

## Mid-year Progress and Planning Brief DUPC2 (January – August 2020)

### A4 Labs

### Arid African Alluvial Aquifers Labs securing water for development

January –August 2020

5 October 2020

#### General information

<b>Project nr. / reference nr.</b>	<b>106470</b>	
<b>Project Title</b>	<b>A4 Labs - Arid African Alluvial Aquifers Labs securing water for development</b>	
<b>Project Leader and organisation</b>	Pieter van der Zaag, IHE Delft	
<b>DUPC Themes</b>	<ul style="list-style-type: none"> <li>• Efficient water management, particularly in the agricultural sector</li> </ul>	
<b>DUPC Cross Cutting Themes</b>	<ul style="list-style-type: none"> <li>• Water governance</li> <li>• Climate change</li> <li>• Gender &amp; diversity</li> </ul>	
<b>Target country/ies</b>	<ul style="list-style-type: none"> <li>• Nile River Basin – Tekeze sub-basin, Ethiopia</li> <li>• Limpopo River Basin, Mozambique</li> <li>• Limpopo River Basin – Mzingwane sub-basin, Zimbabwe</li> </ul>	
<b>Project partners (incl. IHE) and team</b>	<b>Project partner (name &amp; type)</b>	<b>Team members per partner (incl. title and gender)</b>
	<b>IHE Delft</b> (knowledge institute)	Prof Pieter van der Zaag (Mr), Ms Annelieke Duker, Dr Tibor Stigter (Mr), Prof Charlotte de Fraiture (Ms)
	<b>Mekelle University</b> (knowledge institute)	Dr Eyasu Yazew Hagos (Mr), Eng. Tesfa-alem Gebreegziabher Embaye (Mr), Dr Atinkut Mezgebu Wubneh (Mr); Ms Shewit Abraham Ykunoamlak
	<b>Oxfam Mozambique</b> (civil society)	Mr Adelmarr Riberio
	<b>Instituto Superior Politecnico de Gaza</b> (knowledge institute)	Mr Cesario Cambaza, Mr Paulo Saveca, Mr Sergio Ponguane
	<b>Dabane Trust</b> (civil society)	Ms Louise Nkomo, Dr Stephen Hussey (Mr), Ms Joyce Dube
	<b>Acacia Water</b> (private sector)	Dr Arjen de Vries (Mr), Ms Maaïke Feltmann
	<b>Oxfam-Novib</b> (civil society)	Mr Ruben De Winne, Ms Anne Oudes
	<b>Practica</b> (civil society)	Mr Robert Vruik, Mr Berry van de Pol
<b>Start and end date project</b>	<b>29 September 2016 – 29 September 2019; budget neutral extension until 30 June 2021</b>	
<b>Total project budget (Euro) (A)</b>	<b>€ 981,460 + € 50,000 + € 25,000 (top-ups)</b>	
<b>Max. DUPC2 contribution (Euro) (B)</b>	<b>€ 698,460 + € 50,000 + € 25,000 (top-ups)</b>	
<b>Co-funding (Euro) (A-B)</b> (indicate the source(s) of co-funding)	<b>€ 283,000</b> <b>Sources:</b> <b>Ethiopia: Mekelle University, Relief Society of Tigray REST</b> <b>Mozambique: Oxfam Mozambique</b> <b>Zimbabwe: Dept. of Irrigation Development, Dabane Trust, University of Zimbabwe, WaterNet, NUST, Oxfam Zimbabwe</b> <b>Netherlands: Oxfam-Novib, Acacia Water</b>	

## 1. Progress on project results

Covid-19 notwithstanding, progress by the three labs has been impressive. The three living labs are alive as ever, demonstrated by the continued activities of the smallholder farmers who were equipped with sand river irrigation pack, by the profit they made by selling part of their vegetables and fruits on the market, and by the fact that the number of farmers expanded during the reporting period. Apparently, the A4Labs sand river irrigation pack provides a development option under extreme circumstances experienced during the reporting period.

Progress of the individual labs is reported in detail by the labs themselves in the annexes of this brief. Note the large number of photos illustrating progress.

## 2. Project highlights

Currently the following farmers are operational and making a profit:

Lab	Number of active farmers		
	Female	Male	Total
Tekeze Lab – Ethiopia	2	11	13
Limpopo lab – Mozambique	3	0	3
Mzingwane Lab- Zimbabwe	5	6	11
Total	10	17	27

As an illustration, data on 9 farmers of the Mzingwane Lab (taken from that lab’s report in the Annex) show that these farmers sold crops during the reporting period worth 5,000 Rand each (equivalent to approximately € 250), but with a large variation: the farmer who sold least earned 1,300 Rand (€65), while the farmer who sold most earned 10,000 Rand (€500). In addition, farmers bartered their crops for other goods. And, of course, a significant part of their produce was used for home consumption, making them less dependent on the outside world (including energy-wise, given that the pumps use solar power). As a result, food security increased for all participating farmers. Remarkably, one of the community members near the Mzingwane lab got inspired by the success of the lab and decided to invest in solar-powered irrigation on his own, illustrating unintended impact of the project. Monitoring and more precise analysis of the farmers’ results are ongoing.

One interesting development worth noting is the WhatsApp challenge initiated in the Mzingwane Lab, which invited participating farmers to make short videos of their achievements and experiences. 35 videos were received, which are currently being edited (with translation subtitles added). The best will be showcased during the special session “*Farmer Voices from Sand Rivers*” during the 21th WaterNet Symposium (28-30 October 2020), the fourth such a session to be held.

Another important development is that the Labs network of farmers was used to inform them and advise them concerning the pandemic, as communication by government was not always sufficient. Lab partners purchased masks and hand-washing utensils for the farmers.

Another notable development is that given the Covid-19 situation, the labs had to improvise and take initiative, where possible morally and otherwise supported by IHE Delft. This gives the impression that once the A4Labs project ends, the Labs will continue.

Fortunately, all Labs have now affiliate projects that will help them keep going: Tekeze Lab participates in the NABWIG project, Mzingwane Lab participates in the CES-Rural and WEF-Tools projects, and Limpopo Lab

participates in the CES-Rural project as well as in the TMT+ capacity building project on “Sustainable development of groundwater from nature based storage (NBS) for rural multi-purpose water supply”

### 3. Overview of expenses

Items	DUPC grant €	Co-funding €	Total budget €
Planned project expenditure this year (based on tentative plan of September report preceding year)	€ 229,804	€ 0	€ 229,804
Actual project expenditure (1 <sup>st</sup> January – 31 <sup>st</sup> August current year)	€ 106,711	€ 0	€ 106,711
Expected expenditure until 31 December current year (1 <sup>st</sup> January – 31 <sup>st</sup> December)	€ 70,000	€ 0	€ 70,000
Total actual project expenditure (start project – 31 <sup>th</sup> August current year) *	€ 661,859 *	€ 0	€ 661,859 *
Expected expenditure until 31 December current year (start project – 31 <sup>st</sup> December)	€ 731,859	€ 0	€ 731,859
Expected balance DUPC2 project grant end of current year	€ 41,601	€ 0	€ 41,601

\* includes €53,352 of advances that have been issued but not yet accounted for.

The above amounts have been checked by Rafaela of Finance (on 7/Sep/2020).

Refer to Annex 2 for more details.

### 4. Tentative activity plan next year

The following activities are foreseen, by the indicated labs during the first half of 2021. The annual international A4Labs partner meeting scheduled for October 2020 in Bulawayo, Zimbabwe, will be postponed to a later date (hopefully mid 2021), which will mark the end of the A4Labs project. See also Annex 1.

Activities	Mozambique	Ethiopia	Zimbabwe	Netherlands
1: Demand-driven innovation fund	X	X	X	
2: Monitoring	X	X	X	X
3: Student research	X	X	X	X
4: Lab hosting and coordination	X	X	X	
5: Stakeholder workshops & local dissemination				
6: Student research supervision	X	X	X	X
7: Annual international stakeholder seminars	X	X	X	X
8: Cross-lab learning & global dissemination				X
9: Overall programme coordination	X	X	X	X
10: Implementation support (TOP-UP)	X		X	X
11: Outreach (TOP-UP)	X	X	X	X

## 5. Assistance and/or support from the DUPC2 programme

In their mid-year progress and planning brief (see Annex), Tekeze lab made a strong plea for additional top-up funding, because of the delays and disruptions caused by the Covid-19 pandemic. This we, of course, strongly support. Inquiries with the DUPC2 team about a possible top-up, however, resulted in a negative response.

Whereas initially we had planned to organise the end workshop of A4Labs in Zimbabwe in 2020, this will now have to be postponed to sometime in 2021, depending on how the pandemic evolves. We feel that it is very important to have a face-to-face meeting, and to jointly conduct field visits and hold discussions with stakeholders, including farmers and policy makers to enable south-south learning and dissemination of results.

To ensure flexibility in these uncertain times, we herewith request a budget neutral extension until the end of 2021.

## Annex to the Mid-year progress and planning brief:

### Annex 1. Tentative activity plan 2021, including a budget indication for 2021

Activities	Mozambique	Ethiopia	Zimbabwe	Netherlands	Total
1: Demand-driven innovation fund	X	X	X		
2: Monitoring	X	X	X	X	
3: Student research	X	X	X	X	
4: Lab hosting and coordination	X	X	X		
5: Stakeholder workshops & local dissemination					
6: Student research supervision	X	X	X	X	
7: Annual international stakeholder seminars	X	X	X	X	
8: Cross-lab learning & global dissemination				X	
9: Overall programme coordination	X	X	X	X	
10: Implementation support (TOP-UP)	X		X	X	
11: Outreach (TOP-UP)	X	X	X	X	
<b>Indicative budget</b>	€ 6,000	€ 10,000	€ 14,000	€ 11,600	€ 41,600

### Annex 2: Total expenditure and remaining balance per project partner, as per 31 August 2020

Total project balance up to 31-08-2020	IHE Delft	Oxfam Moz.	Mekelle Univ.	Dabane Trust	Oxfam Novib	Acacia Practica Water	Total	
Staff time	€ 103,371						€ 103,371	
Costs (incl. open advances)	€ 96,462	€ 122,961	€ 126,735	€ 129,696	€ 17,790	€ 12,000	€ 52,844	€ 558,488
Total spent	€ 199,833	€ 122,961	€ 126,735	€ 129,696	€ 17,790	€ 12,000	€ 52,844	€ 661,859
Budget (incl top-ups, excl co-funding)	€ 229,810	€ 151,035	€ 135,735	€ 152,280	€ 37,800	€ 12,000	€ 54,800	€ 773,460
<b>Balance (incl open advances)</b>	<b>€ 29,977</b>	<b>€ 28,074</b>	<b>€ 9,001</b>	<b>€ 22,584</b>	<b>€ 20,010</b>	<b>€ 1,956</b>	<b>€ 111,601</b>	
Issued advances (open - not yet accounted for) *			€ 26,659	€ 26,693	€ -	€ -	-€ 0	€ 53,352
<b>Total actual expenditures accounted for (excl open advances) **</b>							<b>€ 608,507</b>	
<b>Balance (excl. open advances) ***</b>							<b>€ 164,953</b>	

\* The issued advances are included in the total expenditure. Hence, the balance is the amount that we can still issue to the partners.

\*\* We don't know the exact amount of these issued advances that has actually been spent.

\*\*\* So the actual balance is between 111k€ and 164k€ (more likely closer to 111k€)

# Mid-year progress and planning briefs of the three individual labs

## Mid-year progress and planning brief - Limpopo Lab - Mozambique

### 1. Progress on project results

*In this section please briefly report the progress for the period 1st January 1st - 31st August. Please also address comments from the previous annual report, if any.*

We are working with funds from A4Labs and CES-RURAL. The latter is an ongoing project funded by DUPC2 and coordinated by the ISPG.

Main ongoing activities and results (so far):

- Continuous groundwater quantity and quality monitoring in the Limpopo river in Macarretane (Chókwè district) and Caniçado (Guijá district);
- Continuous assistance to farmers in cropping systems and irrigation technics;
- 2 well points (for 2 new farmers) in Macarretane: Mrs. Teresa and Mrs. Ania. Together with Mrs. Anita, we now have a total of 3 farmers (all women) working with A4Labs/CES-RURAL;
- Acquisition of 2 new pumps + irrigation kits for the 2 (new) farmers (one for each);
- Mrs. Anita started her 3<sup>rd</sup> season by herself, with money for seeds and inputs from selling products from her previous cropping season. She also helped the new farmers with plants and seeds, and the installation and operation of the solar pump. Mrs. Anita is cropping maize, beans, cabbage, lettuce, onions and tomatoes in 0.17 ha;
- Mrs. Teresa is cropping maize, beans, lettuce, sweet potatoes, cassava and tomatoes in 0.14 ha;
- Mrs. Ania is cropping Maize, beans, lettuce and tomatoes in 0.19 ha;
- Acquisition of all materials for installation of planned boreholes in Caniçado (Guijá) site is done;
- Ongoing student research:
  - o Ms. Adelina Mujovo, BSc student ISPG, is conducting her BSc thesis research entitled “Evaluation of the performance of different irrigation systems using a low flow solar pump in Macarretane and Caniçado, Mozambique”;
  - o Ms. Vânia Florinda Vilanculos, BSc student ISPG, is conducting her BSc thesis research entitled “Hydrochemical Processes and the quality of groundwater used for agricultural irrigation on the dry bed of the Limpopo river in Guijá, Mozambique”;
  - o Ms. Nádia Chambal, BSc student ISPG, is conducting her BSc thesis research entitled “Hydrochemical Processes and the quality of groundwater used for agricultural irrigation on the dry bed of the Limpopo river in Macarretane, Mozambique”;
  - o Mr. Juvêncio Mate, BSc student ISPG, is conducting his BSc thesis research entitled “Evaluation of the performance of cabbage submitted to different irrigation systems in CEXP-ISPG, Mozambique”.

Major setbacks:

- Dona Anita’s pump stopped working suddenly. We immediately replaced with the one we have in the ISPG, which also broke a screw. We fixed it and is currently working. To avoid future pump problems, we are planning a refresh training on how to install and operate the SF2 solar pump;
- Contacts with the director of SDAE Guijá are still going for the identification of a farmer to work with;
- Working with Kulima/Oxfam Mozambique is still a problem, specially when it comes to availability of funds for fieldwork. We therefore, always have to resort to budget from other projects to the work of installation and monitoring of all field activities.

## 2. Project highlights

### 2.1. Installation of Dona Teresa's borehole

The work took 3 days and we lost many material (pipes) due to its quality. Therefore, we decided that for the next boreholes the pipes should be bought in Maputo and not in the Chókwè market.



**Figure 1:** Mr. Paulo Saveca, Mr. Salimo Muchecua and Mr. Moisés Buduio installing the pipe for the borehole





Figure 2: The borehole



Figure 3: Mr. Paulo Saveca helping the farmers carry the pump

2.2. Installation of Dona Ania's borehole



**Figure 4:** Mr. Moisés Buduio, Mr. Salimo Muchecua, Mr. Cesário Cambaza and Mr. Paulo Saveca installing the pipe for the borehole



**Figure 5:** Late in the afternoon, the team was tired

2.3. Other pictures



**Figure 6:** Field visit at dona Teresa's field. In the picture: Mr. Sérgio Ponguane, dona Anita, dona Teresa and Mr. Paulo Saveca



**Figure 7:** Field visit at dona Teresa's field. In the picture: interested farmer (neighbour of dona Teresa) and dona Teresa

Annex: mid-year progress and planning brief - Limpopo Lab - Mozambique



**Figure 8:** Field visit at dona Anita's field.



**Figure 9:** Field visit at dona Ania's field. In the picture: Mr. Paulo Saveca, dona Teresa, dona Ania, dona Anita and Mr. Cesário Cambaza

## Annex: mid-year progress and planning brief - Limpopo Lab - Mozambique

### Tentative activity plan September-December 2020, including a budget indication

Activities	Responsibility	Months						Location	Unit price	Quantity	Total cost (MTN)	Exchange rate	Total cost (EUR)
		OCT	NOV	DEZ									
Monitoring of all ongoing activities (groundwater quantity and quality, irrigation and other farming activities)	ISPG							Macarretane, Caniçado	2 800,00	24.00	67 200.00	80,00	840,00
Field visits to Guija to meet the Director of SDAE, extensionists and farmers	ISPG							Caniçado	2 800.00	3.00	8 400.00	80,00	105.00
Data collection about new Guijá sites and farmers	ISPG							Caniçado	2 800.00	3.00	8 400.00	80,00	105.00
Installation of boreholes in the farmer's fields	ISPG							Caniçado	2 800.00	36.00	100 800.00	80,00	1 260.00
Student research and other research activities	ISPG							Macarretane, Caniçado	1 400.00	45.00	63 000.00	80,00	787.50
<b>TOTAL</b>											<b>247 800.00</b>		<b>3 097.50</b>

## Mid-year progress and planning brief - Tekeze Lab - Ethiopia

### 1. Progress on project results

- Continuous in-situ monitoring of climate parameters, groundwater and soil moisture data using state-of-the-art equipment is ongoing.
- Five SunFlower 2 solar pumps are purchased and will be distributed to the farmers in the study area for joint operation and monitoring. At least 15 farm households will benefit.
- 2 TD-Divers, 2 CTD-Divers and 3 Baro-Divers are purchased for groundwater monitoring.
- Story of Change interview for the beginning of the crop season carried out.
- Log book for monitoring the water levels and keeping track of farm operations was prepared in local language. Farmers were given training on how to document the log book and are now keeping regular record.
- Participated in the “Intensification of Agriculture through Natural Water Storage in Alluvial Aquifers for Small Scale Farmers in Arid and Semi-Arid Areas (ASAL) in Eastern Africa” workshop organized by the A4Labs and NaBWIG projects during 24 – 27 February 2020 in Nairobi, Kenya.
- The PhD program in Water Resources Development and Management (WRDM) has officially been approved by the Mekelle University Senate Standing Committee for Curriculum and Standards on 17 February 2020. The idea was initiated at the beginning of the A4Labs project and was finally realized before the end of the project!!!!
- Peer review journal: Gebremicael, T.G., Mohamed, Y.A., van der Zaag, P, Hassaballah, K. and Hagos, E.Y. (2020). Change in low flows due to catchment management dynamics—Application of a comparative modelling approach. *Hydrological Processes*. 1– 16.  
(DOI: <https://doi.org/10.1002/hyp.13715>).
- Mr. Mezgebu Tesfay, MSc student at Mekelle University, has submitted his MSc thesis entitled “Evaluating field application efficiency and water productivity at May Gobo small scale irrigation scheme in Eastern Tigray, Ethiopia”.
- Mr. Tesfa-alem G/Egziabher, PhD student Mekelle University, is carrying out his PhD research field work entitled “Understanding the Hydrological Response and Agricultural Productivity of Natural and Built Infrastructures in Sand bed Aquifers: The Case of Tigray region, Ethiopia”.

### 2. Project highlights

#### 2.1 Farmers benefiting from low operational cost and water saving technology

The SunFlower 1 solar pumps given to the farmers in 2019 are still operational and are liked by the farmers for three reasons, namely, (a) Unlike the diesel pumps, SF pumps have no running expenses, (b) Their pumping rate is small compared to the diesel pumps and save unnecessary water losses, and (c) They haven't yet faced any maintenance problem.

## Annex: mid-year progress and planning brief - Tekeze Lab - Ethiopia



SunFlower 1 solar pump in operation



A young happy farmer appreciating the fruits of his hard work

### 2.2 Farmers recording important farm operation information on log book

Using a log book prepared for keeping track of farm operations, farmers are engaged in:

- Mapping of the farm
- Recording the water levels in their wells every week
- Recording the date and duration of irrigation

## Annex: mid-year progress and planning brief - Tekeze Lab - Ethiopia

- Recording the water levels of the wells before and after every irrigation
- Recording harvest information



Farmers recording water level using tape meter

### 2.3 Balancing research activity with safety of farmers

The Tekeze A4Labs has as much as possible continued its research for development activity by taking the necessary precautionary measures to protect the researchers and the farmers safe from COVID. Accordingly, our project has provided sufficient surgical masks to the farmers engaged in the joint monitoring and evaluation.



A4Labs provided face masks to farmers



## Annex: mid-year progress and planning brief - Tekeze Lab - Ethiopia

### 3. Overview of expenses

Provide in the table below your project expenditure of this year (from January until end of August) and expected expenditure until the end of the year.

Items	DUPC grant €	Co-funding €	Total budget €
Planned project expenditure this year (based on tentative plan of September report preceding year)	<b>46,676.54</b>		
Actual project expenditure (1 <sup>st</sup> January – 31 <sup>st</sup> August current year)	<b>29,920.54</b>		
Expected expenditure until 31 December current year (1 <sup>st</sup> January – 31 <sup>st</sup> December)	<b>16,756.00</b>		
Total actual project expenditure (start project – 31 <sup>th</sup> August current year)	<b>118,979.00</b>		
Expected expenditure until 31 December current year (start project – 31 <sup>st</sup> December)	<b>135,735.00</b>		
Expected balance DUPC2 project grant end of current year	<b>0.00</b>		

### 4. Tentative activity plan next year

Provide in Annex 1 a tentative activity plan including a budget indication for next year.

### 5. Assistance and/or support from the DUPC2 programme

Please use this section to provide any feed-back or recommendations to DUPC2 management.

- Extension of the project till September 2021 to compensate the disruptions and delays created by COVID 19 pandemic
- Provision of additional top-up budget for 2021

## Annex: mid-year progress and planning brief - Tekeze Lab - Ethiopia

### Annex to the Mid-year progress and planning brief:

1. Tentative activity plan next year, including a budget indication

The tentative activity plan and corresponding budget for 2021 is presented below.

PLANNED ACTIVITIES	Budget (Euro)
<p><b>1. Monitoring infrastructure and observation</b></p> <p>Associated actions:</p> <ul style="list-style-type: none"> <li>• Organize experience sharing visit to the Tekeze lab for farmers from selected areas in Tigray</li> <li>• Data analysis, interpretation and report writing</li> </ul>	<b>3,000.00</b>
<p><b>2. Lab hosting and coordination</b></p> <p>Associated actions:</p> <ul style="list-style-type: none"> <li>• Quarterly meeting of focal persons to discuss the project progress</li> </ul>	<b>1,500.00</b>
<p><b>3. Stakeholder workshops and local dissemination</b></p> <p>Associated actions:</p> <ul style="list-style-type: none"> <li>• Prepare a practical note on the major findings and lessons learnt, and provide training to selected farmers and DAs from Tigray</li> <li>• Organize end of project local stakeholder workshop to share experiences of target farmers, SoC and joint research findings</li> <li>• Organize experience sharing visit to the project area for regional partners</li> </ul>	<b>8,000.00</b>
<p><b>4. Annual international stakeholder seminars</b></p> <p>Associated actions:</p> <ul style="list-style-type: none"> <li>• Participate in the final annual international stakeholder meeting</li> </ul>	<b>4,900.00</b>
<p><b>5. Cross-lab learning and global dissemination</b></p> <p>Associated actions:</p> <ul style="list-style-type: none"> <li>• Produce final field/testimony videos and blogs</li> <li>• Present paper(s) at relevant national and international events</li> <li>• Publish up to 2 articles on peer reviewed journals</li> </ul>	<b>6,000.00</b>
<p><b>6. Overall programme coordination</b></p> <p>Associated actions:</p> <ul style="list-style-type: none"> <li>• Follow up the implementation of planned activities</li> <li>• Administrative fee (10%)</li> </ul>	<b>4,465.00</b>
<b>Total</b>	<b>27,865.00</b>

## Mid-year progress and planning brief – Mzingwane Lab - Zimbabwe

### 1. Progress on project results

#### Introduction

In the reporting period, the 11 farmers (6 men and 5 women) at ALL ONE and Malaba irrigation scheme had a productive season with 1.5ha of land under horticultural production from alluvial aquifers despite the macro socio-economic challenges faced in the country impacting on farmer livelihoods and productivity. The reporting period was characterized by rainfall inadequate for dryland crop production (469mm)<sup>1</sup> due to erratic precipitation and hot dry spells between falls. The season was complicated by an economic meltdown and political instability with heavy police and military presence in both cities and rural areas as a measure to curb anticipated protests against economic hardships and poor governance. As of March 30, the Government of Zimbabwe issued a national lockdown to curb the spread of the COVID 19 virus. The lockdown restricted travel movement and as a result field activities were suspended for a 3 month period (April, May and June 2020). Staff worked from home and communicated with the farmers through the use of digital communication platforms such as WhatsApp and Zoom. Dabane used these platforms to conduct project monitoring and to send and receive information videos of the WhatsApp challenge and conducting the Stories of Change interviews. Additionally, in line with the Dabane Safeguarding and Participant Protection Policies, Dabane used the WhatsApp platform to cascade the COVID-19 prevention and awareness messages to project participants. Farmers appreciated the COVID 19 messaging and established prevention measures such as setting up hand washing basins at the garden point of entry and ensuring that all farmers wear their masks in the garden.

At ALL ONE and Malaba irrigation schemes, farmers continued crop production amid the Corona virus. Crops grown by the farmers included cabbage, tomatoes, rape, choumolia, maize, beans, onion and okra. Between January and August 2020, farmers earned an average income of between +ZAR1000/USD\$50 - +ZAR12000/USD600 from the sale of their produce using the farm gate and door to door sales method.

- For example, farmer Violet Mpofu (F) got an income of ZAR7020 on her 0.125ha plot from a maize crop planted on 225m<sup>2</sup> of land (ZAR2,500), ZAR1,200 from the sale of Kale, ZAR3000 from melons and pumpkins and ZAR320 from the sale of okra. She harvested 300 melons and 100 pumpkins (priced at ZAR12,300/USD615) which were utilized for home consumption.
- In the best case scenario, farmer Lisani Mathanda (M) on his 0.16ha plot at ALL ONE irrigation scheme earned an income of +ZAR10,000 from the sale of maize, choumolia, rape, cabbage and melons from January to August 2020.
- Farmers Lameck Moyo (M), Albert Sibanda (M), Lovemore Ncube (M), Winnie Dube (F), Lungani Ncube (F), Charles Ncube (M) and Lungile Malaba (F) generated an income of ZAR4,800; ZAR6,000; ZAR1,600; ZAR7,500; ZAR3,600; ZAR2,300 and ZAR1300 respectively.

Had it not been for the limitations imposed by the COVID 19 restrictions, the inability of farmers to access certified seeds and pesticides and that locally purchased seed at the Tshelanyemba Business centre failed to germinate after repeated attempts at planting, farmers had the potential for a 30% projected increase in incomes through the sale of their horticultural crops. Farmer households also benefited from the consumption vegetables with farmers reporting that the vegetables were also used to barter for cereal and small livestock. Two bundles of Chomoulier were exchanged for 5kg of grain and tomatoes exchanged for chickens. However, some irrigation scheme farmers on other, larger schemes known to Dabane have reported difficulties in marketing due to COVID pandemic limitations on travel.

Project teams resumed field based activities in July 2020 with strict adherence to COVID-19 measures such as maintaining a social distance of two metres or more, wearing masks in public, hand washing or sanitizing hands

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<sup>1</sup> TAHMO weather station \_Tshelanyemba, Zimbabwe (2019-2020)

## Annex: mid-year progress and planning brief – Mzingwane Lab - Zimbabwe

and surfaces at meeting point of entry and meeting venues and ensuring that meetings were not more than two hours. The Key activities undertaken in July and August include:

- The purchase of two Future pump SF2 pumps that will benefit two female farmers, Thembekile Nyathi and Tumani Ncube in Ward 7, Matobo District farming on 0.1ha of land each. Installation works are set for November 2020.
- A Water Management Training at ALL ONE and Malaba irrigation schemes (with a total of 7 farmers, 4 women and 3 men) participating in the training,
- The development of 7 (3 men and 4 women) farmer profiles including Stories of Change interviews
- editing of 35 WhatsApp challenge videos and the development of the Pump service and maintenance of the Future Pump SF2 video at ALL ONE irrigation scheme.
- Water use and yield monitoring was carried out at both ALL ONE and Malaba irrigation schemes to check changes in groundwater availability and crop water requirements related to the weather as it affected productivity which could be achieved from irrigation as well as income gained from garden activities
- Information packages for ALL ONE and Malaba irrigation schemes were developed to provide information on the A4 LABS gardens which include geographical location, size, pumps used, watering system of the gardens as well as a general farmers' profile.
- Awareness raising on the COVID-19 pandemic was carried out with information targeting the sustained adoption of the 4 critical behaviours that people must adhere to was shared with the farmers

The COVID-19 pandemic affected planned student research activities. The Lab has unfortunately only hosted one student in this report period. Mutsa Muhambi (male) research focused on the financial viability of individual smallholder farmers using alluvial groundwater, comparing solar and fuel-powered irrigation.

The project team participated in an internal report writing workshop at Dabane where logframe based monitoring tools were developed to aid beneficiary profiling, individual and garden monthly monitoring and tracking. Ground water monitoring was conducted on the Shashane River at All One Irrigation Scheme.

The graph below shows the decreasing level of water in the Shashane River during June and July 2020.

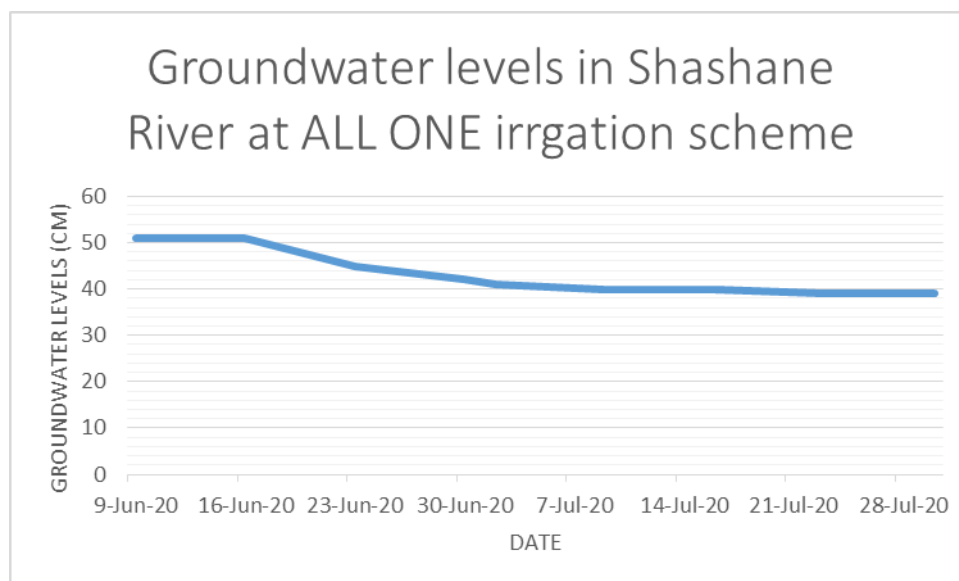


Figure 1. Ground water Levels in the Shashane River adjacent to All One Irrigation Scheme

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**Top Up Fund:** The WhatsApp video competition involved eight gardens with 88 participants (22 men and 66 women). The selected gardens were from the two A4 LABS gardens (All One and Malaba irrigation schemes) and six gardens (Shashani 5, Madlelo Aluhlaza, Siyazama, Bhekimpilo, Them bani and Vusanani Toloki) that have been supported by Dabane through the provision of irrigation infrastructure such as photovoltaic water-pumping systems, in-field reticulation systems, fencing and training and capacity building workshops. In this challenge, farmers were required to submit short videos with a maximum of five minutes using their mobile phones showcasing their knowledge of photovoltaic systems, pump operation, service and maintenance. The best video will be professionally shot and packaged as a user operations, service and maintenance manual of photovoltaic systems. This manual will be shared with the farmers and other stakeholders locally and internationally within the A4 LABS project. The videos will also be broadcast on the Dabane and A4 LABS' social media sites enabling any user of a photovoltaic system to receive tips and operating techniques. A total number of 35 videos were received for the WhatsApp video competition from Malaba, Shashani 5, Them bani, Bhekimpilo and Vusanani Toloki gardens. The videos have been provided with subtitles and judging of the best videos will take place at the end of September 2020

### 2. Project highlights



*Figure 2 above and below: Cabbages grown by Mr. Lisani Mathanda's at All One irrigated Garden.*

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Mr. Lisani Mathanda (53) from Patalika village in Dzembe ward, Matobo District is the secretary and one of the three members of the 0.5ha ALL ONE irrigation scheme. Farmer Mathanda is a keen irrigator willing to learn, co-develop and experiment with various technologies and has been actively involved from project inception to date. He has participated in the establishment of the garden and the installation and development of water abstraction systems as well as capacity building training workshops. In April 2020, he planted and irrigated 0.08ha of land to cabbage, which he sold to the community, Tshelanyemba shops and people in mines within the community. He made an income of ZAR5,000 with which he purchased two goats and building material for constructing a house. According to Mr. Mathanda, at first, the community doubted that he was the producer of the quality cabbages he was selling as it was a common believe that cabbage could only be sourced from Bulawayo and not locally grown. To convince potential customers he conducted look and learn visits at his plot to show that he was the grower. He delighted in relating some of the comments he received such as: *“Ingadi leyi eye ALL ONE elayifakayo ilemfundiso enkulu”*, meaning, “the ALL ONE garden is indeed a true learning centre”.

Admiring the success of the All One irrigation scheme and the ability of the irrigators to work as individuals a near-by farmer to ALL ONE irrigation scheme, Mr. Thulani Ncube (39) was so inspired that with the assistance of the three All One farmers he set up his own 0.5ha individual irrigation scheme with a sand-abstraction system from the Shashane sand river. The farmers who had worked with Dabane on the installation of their own pumps, installed a submersible pump on their own with no further assistance. The pump yielding 2 800 litres per hour was bought locally for US\$600 from Foster irrigation in Bulawayo and installed in the riverbed in a 160mm PVC pipe which he slotted. He also purchased two 340 watt PV panels at US\$150 and a stand for the panels at US\$300 which he installed on the riverbank. In addition he purchased a water storage tank in Botswana at 2,000 Pula and a tank stand at US\$600 as well as a drip irrigation system with a filter, noting that it was water efficient and was not labour intensive. Of particular interest is that he took water samples to NUST for analysis to determine the properties and to assess the risk of clogging drip lines. He has included a water filter with the drip lines and plans to use acid in the event of the drip lines clogging. With all costs he estimates the scheme cost him USD 6,000.

## Picture Gallery



*Figure 3. (From right to left) Mr. Thembelani Tshuma, Mr. Lameck Moyo and Mr. Lisani Mathanda during the water management training at ALL ONE irrigation scheme, August 2020. Photo; Sambulisiwe Maseko*



*Figure 4. Mr. Lameck Moyo's tomatoes at ALL ONE irrigation, July 2020. Photo; Celine Muzarabani*

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*Figure 5. Mr. Lisani Mathanda recording groundwater levels from a piezometer at ALL ONE irrigation scheme, July 2020. Photo; Celine Muzarabani*



*Figure 6. COVID 19 Hand washing facilities at ALL ONE irrigation scheme, August 2020. Photo; Sambulisiwe Maseko*



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Figure 7. Farmers Violet Mpofu, Lungani Ncube and Lovemore Ncube during the Water Management training at Malaba irrigation scheme, August 2020. Photo; Sambulisiwe Maseko

Bed	Vegetables	Area watered (m <sup>2</sup> )	Total watered Area	Time taken	How many mins taken per bed	Number of 20L buckets applied to bed	Comments
1	Tomatoes Beetroot Carrots Tree	3 beds	35 beds	9:00am 4:00pm	20 mins	30 buckets	Angihlangaranga lohlupho
2	Tomatoes Beetroot Carrots groundnuts Maize Vegetables Tree + belele	3 beds 1 bed 11 beds 10 beds 5 beds 1 tree	31 beds	10:00am 3 to 4:45 pm	15 mins each bed	10 buckets each bed	Akula hlupho
3	Maize Vegetables groundnuts Beetroot Carrots Tomatoes	10 beds 8 beds 9 beds 1 bed 1 bed 7 beds	31 beds	Ngizike 2:00pm Ngaphum 4:30pm	15 mins each bed	16 buckets each bed	Ngithole ama carrots entshentshiseke Amanzi angabanga lohlupho
4	Maize Beetroot ground nuts vegetables carrots Tomatoes Tree and delele	- - - - - - -	-	8 am Ngaphum ngo 4pm	-	-	Ngithole ngo li empty, ngaphi yenza Priming uqhakama wethala ukuduma, Sa amanzi angangeni ku lujjo.
5	Maize beans groundnuts Carrots Tomatoes vegetables	10 beds 1 bed 9 beds 1 bed 3 beds	25 beds	8:45am Ngaphum ngotpm	15 to 20 mins	12 buckets each bed	Ngibe lo problem uqhakama amaphuphi kuthi

Figure 8. Farmer Violet Mpofu's Log Book (Malaba irrigation), August 2020. Photo; Sambulisiwe Maseko



*Figure 9. Farmer Violet Mpfu's tomatoes at Malaba irrigation scheme, August 2020. Photo; Sambulisiwe Maseko*



*Figure 10. Farmer Lovemore Ncube working on his plot with his wife (Visitor Moyo) at Malaba irrigation scheme, August 2020. Photo; Sambulisiwe Maseko*

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### Tentative activity plan September 2020-February 2021

Activity 1	Demand-driven innovation fund	Description	Target	Unit	Number	Unit Cost (\$)	Total Cost (\$)	Sept	Oct	Nov	Dec	Jan	Feb
1.1.	Installation of two Sunflower pumps	Mileage (Bulawayo to Matobo and back)	2	400	2	0.6	\$ 480.00			x			
		Accommodation and meals		15	5	15	\$ 1,125.00						
		Installation costs					\$ 2,000.00						
		Provisions community		15	5	1	\$ 75.00						
1.2	Community training market systems development/agroprocessing, record keeping and costing	Mileage (Bulawayo to Matobo and back)	2	400	1	0.6	\$ 240.00						
		Accommodation and meals (3 staff)		5	3	15	\$ 225.00		x				
		Stationery (bond paper, notepads, pens, flipchart)		1	4	20	\$ 80.00						
		Provisions (community)		5	20	1	\$ 100.00						
		Stakeholder Allowances		5	2	10	\$ 100.00						
1.3	Community training (crop production, soil management, post harvest handling, pest control)	Mileage (Bulawayo to Matobo and back)	2	400	2	0.6	\$ 480.00						
		Accommodation and meals		5	3	15	\$ 225.00						
		Stationery (flip chart, markers, stick stuff)		1	3	20	\$ 60.00		x				
		Stakeholder Allowances		5	2	10	\$ 100.00						
		Provisions (community)		5	20	1	\$ 100.00						
1.4	Market Linkages - agro dealers and input suppliers, retailers(seasonal)	Mileage (Bulawayo to Matobo and back)	2	400	2	0.6	\$ 480.00						
		Accommodation and meals		2	2	5	\$ 20.00		x				
		Stakeholder Allowances		2	2	10	\$ 40.00						
1.5	Training in Climate Smart Horticulture (DRR)	Mileage (Bulawayo to Matobo and back)	2	400	2	0.6	\$ 480.00						
		Perdiems		8	3	15	\$ 360.00						
		Stationery (use of materials from previous trainings)		2	4	20	\$ 160.00		x				
		Provisions (community)		8	20	1	\$ 160.00						

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1.6	Pump and abstraction system experimentation	Mileage (Bulawayo to Matobo and back)	3	400	3	0.6	\$ 720.00	x	x	x	x		
		Accommodation and meals		6	5	15	\$ 450.00						
<b>Job 2</b>		<b>Monitoring</b>											
2.1	Monitoring water use and abstraction, water levels and data collection of use of technologies	Mileage (Bulawayo to Matobo and back)	4	400	4	0.6	\$ 960.00	x	x	x	x	x	
		Accommodation and meals		20	4	5	\$ 400.00	x	x	x	x	x	
2.2	Monitor crop yields, crop sales, use of incomes	Mileage (Bulawayo to Matobo and back)	2	400	2	0.6	\$ 480.00	x	x	x	x	x	
		Accommodation and meals		4	2	15	\$ 120.00			x		x	
2.3	Stakeholder Joint Monitoring Visits	Mileage (Bulawayo to Matobo and back)	4	400	4	0.6	\$ 960.00						
		Accommodation and meals		8	4	15	\$ 480.00			x			
		Stakeholder Allowances		8	2	35	\$ 560.00						
				8	4	10	\$ 320.00						
2.4	Project Compliance Monitoring	Mileage (Bulawayo to Matobo and back)	2	400	2	0.6	\$ 480.00			x		x	
		Accommodation and meals		2	4	5	\$ 40.00						
<b>Activity 3&amp;6</b>	<b>Student Research and Supervision</b>												
3.1	Supports student conduct field work activities (IHE/TU Delft)		2				\$ -						
3.2	Student Proposal Presentation Meetings and sharing of field work findings	Stakeholder Allowances	4	4	10	20	\$ 800.00						
		Meals (teas and lunch)		4	20	5	\$ 400.00						
<b>Activity 4</b>	<b>Lab Hosting and Coordination</b>												
4.1	Stakeholder meetings (MRDC) social services and projects Committee meetings	Mileage (Bulawayo to Matobo and back)	11	300	11	0.6	\$ 1,980.00	x	x	x	x	x	
		Accommodation and meals		11	2	5	\$ 110.00						
4.2	Partner meetings for project coordination	Meals (teas and lunch)	2	2	20	5	\$ 200.00			x			
		Stakeholder Allowances		2	10	20	\$ 400.00						
4.3	IHE Monitoring Visit	Mileage (Bulawayo to Matobo and back)	1	500	1	0.6	\$ 300.00						x
		Accommodation and meals		2	5	15	\$ 150.00						
4.4	Submission of Monthly reports and monitoring data	Internet connectivity (office work)	11				\$ -	x	x	x	x	x	x

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Activity 7 & 5	Annual International Stakeholder seminars & Stakeholder workshops												
7.1	Host the 5th A4 Labs Annual Project Meeting - Zimbabwe	Hosting	1	1	1	11100	\$ 11,100.00						x
7.2	Participate in Annual Symposium 2020 Waternet Symposium	accomodation in Vic Falls and meals	1	3	5	200	\$ 3,000.00						x
Activity 8	Cross-lab learning & global dissemination												
8.1	Host 1 Exchange visit (11 Farmers)	Mileage (Bulawayo to Matobo and back)	1	800	1	0.6	\$ 480.00			x			
		Accomodation and meals		2	4	15	\$ 120.00						
		Provisions (farmers)		11	2	15	\$ 330.00						
8.2	Collect stories of Change (2 sets)	Mileage (Bulawayo to Matobo and back)	2	400	2	0.6	\$ 480.00		x			x	
		Accomodation and meals (4 staff)		2	4	15	\$ 120.00						
		Stationary		1	4	20	\$ 80.00						
Activity 9	Overall Programme Coordination												
9.1	Visit by IHE to Zimbabwe		1				\$ -						
9.2	Project Evaluation		1				\$ -						
9.3	Annual Audit		1				\$ -						
Activity 11													
1	Partner planning meeting with Government departments to inform of project extension and agree on manual content parameters	Meals (teas and lunch)	1	4	20	5	\$ 400.00			x	x		
		Stakeholder Allowances		1	10	20	\$ 200.00						
3	Identification and selection of suppliers to produce manual paper based technical drawings	Mileage to and from suppliers	1	20	5	0.6	\$ 60.00				x		
		Telephone		1	1	40	\$ 40.00						
4	Development of manual paper based drawings and sharing for design and layout approvals	Office supplies		1	1	50	\$ 50.00						
		Mileage to and from suppliers		20	5	0.6	\$ 60.00					x	
		Telephone		1	1	50	\$ 50.00						

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		Editing costs		1	1	50	\$ 50.00						
		Stationary		1	4	20	\$ 80.00						
6	Adjudication of WhatsApp challenge videos	Internet connectivity (data bundle)	1	88	1	0.5	\$ 44.00		x				
7	Video Editing of selected winning videos for sharing at community and partner level	Internet connectivity	5	3	1	50	\$ 150.00						
		Purchase of camera		1	1	1330	\$ 1,330.00			x			
		Purchase of blank DVDs		20	1	1	\$ 20.00						
8	Professional video shooting of winning videos	Mileage (Bulawayo to Matobo and back)	5	400	1	0.6	\$ 240.00				x		
		Accommodation and meals		5	4	15	\$ 300.00						
		Professional editing costs		5	1	500	\$ 2,500.00						
9	Printing and distribution of paper Manual to Farmers	Mileage to and from suppliers	50	400	1	0.6	\$ 240.00					x	
		Stationary		50	1	2	\$ 100.00						
11	Community based Award Ceremony for the WhatsApp Challenges during the Annual 2020 Seminar		1				\$ -						x
12	Monitoring of farmers' use of videos and manuals	Mileage	2	400	2	0.6	\$ 480.00						
		Accommodation and meals		2	3	15	\$ 90.00						x
13	Joint site monitoring visit – to measure impact of lesson learning from videos - combine with activity 2 Joint Monitoring	Mileage (Bulawayo to Matobo and back)	2	400	2	0.6	\$ 480.00						
		Accommodation and meals		8	2	15	\$ 240.00						
		Stakeholder Allowances		8	2	35	\$ 560.00			x		x	
				8	4	10	\$ 320.00						
	<b>Total</b>						\$ 41,194.00						

**5. Assistance and/or support from the DUPC2 programme**

- This essentially research programme is the first opportunity that Dabane has had to work with individual farmers and not the group, community schemes that funders have required for so long. The results have been quite remarkable, very interesting with a significantly better proposition for successful sustainability.
- Low cost individual photovoltaic pumps such as the Sunflower SF2 pump is proving to be useable in sand river sand-abstraction irrigation schemes. R&D to further develop small-scale, low cost water abstraction from alluvial aquifers is required with BCA (cost benefit analysis). Noting the individual scheme developed at Tshelanyemba with the assistance of All One irrigators we need to continue to develop and to make systems better and cheaper.
- Further research, development and accurate costing is required to demonstrate cost effective crop production
- It is clear that there is potential for both staple and protein food production for a family. A plan to utilise this at three irrigation schemes Dabane has assisted resulted in the irrigators not letting the crop mature to dry maize but selling the experimental crop as green mealies. As staple food production becomes more problematic due to climate change and a lack of coordinated national food security planning and as irrigation becomes more widespread and competition for sales more intense, the opportunity for food security from irrigation increases. There is need to continue to work with both irrigators and research students to develop cost effective family-based staple food and nutrition production systems.