etc. From the discussions with the Buleya farmers, it is obvious that behavioural changes have occurred, with the cooperative showing good commercial instincts and developing other income generating activities such as a hammer mill (for maize milling) and a chicken broiler. One should however not forget that the cooperative has been in operation for decades, and has benefited from long term external advisory and financial support.

The *potential* impact of the Sinazongwe, Nzenga and Manyonyo schemes on farm income is also considerable. Net profits from one yield of Irish potatoes in Nzenga are expected to be at least ZMK 20,000 (Euro 2540) / ha, which also translates into ZMK 20,000 / beneficiary HH given that each beneficiary brings in 1 ha of land. Higher incomes are expected since at least 2 crops can be grown in the irrigation scheme each year as long the water supply is guaranteed. Since Irish potatoes can only be grown once every 4 years (for agronomical reasons), other crops need to be grown. Business plans for these crops (such as soya bean, onion, winter wheat) have not yet been developed. Potential markets are however good, as confirmed by ZNFU, although net profits are likely to be somewhat lower than for the potatoes (based on experience with these crops in another irrigation scheme (Chiansi)). The sugarcane in Manyonyo scheme is expected to provide around Euro 4,200 net profits to the beneficiaries (based on 4 hectares per beneficiary).

Although it is too early to see clear behavioural changes amongst the intended beneficiaries in these new schemes, the project appears to have managed to instil a more commercial attitude amongst the target group. They are generally fully supportive of the proposed commercial approach adopted, and understand that the schemes should best be used for cash crops like Irish potatoes, wheat and sugar cane, rather than for the production of subsistence crops like maize.

## 3.2 Sustainability issues

### 3.2.1 Ownership

Ownership was analysed at the level of the beneficiaries and the level of the Government of the Republic of Zambia (GRZ), through its executing agency MAL.

At the basic level, ownership of beneficiaries is strong. In all schemes, the beneficiaries confirmed that it was they themselves who requested support from GRZ for implementation of irrigation schemes. In particular for the schemes in the Zambezi valley (Buleya Mulima, Sinazongwe, Nzenga), irrigation can significantly increase food security since the risks of rainfed agriculture are high because of erratic and relatively low rainfall<sup>11</sup>. The beneficiaries were also directly involved in selecting the areas where the irrigation schemes were to be implemented. Although only farmers in Manyonyo have formal title deeds to the land that they have brought in for irrigation, the beneficiaries in Sinazongwe and Nzenga are for the main part farmers who have traditional land use rights in the area to be brought under irrigation. Such traditional rights are recognised under customary law and as such provide a good security against land alienation.

Through the continuous community mobilisation efforts, the project has also kept communities informed about progress with construction contracts, management issues, etc. However, by continuously under-estimating the time required to deliver on outputs, in particular on completing the infrastructure, the commitment of the communities has been partly undermined. Also, the management model that SIP has developed for the new schemes, is not yet well understood by the beneficiaries, with e.g. the scheme managers seen more as project coordinators than as staff of the farmer-owned irrigation companies who are ultimately accountable to the farmers. At this level therefore, ownership is not yet as strong as it should be, and it remains to be seen how the relationship between farmers and scheme management staff will develop in the future. Some minor conflicts have already surfaced in Manyonyo, where the scheme manager and agronomist are sometimes hampered in their activities because requests for resources like fuel are sometimes not approved by the farmer representatives (chairman and secretary of the Manyonyo Irrigation Company in this case). When talking to beneficiaries, also of non-SIP schemes like Magobo, the impression is that they are very much looking at maximising their short term income instead of maximising long term sustainability by ensuring (and paying for) professional management of the schemes.

All projects within MAL are coordinated by the Department of Policy and Planning, but there is always a technical department more directly involved in implementation. In the case of SIP, this is the Department of Agriculture, and their involvement has been good at both national level (in particular strong involvement of an irrigation expert of the Technical Services Branch, and involvement of higher management in the supervisory missions and in the Project Steering Committee), and even better at district level, where one technical staff person was designated as District Project Manager (DPM), in charge of day-to-day coordination of the project at the district level. There is one DPM in Sinazongwe district covering Buleya, Sinazongwe and Nzenga schemes. There was one DPM in Mazabuka (now Chikankata district) who covered Manyonyo but that position has now been vacant for a while. The Department of Policy and Planning has participated in the PSC and in supervisory missions but its active involvement in important policy-related

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<sup>11</sup> This was evident during the field visit which came at the end of a so-called "partial drought" of 3 weeks, which had severely reduced the prospects of a decent maize harvest. The heavy rains that fell during the field visit only exacerbated the problems by increasing the risk of rot in the crop.

issues (such as whether the SIP type of irrigation schemes should be promoted nationwide) appears to have been somewhat limited.

In how far GRZ can effectively take over future support to the SIP schemes remains to be seen. A positive sign is the fact that capacity building of extension staff is more and more incorporating irrigation and agribusiness aspects. However, the resources available to do their work effectively, in particular transport means, are severely limited in districts where there are no projects to provide such resources. With the main portion of GRZ's agriculture budget still going to maize and fertilizer subsidies, this situation seems unlikely to change significantly in the near future. On the other hand, GRZ has shown its commitment to irrigation by providing more than the planned counterpart funding to SIP such as paying for the salaries of the PIU staff during the current extension phases of the project.

### 3.2.2 Technical aspects

The appraisal document laid down the basic parameters for the technical design of the irrigation schemes: they were to be based on furrow irrigation (rather than f.ex. central pivot irrigation) using earth canals (rather than lined canals). The proposed design parameters were not substantiated with detailed business plans based on a cost-benefit analysis or a well-defined management model. The appraisal document merely mentions the following production estimates (of all 6 schemes considered at that point): 2,900 tons of maize, 2,500 tons of paprika, 4,200 tons of onion, 3,600 tons of cabbage, 4,000 tons of vegetables, 1,200 tons of green maize, 800 tons of sugar beans, 850 tons of sunflower, and 165 tons of soya beans. 60% of this production would be for own consumption, and the remaining 40% to be sold mainly on nearby markets. The schemes were to be managed by farmer cooperatives, presumably with each farmer responsible for its own plot of land.

It is questionable whether relatively high-tech (pumping stations, large reservoirs, long intake-canals, pipes) and expensive schemes like the SIP schemes are economically viable when used primarily for own production and local markets. The consultant fully agrees with the approach followed by SIP in the second phase of developing the schemes on a more commercial basis with centralised scheme management, an approach that is likely to provide higher levels of incomes and hence a better justification for the high investments in infrastructure. The main drawback of this approach is the fact that the original technical designs of the schemes are sub-optimal for the chosen commercial approach. For all 3 new schemes, central pivot irrigation is considered the most efficient option when the scheme is under central management, yet all schemes are under furrow irrigation. This requires higher initial capital investment as well as higher operational costs. The schemes can still be profitable, but both construction costs / ha and profits per ha would be more favourable under central pivot.

Also, under a furrow irrigation system where water is not provided for free (it has to be pumped at a cost), the normal approach would be to invest in lined canals rather than earth canals to minimise water losses and ensure high irrigation efficiency. SIP has (belatedly) recognised this issue and has opted for lined canals in Sinazongwe and Nzenga. Unfortunately, in Manyonyo, the biggest scheme, all canals except one are earth canals and water leakage is high. Irrigation efficiency has not been measured but for long earth canals conveyance efficiency is typically around 70% for loamy soils (FAO). Combined with furrow irrigation through siphons, overall efficiency is likely around 30 to 50% at Manyonyo. Sinazongwe / Nzenga efficiency should be considerably higher at probably around 60% thanks to lined canals. With central pivot efficiency could have reached around 70%.

Manyonyo has other serious technical problems in fact:

- The scheme consists of 3 blocks A, B and C, with only block C having large contiguous fields. Block A and B consist of smaller blocks, with in between land of farmers who did not want to participate in the scheme. This negatively affects irrigation efficiency.
- Some part of the canals lies lower than the land to be irrigated, and one field in block C is not linked to a canal yet and will require a separate supply pipe.
- The outlets at the reservoirs are smaller (300 mm) than designed (400 mm) and this may lead to water shortages if the 3 blocks are fully planted with sugar cane. Apparently the contractor could not procure 400 mm pipes in Zambia and thus opted for 300 mm. This was accepted to avoid further construction delays but undermines the long term technical sustainability of the scheme.
- There are some problems at the foot valves at the pumping station, mostly due to the lack of silt traps and sieves to keep deposits and hubris away from the valves.
- Control structures in the canals are in the wrong place for effective sugar cane irrigation; makeshift weirs and plastic pipes are now used to supply the feeder canals.
- Sugar cane requires a good road haulage network (for trucks up to 80 tons), which hasn't been foreseen in the original design.

According to Zambia Sugar, only block C (210 ha) can at the moment be fully developed for sugar cane production, with the full development of block A and B requiring an additional Euro 2.2 million investment. The SIP PIU concurs that additional work is needed, but believes that with the remaining available SIP funds block C and block B can be fully developed.

More in general, the technical designs of the schemes appear to have been of limited quality and provided insufficient details for the development of accurate Bills of Quantities for the tenders, leading to a large number of changes (variation orders) required during construction. With variation orders having to go through bureaucratic approval procedures, this has contributed to a lot of delays.

A specific problem, potentially related to climate change, is the fact that the pumps in both the Buleya Mulima and the Nzenga scheme are currently not in water due to receding water level of Lake Kariba. This is discussed further in section 3.3.2.

### 3.2.3 Institutional aspects

At Buleya Mulima, the scheme is managed by a farmer cooperative, which has been in operation for several decades. Although neither scheme management nor cooperative management are 100% effective, the scheme can be considered institutionally and commercially sustainable. The cooperative has branched out to other income generating activities such as provision of domestic water (they operate a borehole), providing maize milling services and producing fruits. They are currently constructing a chicken broiler as yet another source of income. The main issue of concern with Buleya Mulima may be the governance of the cooperative. Information from indirect sources seems to indicate that the profits of the cooperative are not shared equally amongst all members. In how far this is correct could not be established during the visit to the scheme.

For the 3 new schemes developed by SIP, an innovative management model has been designed, with the following main characteristics:

- The farmers in the scheme register a company, with themselves as the shareholders. They bring in their land in the scheme as shares. In principle, each farmer brings in the same amount of land. Where

farmers have more land, they can bring in relatives into the scheme. Shares in Sinazongwe and Nzenga represent 1 ha each; in Manyonyo it is 4 ha each.

- The company is responsible for all aspects of growing and marketing crops: Operation & Maintenance of the scheme, planting of crops, applying herbicides / fertilizers, irrigating the crop, harvesting, marketing the crops to buyers. To this effect, the company (i.e. the farmers) employs professional staff (a manager, agronomist and accountant as a minimum).
- Gross revenues generated through the sale of crops grown in the scheme are first used to pay for all operational and investment costs of the company, as well as for paying off any loans that the company may have secured as working capital. The remaining net revenues are then paid out to the farmers as dividend, on an equitable basis i.e. each shareholder receives the same amount, irrespective of how much their plot contributed to the total yield.<sup>12</sup>
- Farmers can, but don't have to, be engaged as labourers in the scheme.
- The infrastructure of the scheme remains the property of the GRZ, but is leased to the company free of charge.
- The company has a Board of Directors, which includes representatives of the farmers, of GRZ, and of any other key stakeholders. The Board of Directors is appointed by GRZ, through MAL.

For both Nzenga and Manyonyo schemes the companies have been set up and are called Nzenga Irrigation Company (NIC) and Manyonyo Irrigation Company (MIC) respectively. At the time of the evaluation, the Boards were not yet appointed but board members were identified and the process is at MAL for approval. Staff for the companies was initially recruited and paid for through SIP. At Manyonyo, current staff includes a scheme manager and an agronomist, and both are now paid through a loan provided to MIC by the Mazabuka Sugar Cane Growers Trust (a Trust set up by Zambia Sugar to represent the interests of smallholder sugarcane farmers). In NIC there is currently only a scheme manager. His salary is paid by GRZ until a loan from First National Bank is approved (expected anytime).

In the view of the consultant, this is a very promising management model, but it still needs to prove itself and it has some peculiarities that may hamper its effectiveness. For example, the professional staff recruited by the farmers to run the scheme double as their bosses when they work in the scheme as labourers. Also, it is still to be seen whether the farmers accept that around 50% of gross revenues will go to paying for the management of the scheme (inputs, staff salaries, marketing, transport, O&M), rather than straight into their pockets. To address these and other possible weaknesses of the management model (quality of governance, quality of hired staff, systems and tools in place, etc.), the Embassy of Finland has, under a separate contract, recruited AMSCO – African Management Services Company. This company will between January 2015 and January 2016 provide organisational and institutional capacity development support to both MIC and NIC. This will hugely increase the prospects for institutional sustainability of the companies.

As part of the consultancy, some non-SIP irrigation schemes were visited to compare SIP's management model with existing other models. Table 3 compares these different schemes in terms of ownership issues and profitability.

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<sup>12</sup> E.g. in Manyonyo, only block C and (part of) block B will likely be fully planted the first years. The net revenues will however be shared equally between all shareholders of block A, B and C.

Table 4 - Comparison between different irrigation management models

Scheme	Management model	Ownership level	Active role farmers	Profitability per smallholder	Profitability per ha	Funding
Kaleya	Large sugar cane estate with commercial and smallholder plots. Land owned by GRZ. Smallholders formally responsible for their own plot, but have to follow exact instructions from overall estate management.	Very low – smallholders don't own the land and are minority shareholder in the estate. They can't decide what to do on their plot.	High – the farmers do most crop management themselves on their own plot, including irrigation.	around Euro 7,500 / year net profit, based on 6.5 ha.	Euro 1,200	GRZ, Zambia Sugar (was state company when Kaleya started), other investors like Dev. Bank of Zambia
Magobo	Farmer owned sugarcane scheme. of around 400 ha. Farmers have block title. Management of scheme fully outsourced to a Zambia Sugar subsidiary	High formally because of block title. But little practical influence on management	Very low – Some work as labourers in the scheme; some are not involved at all.	Around Euro 7,500 / year based on 5 ha.	Euro 1,500	European Union
Chiansi / Chanyanya	Chanyanya smallholder scheme of 550 ha, with block title. Supposed to be part of much larger scheme with commercial farmers. Schem managed by company, with farmers having separate small plots for vegetables etc.	Low. Only own 20% of shares of company managing it.	Medium – No role in major scheme, but they have their own small market garden plots	No data	No data	Various international donors through PIDG / ORIO
IDSP	Different tiers in each scheme, from commercial farmers to intermediate and smallholder farmers. Commercial farm company to provide services to medium / small farmers organised in associations. Follows Chiansi model mostly.	Probably low, with commercial farmers likely to dominate decision making. But project still under development	Medium to High – would likely be responsible for working their own plots.	No data	No data	World Bank / GRZ
T-COBSI	Small schemes (up to 50 ha) managed by farmers / farmer associations	High. Farmers own the whole scheme	Very high, both in construction and operation	around Euro 300	around Euro 1,400	JICA
SIP – Buleya	Managed by farmers cooperative	High	High	around Euro 1,200 / Iima (0.25 ha)	Euro 5,000	AfDB / MFA Finland / GRZ
SIP – Manyonyo	Managed by farmer owned company with professional staff	Medium – 100% owners of the company. But Board has many other members. And Zambia Sugar tends to try to control all smallholder	Low – scheme is managed by the company. Only optionally as labourer.	around Euro 4,200 off 4 ha (after paying off loan)	Euro 1,050	AfDB / MFA Finland / GRZ

Scheme	Management model	Ownership level	Active role farmers	Profitability per smallholder	Profitability per ha	Funding
		outgrowers				
SIP – Nzenga / Sinazongwe	Managed by farmer owned company with professional staff	Medium – 100% owners of the company. But Board has many other members.	Low – scheme is managed by the company. Only optionally as labourer.	around Euro 2,500 off one ha. Based on one crop only, and after paying off loan	Euro 2,500, but can at least be doubled with 2 crops per year.	AfDB / MFA Finland / GRZ

As the table shows, Buleya Mulima is in fact the scheme with the highest profitability per ha and with high ownership levels. However, one should keep in mind that this is a small scheme of only 46 ha. Whether a much larger scheme can be effectively managed through a cooperative remains to be seen. Apart from Buleya, the other SIP schemes have a relatively high ownership level, but low active involvement of farmers in the scheme. The expected profits are within the same range of most of the other schemes. It appears that, in general, schemes that do not grow sugarcane but other commercial crops have higher (potential) profitability levels per ha. The numbers presented here should however be treated with caution, since they are based on different sources of information and time limitations not allowing proper triangulation.

### 3.2.4 Commercial and financial aspects

As can be deduced from table 3 above, the SIP schemes are, on paper, commercially viable. The profit data presented in the table are based on the principle that the capital investment for the construction of the schemes is not considered i.e. the infrastructure is provided to the beneficiaries at no cost.

A risk to commercial viability is the dependency on single buyers. For sugarcane Zambia Sugar is the only available buyer and has a de facto monopoly in the sector. However, the company is depending on many outgrowers to produce the quantities of sugarcane that it requires for an effective business operation. It means that they will have to offer reasonable prices for the raw product to ensure that the outgrower businesses are sustainable. Zambia Sugar also guarantees buying the sugarcane from any outgrower including Manyonyo up to the quota amount that they have given to each outgrower (555 ha for Manyonyo). The actual price of the sugarcane depends on the quality, in particular the sucrose content. Although the soils in Manyonyo are not ideal for sugarcane, the current 95.5 ha of cane in the scheme is of good quality and should fetch a decent price.

Nzenga currently has one contract for Irish potatoes with a single South African buyer, Top Fruits & Veggies. The contract foresees in a margin of 10% for the buyer and 90% for the Nzenga Irrigation company, with a minimum price for the potatoes of ZMK 20 / 10 kg. The profit listed in table 3 are based on this minimum price, but thanks to the way the contract has been formulated (through SIP's facilitation) it is likely that a higher profit will be achieved. According to the buyer, there is a good market for Irish potatoes both within Zambia (e.g. for the factory in Ndola that makes chips) and abroad (Namibia and Angola in particular).

Theoretically, schemes like Nzenga can grow up to 3 or even 4 crops per year. The only confirmed crop for now is Irish potatoes but according to ZNFU there is also a good market for other crops such as soya beans, winter wheat and onions. This is important, since Irish potatoes can only be grown on the same field once every 4 years.

Whereas the irrigation schemes will provide a good cash income to the farmers, they are not fully dependent on it. All farmers confirmed that they also grow, and will continue to grow, crops under rainfed



agriculture, usually maize. As such, the irrigation scheme contributes to livelihoods diversification. It is likely that the beneficiaries in the new schemes will follow the example of Buleya Mulima i.e. branching out income generating activities to e.g. poultry and cattle, further diversifying their livelihoods.

Thanks to the central management model of the new schemes, the costs for inputs, for crop management (planting, spraying, weeding, harvesting, post-harvest processing) and for marketing can be kept relatively low. Both for Manyonyo and Nzenga, the inputs will be provided by the buyers. Equipment will also be provided on a lease basis since the companies do not yet have any equipment themselves.

The company model as developed and facilitated by SIP has convinced commercial credit providers like First National Bank to provide loan facilities to the schemes. These are provided without any collateral, but are instead secured through a combination of 3 factors: (i) crop insurance; (ii) crop charge (the bank can supervise the scheme's functioning) and (iii) market guarantee. FNB has already approved a loan facility for Manyonyo (which ultimately wasn't used because the MSGCT provided a loan instead<sup>13</sup>), while a loan for Nzenga for working capital for the first season was about to be approved at the time of the evaluation. This loan of around Euro 150,000 represents 50% of the required working capital (inputs, management staff salaries, O&M, harvesting) for the first growing season. The loan will serve as a deposit to ZNFU, which itself can then provide the 100% working capital under a separate loan agreement they have with another bank (ZANACO). Once the loans are available, the planting of the first 50 ha of Irish potatoes at Nzenga can start.

### 3.3 Cross-cutting objectives

#### 3.3.1 Gender and social equality

Attention for gender and social equality in SIP has been weak, especially during the first phase of the project. There is no gender mainstreaming or social inclusion strategy that has guided SIP's work with beneficiaries. Some of the beneficiaries were exposed to a gender and HIV/AIDS training during the second phase of SIP, but these were one-day affairs which only managed to create a basic level of awareness on these issues. There is no evidence that they have led to any changes in the way gender and social inclusion issues were (or were not) dealt with in the project. While women and youth are represented in the beneficiary group (for Nzenga, Sinazongwe and Buleya around 30% of beneficiaries are women; in Manyonyo around 10%; numbers for youth are not known), they are strongly under-represented in the decision-making bodies. In fact, in none of the committees in the schemes (Water Users Associations, or Irrigation Committees) is any of the positions of chair/vice-chair/secretary held by a woman. Only the treasurer in Nzenga is a woman.

All the sites where SIP undertook activities are resettlement areas for Tonga people who were displaced by Lake Kariba, most of whom live below the poverty line. As such the project directly contributes to poverty alleviation, although it is doubtful that the scheme beneficiaries are the poorest of the poorest. The selection of beneficiaries and of committee members has been done by the communities themselves through a consensus process with involvement of the traditional leaders and facilitated by SIP. Households with land in the proposed schemes were de facto the main beneficiaries. Gender criteria or poverty criteria

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<sup>13</sup> This loan was only offered after FNB approved its loan for Manyonyo. Why MSCGT did not offer the loan earlier is not exactly clear. According to Zambia Sugar because the conditions of the FNB loan were unfavourable so they wanted to provide a loan at better conditions (which it is, although not by much); according to others because Zambia Sugar can keep a level of control over Manyonyo through the loan.

were not used. It is also questionable whether this sort of irrigation schemes are the best approach for targeting the poorest of the poorest<sup>14</sup>. Participation in these schemes is more likely to focus on what ZNFU calls *viable* farmers i.e. subsistence farmers that have the capacity to develop into more commercial oriented farmers but that lack resources to make that step.

In spite of this participatory beneficiary selection process, a social conflict has flared up in the Sinazongwe scheme. A number of families who claim the user right of a large portion of the land in the scheme (up to  $\frac{3}{4}$  of the land according to themselves) have now indicated that they are against the irrigation scheme. The fact that this has only come up years after the scheme site had been agreed upon with the community indicates that there are some external factors at play. It could be political issues (the area is considered an opposition stronghold) or the fact that they have seen huge compensations paid at a nearby mine to people who had to be displaced. Whichever way, the issue has even gone all the way to State House, and during the meeting with beneficiaries it became clear that sentiments are still running very high on this issue. The current proposed way forward is to put the Sinazongwe scheme on hold while developing the nearby Nzenga scheme, in the hope that a successful implementation of Nzenga will also convince the current opponents of the Sinazongwe scheme to cooperate with the implementation of Sinazongwe scheme.

By targeting rural farmers, the project is definitely contributing to reducing social inequality at national level. Rural poverty levels are much higher (around 70%) than in urban areas (around 30%), and Southern Province, where all implemented schemes are located, is one of the poorer provinces in the country.

### 3.3.2 Environment and climate change

According to the appraisal document, all schemes except the large Kanakantapa scheme<sup>15</sup>, were classified as AfDB category 2 defined as "Projects with limited environmental impacts or impacts that can be easily mitigated by applying specific measures or changes in the project design". Nevertheless, Environmental and Social Impact Studies were undertaken for all sites that eventually were developed. The main environmental risks identified for Nzenga, Sinazongwe and Manyonyo are:

- Water pollution from run-off of herbicides and fertilizer
- Reduction in soil quality (salination, loss of topsoil, pollution) and increase in soil erosion
- Vegetation / ecosystem losses due to bush clearing and land levelling
- Clogging of canals by weeds.
- Stagnant water

Of these 3 schemes, Manyonyo is by far the largest and an updated status of implementation of the Environmental Management Plan included in the ESIA was provided by the SIP project coordinator. According to this information, current implementation rate of mitigation measures is estimated at 63%, while 21% of the recommended measures are in the process of implementation, and the remaining 26% not yet implemented. The failure to implement some of the construction-related measures such as creation

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<sup>14</sup> One way to target the poorest households would be through offering them opportunities to work as labourers in the schemes. Currently, labourers are primarily drawn from the households that have land in the schemes. In Nzenga, the committee members interviewed expressed their willingness to allow the scheme to provide employment to poor households that were not direct beneficiaries.

<sup>15</sup> Which is also the only scheme requiring the building of a large dam, which would have much higher environmental impacts than just a scheme.

of wetlands to pre-treat drainage water before it is discharged into the Kafue river is attributed to same budgetary constraints that have hampered effective infrastructure development.

The Sinazongwe and Nzenga schemes are so small that they don't need full Environmental Management Plans. On the evidence of the field visit, it seems the major impact is bush clearing leading to some loss of ecosystem values. Another issue is the increase in stagnant water (in the reservoirs, but also in the canal control structures) which could become breeding areas for mosquitoes. These are impacts that are difficult to mitigate, unless by providing mosquito nets to the potentially affected population. This has however not been done.

The overall impact of the schemes on the water resources where it draws the irrigation water from (Lake Kariba and Kafue reiver) is negligible. The schemes are small-scale and their water needs pale in comparison with the water needs of large commercial operations like the Zambeef farms along Lake Kariba and all the large-scale sugarcane producers along Kafue river.

One of the sensitive social aspects in this sort of projects is always the displacement / relocation of people who have their houses or land in the area to be developed for irrigation. It is somewhat surprising that in the SIP case, no formal compensation measures were developed, but that instead the communities themselves organised compensation measures. Those who had more land in the schemes than they get benefits from (e.g. more than 1 hectare in Nzenga) were allowed to bring in relatives to occupy the other hectares, or they were compensated with land for rainfed agriculture outside the scheme. The few people that had dwellings in the scheme were relocated to other areas, with only some material support provided in the form of roofing sheets.

Climate change issues have not been incorporated explicitly in the project's design and implementation activities. When the project was designed in the early years of 2000, climate change was not yet mainstreamed in a structural manner in AfDB projects.

The current low levels of Lake Kariba are attributed by GRZ to climate change (see box). Two of the schemes, Nzenga and Buleya Mulima, are directly affected by this because their pumping stations are now not reaching water. For Nzenga this can simply be solved by extending the pumping station a bit further outwards into the lake, but for Buleya Mulima a

*(from Zambian Weekly, 17 April 2015):*

The Disaster Management and Mitigation Unit (DMMU) has warned that Zambia will be forced to ration water because of a prolonged dry spell in Western, Southern and Eastern Provinces. "Water for power generation, irrigation, domestic and other uses will significantly reduce in the coming months, and this will call for enhanced water and electricity rationing throughout the country," DMMU national coordinator Patrick Kangwa stated. [...] Government is putting the unpredictable rainfall pattern down to climate change.

structural solution to the problem requires a long pipeline to the lake, since the current pumping station is located in an inlet stream, about 4 km from the current lake shore.

The initial appraisal document notes that "water inlets in the proposed sites were selected with technical evidence of water availability during the four seasons of the year in both sources namely Kariba Lake and Kafue rivers." In other words, the design has only considered historical data, and not any scenarios on the possible impact of climate change on the water resources. As the statement of the Disaster Management and Mitigation Unit (text box) clearly demonstrates, water scarcity is a real concern in Zambia. Although all

schemes have the water rights required for the irrigation, rationing of water may become a reality in the near future, and would negatively affect the scheme's sustainability.

Nevertheless, irrigation is a key strategy in building climate change resilience amongst rural farmers. How necessary this is became clear during the field visit: most rainfed maize fields were in bad shape after 3 weeks without rains. The downpours that started during the field visits only made matters worse. Such heavy rains at the beginning of April are also very exceptional for the project areas, possibly also a sign of the changing climate.

### 3.4 Relevance

As already mentioned in the inception report, the relevance of the project is evident. With its focus on small-scale farmers, the project is designed to contribute to poverty alleviation, a key objective of both Zambian and Finland development policies. Promotion of small-scale irrigation is high on the agenda in Zambia and as such the project is very much in line with national policies. It contributes to agricultural diversification, an objective of the Sixth National Development Plan. A target of 17,500 ha of new irrigated land by 2016 was announced in 2013 by then Zambia's president Michael Sata, and SIP is directly contributing to making progress towards this target. It is noted in fact that the Manyonyo (Nega-Nega) and Nzenga schemes are explicitly mentioned in the revised Sixth National Development Plan <sup>16</sup>.

Zambia's irrigation sector is guided by the Irrigation Policy and Strategy developed in 2004. The overall objective of the Irrigation Policy and Strategy is to bring into being a well regulated and profitable irrigation sector that is attractive to both private investors and Zambia's development partners. Its primary purpose is to ensure food security through increased irrigated crop production. The strategic aim is to expand the emerging farmer base in Zambia by promoting commercial irrigation enterprises, building on the experience of the large-scale commercial sector. This is exactly what SIP is about. Furthermore, a national programme to develop up to 100,000 ha of commercial smallholder irrigation in Zambia by 2019 is currently under development and will focus on smallholder schemes of at least 50 ha, in line with the SIP model.

As already noted, irrigation is rightfully seen as one of the key strategies to strengthen the climate change resilience of the rural population. In Zambia's National Adaptation Programme of Action, irrigation is listed as an important coping strategy against droughts, especially relevant for Eastern, Central, Western and Southern provinces, where rainfall is more erratic than in north-western and northern Zambia.

Finland's country strategy for Zambia includes a result derived from the SNDP, namely to "To increase and diversify agriculture production and productivity so as to raise the share of its contribution to 20 percent of GDP". The amount of land brought under irrigation is one of the indicators for this result. At the global level, Finnish development policy aims to promote a.o. an inclusive green economy. Irrigation can contribute to such green economic growth, especially small-scale schemes that generally do not have significant adverse impacts on ecosystems and overall human well-being.

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<sup>16</sup> From the revised Sixth National Development Plan, page 69: "To reduce the dependency on rain-fed agriculture, Government working with Cooperating Partners continued the construction of irrigation schemes. Construction of Nega-Nega irrigation scheme (595Ha) in Mazabuka and Nzenga irrigation scheme (98 Ha) in Sinazongwe were completed bringing an additional 693 Ha under irrigation against the target of 3,000 Ha."

All in all, it can be concluded that SIP is and continues to be a highly relevant project both within the Zambian context and within the context of the overall Finnish development policy. The main weakness of the project is its limited attention to gender and social equality issues, which are key cross-cutting pillars of in particular the Finnish development policy as formulated in 2012.

### 3.5 Project management and governance

#### 3.5.1 Project Implementation Unit

SIP is managed by a Project Implementation Unit (PIU) on behalf of the executing agency, which is the Ministry of Agriculture and Livestock-MAL (formerly Ministry of Agriculture and Cooperative-MACO).

The PIU currently comprises a project coordinator, irrigation engineer, socio-economist, accountant and support staff. The Project coordinator and project irrigation engineer (and accountant?) have been with the programme from the start. An M&E position was created during the first phase, but was during the second phase changed in the position of socio-economist, with broader responsibilities that still included M&E, but also marketing and management aspects. This was done on instigation of the Embassy of Finland when it became clear that the project had for too long focused mainly on technical issues i.e. the construction of the schemes.

Project management performance would normally be assessed based on level of success in achieving the expected results. As mentioned in section 3.1.1 however, this is difficult in the case of SIP since there is no clear overall results framework that has guided the project throughout the implementation phase. The consultant has found 3 different results framework: the original one in the AfDB Appraisal document, a second one proposed during the 2005 baseline survey, and a third one included in the 2010 SIP programme document for SIP's second phase funded by MFA Finland. While all 3 have the same project purpose/objective ("Food production and farm income of the target group increased"), they have different outcomes and outputs and indicators. All in all, a complicated picture and not conducive for effective results based management nor for effective accountability mechanisms.

The PIU has generally performed well in terms of work planning, reporting and accounting, although work plans and budgets have been consistently too optimistic. Delays in project implementation are however primarily caused by factors outside of the direct control of the PIU, in particular procurement issues. Progress reports were, until recently, largely based on activity reporting, and as such provided a good picture on progress, but of course do not provide a basis for results-based management and oversight.

The role of the various persons who occupied the M&E position during the first phase of SIP is rather unclear. A baseline survey was done in 2005, but was commissioned to an external party. Proper results-based reporting against the original phase I logical framework was never done. The current socio-economist, who is also responsible for M&E, has himself undertaken a useful baseline survey focusing on the one scheme that is fully functional: Buleya Mulima. He has also worked on developing a clear results framework, although that does not seem to have led to an agreed upon list of results and indicators, so there is still no clear basis for results-based management.

With both the initial project design and the initial composition of the PIU very technically oriented, it is perhaps no surprise that the project management failed to see the need for more attention for marketing and management during phase I. It is nevertheless a point of great concern that an irrigation project can continue for several years on the basis of a purely technical approach without neither the PIU nor the PSC

fully realising the need to address the marketing and management issues. Apart from the bureaucratic delays, it is one of the main reasons why the cost effectiveness of the project is so low.

Given the technical focus during phase I, one would have expected that at least the technical quality of scheme construction would be of the highest standards. This is unfortunately not always the case (see section 3.2.2 for examples). The PIU blames this largely on the quality of the work delivered by the companies contracted for scheme design and for construction. It is however too easy to hide behind unsatisfactory performance of contracted parties. It is in fact the key responsibility of the PIU, and the irrigation engineer in particular, to ensure quality control of all the outsourced technical work.

Once the importance of marketing and management were acknowledged in phase 2, and a socio-economist had been recruited to lead those processes, the project has done a remarkably good job in negotiating good markets, obtaining commercial loans, and developing and (partially) implementing an innovative management model that promises to balance farmer ownership with professional scheme management. It is highly commended for this, and it has transformed the project from one with rather bleak commercial and institutional sustainability prospects to one with a good potential to deliver long term sustainable benefits to the smallholder farmers.

During the engagement with the PIU, the consultant has noted a certain level of “motivational fatigue”, something also noted by the supervision mission of December 2013 (see next section). While some of this apparent lack of motivation can definitely be attributed to all the delays which are mostly beyond the control of the PIU, the current crucial last phase of the project requires the full commitment of all staff members to ensure the project completes all key outstanding issues.

### 3.5.2 Project governance

Governance of the project consists of two main elements: the Project Steering Committee meetings and the joint field missions.

The PSC is chaired by MAL and includes representatives from the relevant MAL departments (Dept. of Agriculture, Dept. of Policy & Planning, Finance Management Unit, Procurement and Supplies Unit), from the In-Service Training Trust, from various other Ministries (finance, water, health), from the Zambia Environmental Management Agency and from various external stakeholders such as the Programme Against Malnutrition. The donors MFA Finland (through the Finnish Embassy) and AfDB are ex-officio members of the PSC. The mandate of the PSC is to (a) review and approve the annual work program and budget of the project; (b) review the design of the irrigation schemes and ensure that they conform to the required standards and requirements of the project; (c) review the progress reports and ensure that project implementation schedules are adhered to; and (d) ensure effective coordination among the project stakeholders. While it goes beyond the scope of this evaluation to analyse in detail all discussions and decisions of the PSC, it appears that in general it has been functioning in accordance with its mandate. Like the PIU however, the PSC could and should have realised at an earlier stage that the project was too much technically oriented. Also, the issue of delays has come up frequently in the PSC meetings, but no real structural solution to this problem has ever been found. It is also not quite clear in how far decisions and recommendations of the PSC have been followed up in a structural manner to ensure they were implemented by the PIU.

The regular supervision missions undertaken since 2005 have proven extremely useful. The Aide Memoires resulting from these missions, which are standard procedure for all AfDB funded projects, provide a very

good overview of the project's progress and ensures that the key stakeholders MAL and the donors are not only depending on project monitoring but can verify the actual situation in the field. As with the PSC, the main weakness is the apparent lack of a structural follow up on recommendations emanating from these missions.

An overall weak aspect of the project governance is the lack of strong accountability mechanisms with related mandates. There is for example no formal mechanism for performance assessments of the members of the PIU and the related mandate for correctional measures, including if needed sacking PIU staff. This example is chosen here because of a statement in the Aide Memoire of the supervision mission of December 2013 which reads: "The mission noted with concern that the PIU as a team has lost momentum for work, resulting in poor follow up on key project management issues such as procurement, audit and disbursement. The mission learnt that the work attitude has deteriorated and a critical review of each staff contract during the extension phase is recommended".

## 4 Project level conclusions and recommendations

### 4.1 Overall achievements

When compared with the initial project proposal as described in the appraisal document for the first phase, the project has underachieved when it comes to the number and size of the irrigation schemes to be constructed (hardware).

Instead of rehabilitating 1 and constructing 6 schemes with a total acreage of 1,890 ha, targeting 1,650 households (as per the appraisal document), the project has only rehabilitated one scheme of 46 ha and (almost) constructed 3 schemes totalling around 800 ha, with 500 households as direct beneficiaries. In other words, less than 50% of expected results has been achieved, in around twice the time originally estimated to achieve the results. It has led to a low cost-effectiveness of the project, with an estimated average cost of Euro 21,000 per hectare (Euro 10,800 to 14,100<sup>17</sup> when only considering pure construction costs). These numbers are considerably higher than in some of the other irrigation schemes developed in Zambia.

With 500 households benefiting the investments per household are Euro 35,500 (Euro 18,100 to 23,700 / HH when only considering construction costs). With an average of 6 people per household this translates into Euro 5,900 and Euro 3,950 per person respectively.

The low cost- and time effectiveness can be attributed to 3 main factors that are largely outside the control of the SIP project management: (i) the initial project design which was very technically oriented without much consideration for marketing and management aspects; (ii) the initial budgets for construction were up to 80% under-estimated; and (iii) the bureaucratic procedures for procurement and other important decisions, the direct result of a hybrid management system that had to comply with both GRZ and AfDB rules and regulations. It is clear that for future projects in support of the irrigation sector, these 3 issues require specific attention if the projects are to be cost and time effective.

While one cannot but conclude that the project has underperformed with regard to the “hardware” outputs, it has performed very well on the “software” side. Apart from the considerable efforts on community mobilisation and capacity building, what really stands out is the way the project has addressed the marketing and management issues during the last 2 to 3 years of the project. Once it was recognised that these issues required more attention, and with the recruitment of a socio-economist to lead these processes, the project has taken up this challenge in a remarkably effective manner. It has led to market guarantees for the first main crops to be grown (sugarcane and Irish potatoes), to the approval of commercial loans by FNB, and the development of an innovative scheme management model. These are considerable achievements, especially considering the limited time that was available to address these key issues.

With the construction of the schemes almost completed, and the market and management aspects properly addressed, the prospects for sustainable increase in food production and farmer income are good. In Buleya Mulima, the small scheme that was rehabilitated during phase 1, farmers are reporting income from their 0.25 ha plots of around Euro 1270/year. For the new schemes the expected net annual income for the beneficiaries amount to Euro 2,500 (Sinazongwe/Nzenga, Irish potatoes) to Euro 4,200 (Manyonyo,

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<sup>17</sup> See footnote 8



sugarcane) per beneficiary. For Sinazongwe and Nzenga, potential annual profits are in fact considerably higher because they should be able to produce at least 2 and possibly 3 or even 4 crops per year.

#### Recommendations to maximise achievements:

1. In as far not yet done, the PIU should as soon as possible draw up a list of outstanding issues that requires to be addressed before the end of the project, including aspects that would require additional funding (such as offices, farm equipment, additional road construction, etc.). The list should clearly indicate who is responsible for each issue / action. Progress on all issues should be reported to the PSC on a monthly basis, given that only a few months are left.
2. MAL should as soon as possible appoint the Boards for NIC and MIC.
3. The PIU should analyse the pros and cons of splitting management of Sinazongwe and Nzenga, by having separate companies for each, given the social issues in the area.
4. The PIU/MAL should closely monitor the implementation of irrigation activities at Manyonyo and Nzenga, both to be able to provide adequate support where needed and to document lessons on how the management model and collaboration with buyers is working. The role of MAL in monitoring and in providing support should become more prominent after the end of the SIP project (September 30<sup>th</sup>).
5. The PIU should remain fully dedicated to the implementation of SIP in order to tie up as many of the loose ends as possible (construction issues, social issues, market issues, agreements with stakeholders etc). *This is at this point more important than for example supporting MAL with pre-feasibility studies to identify possible future small-scale irrigation schemes.*
6. The PIU should continue to engage constructively with all stakeholders on all the above issues.

## 4.2 Sustainability

The level of ownership of the projects by the beneficiaries is good in theory, but is still hindered by the fact that they do not fully understand the management model of the scheme. This model is based on the registration of a company with the beneficiaries as the shareholders (with the land they bring in constituting the shares). The company will be responsible for the management of the scheme and marketing of the produce. To this effect, the company employs professional staff with expertise in management, agribusiness, irrigation, agronomy. The company will be governed by a board with representative from the farmers, from MAL (which provides the infrastructure as a free lease to the farmers), and other stakeholders such as outgrower companies, traditional leaders etc. Through the involvement of AMSCO, this management model is currently being further developed and includes further awareness raising and capacity development of the farmers as well as developing conflict resolution skills and mechanisms. This should result in stronger levels of ownership and to the development of a professional and sustainable management model. While MAL will still provide some level of support beyond the project's lifetime, its resources are limited and it is therefore crucial that the efforts of AMSCO do indeed lead to a largely self-sustaining management model up for the schemes.

The cost-benefit analysis done for the schemes shows that the commercial viability is good. Markets have already been secured for sugarcane and for the first crop in Nzenga (Irish potatoes), with markets for other crops to be grown, like soya beans, winter wheat and onions, also confirmed to be good by ZNFU. One should however keep in mind that the cost-benefit analysis does not consider the high capital investment costs for the infrastructure. The commercial viability would be considerable lower if those were considered.

However, in the view of the consultant it is justifiable to have development funds provide for the capital investment, as long as the resulting scheme is sustainable and can cover the cost for Operation & Maintenance (O&M) of the scheme.

With the ownership and management aspects currently being thoroughly addressed, and cost-benefit analysis showing good commercial viability, the overall sustainability prospects are, at least in the short term, mainly hampered by technical issues. This in particular the case for Manyonyo scheme, where the scheme layout and technical design require adaptations for effective sugarcane irrigation. It is likely that initially only a part of the scheme can be fully developed, with the remaining area to be upgraded for sugarcane at a later stage, or possibly used to grow other cash crops.

#### Recommendations on sustainability:

7. The work of AMSCO is crucial for the sustainability of the management model based on farmer-owned companies. If needed, the Embassy of Finland should consider extending the support beyond the current one year, but only if performance of AMSCO is satisfactory. The Embassy itself should closely monitor this.
8. The PIU should dedicate time and effort to support the NIC with the development of markets and related business plans for other crops (other than Irish potatoes) to be grown at Nzenga / Sinazongwe schemes. This should be done in close collaboration with ZNFU.
9. The PIU should work more closely with Zambia Sugar on resolving the technical issues hampering the full implementation of Manyonyo scheme. It should actively participate in meetings and maintain a collaborative attitude. However, it should not relinquish any control over the scheme or the company to Zambia Sugar.
10. MAL should consider providing funding to support the full development of the Manyonyo Irrigation Scheme, in particular the required changes and improvements to the infrastructure for block A and block B to make them better suited for sugarcane production.
11. The outstanding technical issues at Nzenga and Sinazongwe (moving pump station, ensuring ZESCO puts back transformers, completion of land levelling, clearing canals clogged from the land levelling, etc.) can and should be resolved at very short notice.
12. While AMSCO is strengthening the companies, the PIU should continue to provide technical, marketing loan management and conflict resolution support. It is too early to withdraw and leave these issues to the companies and their staff.
13. The PIU should closely monitor the actual costs and benefits accruing from the sugarcane in Manyonyo and first harvest of Irish potatoes in Nzenga, to verify whether the business plans is correct in its assumptions and if need be to correct the cost-benefit analysis. This is also important with a view of future support to the irrigation sector.

### 4.3 Cross-cutting objectives

The project has given little attention to gender and social inequality issues. In fact, it is only during the second phase that some specific relevant activities were developed, such as a gender and HIV/AIDS awareness training, but without any concrete results in terms of even a basic gender mainstreaming approach. While women and youth are amongst the beneficiaries of the schemes and are represented in the various committees, their numbers are relatively low, especially in Manyonyo, and all key decision-

making positions are held by men. This is an unsatisfactory outcome, but one that can be expected if there are no good strategies developed for social inclusion issues and gender.

Poverty numbers in rural Zambia are still high, and as such the project does target the poor, albeit not the poorest of the poor (such as the landless). At the local level, the project may contribute to increased social inequality, which is unavoidable with projects that don't benefit everyone. Seen from a national perspective, the project contributes to reducing the inequality in poverty levels between the rural and urban areas.

The environmental impact of the constructed schemes is limited because of their small size and because they don't require the building of dams (as Kanakantapa would). For the same reasons, their impact on water resources is negligible.

Climate change issues have not been considered in the project. The fact that two schemes are currently experiencing water supply problems due to the receding water levels of Lake Kariba indicates that the impact of climate change should be taken into consideration when developing such schemes. The current problems can fortunately easily be solved for one scheme (Nzenga), but will unfortunately not be solved during the project lifetime for the other scheme (Buleya), which means that scheme will at times not be able to function.

By promoting irrigation, SIP is directly contributing to building the climate change resilience of the small-scale farmers through livelihoods diversification and reduced dependency on rainfed agriculture.

#### Recommendations on cross-cutting objectives:

14. Through the work of AMSCO there is still a good opportunity to strengthen the position of women and youth in the scheme companies. This should be actively pursued, and if needed relevant performance criteria should be formulated to assess AMSCO's progress in this respect.
15. Similarly, PIU and AMSCO should encourage the companies to employ poor but able people from outside the scheme as labourers in the scheme. This will broaden the poverty alleviation scope of SIP, and help reduce local-level social inequalities.
16. The PIU should liaise with ZEMA as soon as possible to discuss the current state of environmental mitigation measures at Manyonyo and agree on a number of key measures that can still realistically be implemented.

#### 4.4 Relevance

A project like SIP that contributes to the development of the irrigation sector with a focus on rural small-scale farmers is highly relevant for the beneficiaries and fully in line with Finnish and Zambian development strategies and priorities. Full stop.

#### Recommendations on relevance:

17. It is recommended that GRZ together with AfDB and Embassy of Finland develops communication material (video, TV article, report in brochure format) that documents and widely shares the key lessons of SIP.

## 4.5 Project management & governance

Overall project management performance shows a mixed picture, with a full assessment made difficult due to a lack of an agreed upon results framework. General project management tasks have been performed adequately, including reporting, work planning and budgeting, although all are activity-based rather than results-based and generally with the planning too optimistic. The long delays in project implementation should for the most part not be attributed to the PIU since they were caused by factors largely out of their control. Nevertheless, the inclusion of a dedicated procurement specialist in the team would likely have helped in reducing the delays.

The lack of attention for management and marketing aspects would likely have been avoided if the PIU had included a socio-economist or agribusiness expert from the start. As it is, the two key technical staff members (project director and irrigation engineer) both had an technical irrigation background. It is disappointing that in spite of this technical know-how in the team, the technical quality of the scheme design and construction is not of the highest technical standards. The PIU could and should have played a more assertive role in ensuring quality control.

The marketing and management activities developed over the last few years and led by the socio-economist recruited in 2012 have transformed the project from a technically oriented scheme development with rather bleak sustainability aspects to a number of irrigation enterprises with good prospects for commercial viability. Quite an achievement.

Project governance through the PSC and supervision missions has generally been functioning well, with good participation of key stakeholders. The supervision missions in particular have been very useful and should be a standard feature in this type of projects. The main governance weakness lies in the lack of formalised accountability mechanisms between PIU and the PSC.

### Recommendations on project management and governance:

18. The PIU is urged to maintain an active and collaborative attitude during these final months of the project.
19. As part of the close monitoring of Nzenga and Manyonyo performance with the first crops (see recommendation 13), the PIU should undertake an impact survey similar to the one undertaken for Buleya Mulima, and focus data collection on performance indicators defined in the 2010 programme document for the Finnish funded second phase of SIP.
20. The PSC (or at least some members of the PSC) should undertake a visit to Manyonyo scheme as soon as possible to help the decision-making process around all technical issues that need to be resolved, and that require prioritisation since funds and time limitations don't allow all issues to be addressed before the end of SIP.

## 5 Broader lessons learnt for possible future support to the irrigation sector

### 5.1 Zero option

The ToR for the assignment indicated to analyse the zero option, i.e. no further future support to the smallholder irrigation sector in Zambia by MFA Finland. In the view of the consultant, this option should be rejected. Development of the smallholder irrigation sector is one of the fundamental strategies to diversify the agricultural sector in Zambia. For decades now, the smallholder agricultural policies and strategies in Zambia have focused on maize as the main subsistence and cash crop. Through subsidised inputs (FISP – Farmer Input Supply Programme) and subsidised buying of maize (through FRA – Food Reserve Agency), the government has created a dependency of smallholder farmers on maize. In fact, more than 50% of the agricultural budget in the country now goes towards these subsidy programmes, and it has become a much politicised issue. Nevertheless, the government is aware of the need to diversify the agricultural sector, and irrigation is seen as one of the best approaches to achieve this. The late President Michael Sata already declared in 2013 that by 2016 the country should have increased land under irrigation from around 4,000 ha to 17,500 ha. More ambitious targets have also been formulated i.e. to develop up to 100,000 ha of commercial smallholder irrigation in Zambia by 2019, focusing on commercially oriented smallholder schemes of at least 50 ha, in line with the SIP model. The consultant fully concurs with these policies and continued donor support to the irrigation sector is vital to help Zambia achieve progress towards these ambitious targets.

A further reason why the zero option should be rejected is the fact that irrigation directly contributes to building the climate change resilience of the rural population. When properly designed, i.e. with guaranteed water supply, a high irrigation efficiency and marketing and management issues addressed, irrigation schemes can provide a guaranteed cash income to smallholder farmers, which will buffer them against low rainfed crop yields due to more erratic rainfall patterns linked to climate change. In good rainfall years, the extra income can be used for additional income generating activities as the Buleya Mulima farmers are showing (chicken broilers, hammer mill, etc.). As such, irrigation can also help kickstart the rural economy.

A third reason why further support to the irrigation sector is considered important is a pragmatic one: to help consolidate the work done under SIP and increase the sustainability prospects, it would be good if these schemes can still count on some continued technical, marketing and management support. While the current support provided by AMSCO is already an important step towards better sustainability prospects, a longer term low-level engagement would still be extremely useful. Let's not forget that the SIP is piloting a new model, and as such it is likely that challenges will emerge that are currently not yet foreseen. Continued engagement with the schemes will also help capture lessons learnt that will be of value for any new schemes to be developed in line with the SIP model.

### 5.2 Project design issues

It is clear from the findings that the initial design of SIP was too much technically oriented, with too little attention for the “soft” yet crucial issues of markets and scheme management. It has led to the construction of relatively expensive irrigation schemes with a design that is sub-optimal for the crops to be irrigated and for the management model that has now been developed. It is one of the main contributors to the low cost effectiveness of SIP.

A future support programme for the development of smallholder irrigation schemes in Zambia should therefore include a sufficiently long preparation phase (i.e. before starting with the construction of any schemes) which allows for a thorough analysis of technical, marketing and management issues at potential sites for irrigation development support. It should furthermore also assess the social fabric of the communities where schemes would be developed as well as any possible environmental impacts. A set of criteria on all these aspects should guide the prioritisation of schemes to be developed. Investing sufficient resources in such a preparation phase will ultimately pay off by increasing the cost-effectiveness of the schemes to be developed.

Issues to be considered during such a preparation phase include, inter alia:

- Thorough value chain analyses should be undertaken as the key element of the marketing assessment.
- Where there are good markets for commercial crops, the SIP model should be considered as the preferred management model (assuming it delivers as promised, see further down). Where market potential is low, smaller and simpler schemes like the “permanent weirs” schemes supported by JICA and managed by farmer associations are likely a more cost-effective option.
- Rehabilitation / expansion of existing schemes or dams<sup>18</sup> should normally be preferred over development of completely new schemes.
- The potential of schemes to contribute to building resilience to climate change should be included in the prioritisation process. Western, Southern, Central and Eastern province are for example more vulnerable to climate change in the form of (partial) droughts than Northern, Muchinga or North-Western province.
- As the Sinazongwe scheme has shown, social conflicts may become a real obstacle to implementation of irrigation schemes. While the emergence of such conflicts can never be fully avoided, a good social analysis can help assess the risk that those conflicts can arise.
- Linked to the above, but more broadly: a risk management strategy should be part of any future support programme. In the case of SIP, a good risk management strategy would likely have led to earlier implementation of mitigation measures for e.g. the social issues in Sinazongwe and the technical design issues in Manyonyo.
- Ensuring complementarity with other initiatives to support the irrigation sector, such as AfDBs plans to fund another 10 sites of between 100 and 500 ha in size. Lessons learnt from past and ongoing irrigation projects should also be considered during project design.

Any future support programme should also be based on a realistic timeline. If there is one thing that can be learned from SIP it is the fact that all stakeholders have been consistently too optimistic about the pace with which the irrigation schemes could be developed. It is also clear that some continued support to the SIP schemes after they have started operating will be very instrumental in furthering the prospects for sustainability. A future support programme should therefore ideally include:

1. A sufficiently long preparation phase, as per points above. During this period, consolidation of the current SIP schemes should be incorporated, and lessons learnt documented and used in the design of new schemes. Depending on the size of the programme, a preparation phase of 1 to 2 years should be sufficient to allow full analysis of the key issues for a few priority schemes to be completed, and hence construction could then start on the schemes that have sufficiently high viability prospects. Concurrently, the analysis work can then be continued for a next set of schemes.

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<sup>18</sup> During discussions with MAL- Dept. of Policy & Planning, an existing dam in Petauke was mentioned for potential irrigation development

2. A realistic implementation period that focuses on construction of the schemes, developing the markets, developing the management model, and capacity building of all key stakeholders.
3. A post-implementation phase during which consolidation of the developed schemes should be supported through a lower-level engagement. Ideally this would be done by providing MAL and/or an organisation like ZNFU with resources that allows them to continue to visit and support the schemes with advisory and capacity building activities.

It is particularly important that a future support programme should not start with the development of new schemes based on the SIP management model until this model has proven itself. At least one to two years are still needed to assess how well the SIP model will be functioning once the schemes (at least Nzenga and Manyonyo) are actually producing and marketing crops. This will allow all stakeholders to learn crucial lessons that can help avoid or mitigate any challenges that this management model faces. One of the key issues to be monitored is the development of the relationship between the professional scheme management staff and the farmers. In the SIP model, the farmers, through their company, contract the professional staff and can therefore be considered their employers, yet the same farmers also work as labourers in the schemes and as such are employed by the professional management staff. A further key issue to monitor is whether the Board of the irrigation companies will take decisions based on professional and long term commercial and technical merit, or whether other interests, such as attempting to cut professional management costs to provide more short-term direct benefits to the farmers, will prevail.

## 5.3 Project management & governance

### 5.3.1 Key factors

SIP was managed through a dedicated Project Implementation Unit, while using GRZ and AfDB procedures for procurement and “No Objections”. As is clear from the findings the project experienced many delays in implementation thus contributing to low cost effectiveness. Clearly, any future support programme should learn from this and avoid the pitfalls that caused these delays. At project management and governance level, five issues are considered crucial for ensure efficient management:

1. The right composition of the project management team
2. A clear results framework
3. Strong accountability and oversight mechanisms
4. Realistic budget & time planning
5. Efficient procurement and financial management procedures

#### Composition of the project management team

The two key technical staff members of the SIP team during the first phase (project coordinator, irrigation engineer) both have a technical irrigation background. It is one of the reasons<sup>19</sup> why the importance of marketing and management issues was only acknowledged half-way during the second phase.

For a future smallholder irrigation support project, a project management team should include at least the following expertise:

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<sup>19</sup> The other reasons are the very technically oriented project design and the fact that the donor AfDB is very much infrastructure development oriented (as acknowledged by themselves) and less on the soft issues like marketing / management.

1. Project management
2. Agribusiness
3. Irrigation engineering
4. Social aspects and general capacity building expertise
5. M&E
6. Climate change adaptation
7. Procurement and financial management

Note that it doesn't mean the team would require 7 staff positions, since one expert may cover various expertise area.

### Clear results framework

SIP was never managed on results-based principles, but rather on achieving progress on activities. Results-based management is however the best approach to promote effective project management and is also in line with current MFA Finland principles.

While there are different ways of formulating a results framework, the logical framework is still the main tool used to manage on results. Such a framework should be based on a thorough problem analysis and possibly a Theory of Change.

With an agreed results framework, the stage is set for managing on results. This means that reporting should also be based on describing progress towards the results (based on assessing in how far relevant indicators are being achieved), rather than on describing activities.

### Strong accountability and oversight mechanisms

With results-based management in place, providing oversight on project implementation through e.g. a project steering committee becomes more straightforward. It is however important that such an oversight body has a strong enough mandate to hold project staff accountable for their actions. Project staff should have performance based contracts with annual deliverables. The PSC should then have the mandate and responsibility to undertake formal performance assessments of the project staff against the agreed deliverables and take correctional measures if needed, including replacement of consistently underperforming staff.

A very useful oversight instrument, as confirmed in the SIP project, are the regular supervision or joint review missions. These should also be included in the governance mechanisms for any future support programme.

### Realistic budget & time planning

The initial SIP budget underestimated irrigation development cost by up to 80% and the time required to develop the schemes by more than 50%. The PIU was also consistently too optimistic with the annual planning and budgeting. A negative side effect is that they made unrealistic promises to the intended beneficiaries of the scheme, who have become increasingly frustrated with promises not kept. For them it is irrelevant whether the cause for the problems lies mostly outside the control of the PIU.

A future support programme should therefore have a realistic overall budget and overall project duration, as well as realistic annual plans and budgets. Budgets should preferably also cover some basic equipment for the schemes e.g. tractor, planting equipment, etc. as well as basic infrastructure as good roads and



office space. In developing budgets, lessons should be learnt not only from SIP but also from irrigation support projects in Zambia, such as IDSP.

### Efficient procurement and financial management procedures

The hybrid model of having to comply with both GRZ and AfDB procedures has led to a lot of bureaucratic delays. A dedicated procurement specialist in the PIU team could have mitigated the resulting delays, but would not have been able to avoid them completely.

A future project management model should avoid the need to comply with excessive procurement procedures and should ideally have more control itself over procurement issues.

### 5.3.2 Possible project management models

Table 4 presents a number of possible management models for a future support programme to the irrigation sector in Zambia. These are based on feedback received from key stakeholders such as MAL, AfDB, Embassy of Finland and the SIP PIU. It goes beyond the mandate of the consultant to indicate which model is best. Suffice to say that each has its advantages and drawbacks, and that combinations of the different models are also possible. The key factors described in the previous section should ultimately be guiding the choice of project management model.

Table 5 - Possible management models for a future smallholder irrigation support project

Model	Description	Main advantages	Main drawbacks
1. Current SIP PIU model	Dedicated PIU under tutelage of MAL, with staff originally from MAL but now under contract (so not seconded by MAL). Donor fund management by AfDB, first with AfDB funds, now with Finnish Trust funds. PSC led by MAL	<ul style="list-style-type: none"> <li>• Good ownership by GRZ</li> <li>• More or less in line with Paris declaration principles.</li> </ul>	<ul style="list-style-type: none"> <li>• No international expertise, so no lessons learnt from elsewhere incorporated</li> <li>• Bureaucratic procurement and No Objection procedures</li> <li>• Possible “perverse incentive” for PIU to extend project as long as possible since they are on contract</li> </ul>
2. Alternate SIP model	Same, but without AfDB administrating the Finnish funds, i.e. would be done directly through Embassy of Finland	<ul style="list-style-type: none"> <li>• Same as above</li> <li>• Plus likely less bureaucracy, although procurement capacity limitations at GRZ remain an issue</li> </ul>	<ul style="list-style-type: none"> <li>• Same as above, although procurement should be less bureaucratic (but problem of limited MAL procurement capacity would still apply).</li> <li>• Requires more time input from Finnish Embassy</li> </ul>
3. Project managed externally, i.e. by a consultancy company / consortium	A consultancy company would be fully responsible for all project aspects. Governance would be through with a PSC that includes at least MAL and Finnish Embassy. Consortium could also include the likes of e.g. ZNFU	<ul style="list-style-type: none"> <li>• Reflects the private sector nature of the project (commercial schemes)</li> <li>• Likely more effective because of less bureaucracy and better suited for results-based mgt.</li> <li>• No limitations in staff to be recruited, so easier to effectively cover all required expertise areas.</li> </ul>	<ul style="list-style-type: none"> <li>• GRZ largely “sidelined” at implementation level<sup>20</sup>, which in SIP scheme management model is problematic (since GRZ brings in the infrastructure)</li> <li>• Not in line with Paris declaration</li> <li>• Cost-<i>efficiency</i> likely relatively low (high overhead because of high staff costs)</li> </ul>

<sup>20</sup> Could be largely mitigated if the project is designed in such a way that it works with and through relevant MAL staff at MAL Headquarters and at field level.

Model	Description	Main advantages	Main drawbacks
4. Split model	Split funding and management of hardware from funding and management of the software. Could be a collaborative effort of AfDB (hardware) and Finland (software). Finnish part could then be managed according to one of management models described above (1 to 3).	<ul style="list-style-type: none"> <li>• AfDB prefers to support infrastructure only</li> <li>• Will ensure good focus on the "soft" elements, like marketing, mgt, cross-cutting issues.</li> </ul>	<ul style="list-style-type: none"> <li>• Coordination between the two components crucial and might be difficult if they follow different management model.</li> <li>• Effective joint PSC needed.</li> <li>• If activities not well synchronised, delays are likely.</li> </ul>