

# MINUTES OF THE PLENARY MEETING HELD IN LIVINGSTONE, ZAMBIA

FEBRUARY 08-12, 2016

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Date: 05-03-2016

Report number 31

Series: Scientific Reports

This report was written in the framework of the WAHARA project – [www.wahara.eu](http://www.wahara.eu)



# Minutes WAHARA meeting (8-12 Feb 2016)

Rudi Hessel, Luuk Fleskens and Abraham Abhishek

*Venue – Chrismar hotel, Livingstone, Zambia.*



Draft: 18 February 2016

Final: 5 March 2016

## List of attendants

### *WAHARA members*

Alterra: Rudi Hessel

UNIVLEEDS: Mike Kirkby, Brian Irvine

MetaMeta: Frank van Steenberg, Abraham Abhishek

IRA: Mohamed Ouessar, Mongi Sghaier

INERA: Hamado Sawadogo, Vincent Dao

MU: Kifle Woldearegay, Eyasu Yazew, Dereje Assefa

WU: Luuk Fleskens

GART: Silenga Wamunyima, Simunji Simunji, John Machona, Mwendalubi Ilutombi and Phillip Mbaale

ACA: Piet Stevens

Advisory Board: Obed Lungu

### *Stakeholders*

Tunisia: Abbes Zammouri (farmer, NGO), Nouredine Lachiheb (government branch)

Burkina Faso: Amidou Ouadraogo (farmer), Boukare Ouadraogo (farmer)

Ethiopia: Arefe Kiros Araya (TBOARD – government branch)

Zambia: Absalom Sakala (Environment and Natural Resources Management Department), Martin Simasiku (Cotton Development Trust), Karen Mukuka Chenda (Ministry of Agriculture-MoA HQ; Head Agriculture Advisory Services), Romadinga Kasauka (Regional Manager; ZNFU), Cecilia Hakayobe (MoA, Extension Officer Monze district), Gift Sikota (MoA, Extension Officer Mazabuka district). Farmers: Ackson Mainga, Agness Mukonze, Nawa Sifuba, Sichikolo L. Mwaanga and Mr. Joe Akakombaetwa (Farmer/Entrepreneur; Farm Implements).

## Action list

<i>No</i>	<i>What</i>	<i>Who</i>	<i>When</i>	<i>Remarks</i>
1	Think about what to disseminate	WPL	29 Feb	
2	Summarise key results WP, 1 A4	WPL	15 March	2 A4 also OK
3	Send info on papers to Rudi	Mohamed	15 Feb	Received
4	Check what happens if C-form not submitted on time	Rudi	29 Feb	Make sure to avoid this situation!
5	Submit final report	Rudi	22 April	
6	Include info on milestones in periodic report	WPL	30 March	
7	Submit draft deliverables to Rudi	WPL	8 April	
8	Provide complete info on publications and dissemination to Rudi	All	8 April	
9	Mention concrete products (e.g. Magoye Ripper) in report	All	8 april	
10	Proposal for data compilation to remain after end project	Rudi	15 March	
11	Complete WP5 tables	SS	ASAP	

12	Send relevant pictures for WP5 to Piet	SS	ASAP	
13	Identify subject policy brief Tunisia	WP6 with Tunisia	ASAP	
14	Check if list of international organisations in DOW is still appropriate	Rudi, WP6	29 Feb	

### Monday 8 February 2016

Participants travelled to Mazabuka from either Lusaka or Livingstone. Transport was arranged by GART.

### Tuesday 9 February

#### *Morning: Excursion to Magoye study site*

The first stop was at a farm near Magoye. Different kinds of equipment that can be used to prepare the land for planting were demonstrated and explained. These included plough, Magoye ripper and GART planter. The use of the equipment was also demonstrated by actually trying out the equipment. A method to spray herbicides without harming the crops was also demonstrated. Rudi and Silenga were interviewed for a radio broadcast by Mazabuka Community Radio Station.

The second stop was at a dam that was built to store water for use in the dry season. Due to the poor rainfall season this year (very little rain in January) the reservoir was not yet full.

The third stop was at a milk cooperative. Dairy farmers can bring their milk to this cooperative, who then tests the milk for freshness and density. Milk is then sold to Parmalat Zambia. Through the assistance of GART, the cooperative has managed to improve the quality of its work, resulting in an A-status. About 5000 liters of milk is provided each day. The cooperative also provides services and advice to farmers; this is not restricted to the members of the cooperative. The director of the station explained the work that is done, as well as the role of dairy in agriculture in Zambia. Dairy farming is on the increase because it provides more resilience against drought. In drought conditions, crop production may fail completely, but animals will still be able to find food, and will therefore be able to provide milk even in droughts. The photos below give some impressions of the excursion.



At a farm in Magoye (picture R.Hessel)



Demonstration of different kinds of implements, including Magoye ripper (picture R.Hessel)



Reservoir to store water for use during dry season (picture R.Hessel)



Explanation at dairy corporation (picture R.Hessel)

*Afternoon: Travel to Livingstone*

On the way a stop was made at the GART offices in Batoka. The LDC Manager explained the work that is done here, which includes work on improvement of crops, providing seeds to farmers, breeding of cattle, goats and chicken.

**Wednesday 10 February 2016 – Stakeholder event**

**Opening (Rudi)**

Rudi opened the meeting and welcomed participants. He briefly explained the programme of the day and explained which information could be found on the USB stick that all participants received.

**Welcome (Mr. Simunji)**

Welcomes people on behalf of GART, especially the stakeholders from all the WAHARA sites. He explained the work of GART. He also sketched the problems agriculture in Zambia faces, including changes in rainfall.

## **Introduction WAHARA (Rudi)**

Rudi gave an introduction of WAHARA project<sup>1</sup>

## **Burkina (Hamado)**

Film for Burkina was shown<sup>2</sup>.

Hamado gave a presentation about work in Burkina. He stressed e.g. the importance of number of rain days. He also introduced the Burkina team that was present at the meeting.

## **Ethiopia**

Film was shown and Eyasu Yazew presented results.

## **Tunisia**

Film was shown and Mohamed gave a presentation & introduced the Tunisia team.

## **Zambia**

Film was shown and Silenga gave a presentation. He stressed the importance of rainfall distribution. 2013/2014 had total good rainfall amounts, but rainfall was poorly distributed. It was especially dry in Feb, March. In 2014/2015 there were also problems with rainfall distribution, dry Feb/March. There was rain in April, but at that time rain is more harmful than beneficial due to the stage of the growing season. These weather conditions resulted in loss of yield; loss was up to 80% of normal yield in 2014/2015.

## **SS questions**

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Piet (to Tunisia): How does one manage to fill the cisterns (that are part of the Jessour system) in dry areas?

Mohamed: There are many different kinds of cisterns. The plastic cisterns shown in the presentation are filled with water brought to it by tractors.

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Frank (to Zambia): What effects on the soil can different tillage methods be expected to have?

Silenga: Some observed effects include:

- Reduction in pH level
  - Increase in organic matter
  - Increase in soil respiration, which means more food for microbes
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Kifle (to Burkina): Why is it that the Zai technique is better suited for maize while the magoye ripper is preferred for maize?

Hamado: This is because maize needs more moisture. The Magoye Ripper can go deeper into the soil, where the plants can get the moisture they need. Sorghum, on the other hand, is well suited for dry conditions.

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<sup>1</sup> All presentations can be found on the WAHARA website

<sup>2</sup> All 4 films can be found on the WAHARA website and on thewaterchannel.tv

An overarching concern of the farmers is that they are able to do much more with the Magoye ripper over a given period of time. So they try to adopt it as much as possible.

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Zambian stakeholder (to Zambia): What about Water Harvesting Technologies other than Conservation Agriculture? If other WHTs can be implemented between rainy seasons, more people will be able to benefit for a greater part of the year.

Simunji: The implements seen during the field day yesterday were newly developed products. There is a need to try them and document the results. The choice of the techniques was made through a consultation with farmers and other stakeholders. Ex-Situ Water Harvesting techniques were beyond the scope of the project.

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Obed (to Tunisia): How large are the 'big' Zai pits implemented in Tunisia? What are the sources of the fertilizer needed to fill those big Zai pits? Is it Livestock? Or sewage?

Mohamed: The 'big' Zai pits are typically 1 cubic metre in volume. The main source of organic matter for them is livestock.

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Obed (to Ethiopia): The video showed people digging ditches. Are those meant for sub-surface storage?

Kifle: They are deep trenches being constructed on steep slopes. Their maintenance demands significant amount of labour. So they are used as an erosion control measure.

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### **Monitoring (Kifle)**

Kifle presents on adaptation and monitoring, as done in all 4 sites of WAHARA.

### **Modelling (Luuk)**

Luuk explains the modelling approach, Quick Scan as well as DESMICE/PESERA. Farmers have a basic choice between choosing for yield increase or risk reduction. The choice experiment that was done gives information on which of these farmers find more important in the 4 different sites. This info can be integrated in modelling.

### **Integration (Piet)**

Planting stick, hand hoe, plough are the most used implements in the world. Piet focusses on ripper. Ripper is part of a system, so should not be looked at in isolation. He mentions intercropping as a method to have less weeds, while weeding is often a bottleneck in the farming system. He explains that the Magoye ripper was too steep for Burkina due to different frames used there; this has now been adapted. Was also made lighter. Farmers are now also interested in planting tool.

Comment farmer Zambia: Piet is doing good work



Frank: There is often a lot of water during a short time of the year. Later there can be capillary rise, which brings water to root zone. Is this included in the model?

Eyasu: Are local data used for modelling? Also for costs and benefits? To what degree? 1) as much data as possible 2) depending on local data?

Luuk: benefit side can be difficult to quantify. Problem is that we only have 1 experiment so we only have info for this particular site. Need assumptions to extrapolate; these are mostly good assumptions, but they cannot be tested. We use local data to characterise model: experiment, surveys, secondary data (statistics, price level). Regarding comment Frank: does not know an answer.

Frank: Water availability seems to improve 2-3 months after rainfall? Mike: roots find water; that might help explain this.

Piet: Noticed that there is still ploughing going on now, hopefully to grown cowpea or so, not maize as it is not too late to plant maize. Cowpea has much shorter growing season, so is better option now.

Assefa: Modelling useful to use at WH at larger scale. Sees advantage in that. But at landscape scale should look at the whole system, including social factors, tradition, migration etc. So, appropriateness at local scale does not guarantee scalability. This is beyond biophysics.

Luuk: Agrees, was perhaps not clear about the objective of modelling. It looks at potential, it is hard to be specific about e.g. socio-economic conditions. Model result is input to decision making process, so it is part of it, but it is not whole story. Stakeholders also use their own criteria to take decisions.

Eyasu: monitoring Zambia about soil improvements, related to ploughing. Are other practices for e.g. improving soil fertility also considered? Rudi: The experiment focussed on different implements. Lungu: in conservation agriculture there is also rotation, which does aim at soil improvement, so it is included. Rudi: agrees, so it part of the system, but experiments focussed on implements.

Kifle: There seem to be more options for Zambia, e.g. dams. Opportunity e.g. deep trenches. Lungu: Agrees that other options used in Tigray may have potential in Zambia too.

Lungu: In relation to capillary water. Had winter ploughing after rain. This loosens top soil, and breaks capillary rise. It is now better to use other crop, e.g. green legumes, plough again in June. Now there is moisture for short season crops, e.g. beans. Beans have 90 days cropping season, so better choice now.

Pictures below give some impressions of the stakeholder day.



Participants stakeholder meeting (picture R.Hessel)



Presentation about WAHARA work in Ethiopia (picture R.Hessel)



Group discussion during afternoon (picture R.Hessel)



Group discussion during afternoon (picture R.Hessel)

## Afternoon

### Panel session

Panel: Obed Lungu (Zambia), Mike Kirkby (UK), Arefe Kiros Araya (Ethiopia), Noureddine Lachiheb (Tunisia)

Chair Panel: Frank van Steenbergen

Frank gives intro to afternoon. Morning was good, with focus on what WAHARA did. Now would like to focus on future. How take WAHARA results forward, how to upscale. Look at how WAHARA is relevant also for bigger world. 5 questions to discuss where identified:

- 1) Which parameters affect the performance of different types of WH?
- 2) How scalable are WH technologies?
- 3) How has WAHARA been relevant for you?
- 4) How to upscale WH in Africa?
- 5) How to disseminate WAHARA results?

Frank asks the Panel to answer the first 3 questions. There are posters on the wall for questions 4 and 5 (dissemination, scale up). Lessons & good findings from WAHARA can be written on these. Everyone can provide answers to these questions. There are separate posters for French speaking people. After group discussion at the posters results will be summarised by panel.

*Question: How relevant was Wahara to you?*

Lungu: For Zambia quite relevant given where we come from. Perennial droughts, shifting in seasons created problems with food shortage. Another aspect: used to be dependent on draft power, but diseases wiped out animals. Therefore it came naturally to respond to this, by using methods that involved less ploughing. Hand hoe needs to be replaced for agriculture as a business. Needed quick alternative. Mechanisation in the form of minimum tillage. Climate change is a problem too. Rains now come later; before started end October, later mid November. Before rain was predictable, but not anymore. This year lost crop if did that. WAHARA is a valuable addition to what we were already doing. It gave new perspectives from other places. Share knowledge, harvest lessons. Adapt to our situation.

Arefe: Tigray more than 64% of land has more than 30% slope, so steep. Population increase 2.5% per year. Deficit of moisture. Households have very little land (0.5ha). In these conditions, they need WHT & upscale these. Need to know farmers and community. WHT must have benefit to society. Otherwise community will not accept. Bench terraces give such benefits. Technologies have to be simple for community to implement. Awareness & capacity of communities; this needs many discussions. Need to be participatory. Different stakeholders need to be integrated. Different stakeholders should be involved in implementing technologies. E.g. bench terraces needs water, labour (community, 20 days per year). Policy support needed to scale up. Extension services important too.

Mike: comparing study sites, modelling approach. Collecting/use ratio. WAHARA gave info on limits of transferability.

Noureddine: Excuses for speaking French. Thanks organisation for being here. 1<sup>st</sup> point (parameters that effect WH). 3 kinds: 1) technical, 2) social- economic, 3) climatic-environmental. Site in Tunisia has little rain, but sometimes rain is torrential; then there can be floods. There are techniques to harvest runoff, mostly traditional. Without WH agriculture is not possible in this place. Social: people know techniques, but WHT is not sufficient to live there, need additional source income for livelihood & to stay there. Question 2: scale. Small watersheds by choosing 3 sites which are different. Help farmers to implement Jessour, tabia. Need to look at watershed scale, that scale is used by technical departments also. Look at system, not individual measures. Upscaling to regional scale is possible as the same technology is used more widely. This means that improvements made to the system in the WAHARA site can be up-scaled easily. Question 3: WAHARA provided important multidisciplinary approach, also within the Tunisia WAHARA group. There was also synergy with similar projects, e.g DESIRE, Afromaison. Also with other projects for interventions (big developments).

Frank: Would like to discuss when WHT structures are beneficial. Yesterday most farmers who came to the demonstration were old. What are your thoughts on what makes WHT appropriate? How easy is it to scale up, keeping in mind changes in rural population? Is there a future for WHT in Africa?

Lungu: Distribution of rainfall Zambia is a problem. Technologies used for in situ water harvesting. Currently there is an insufficient number of dams, not enough water is captured. Can improve on this. Of the total area that could be irrigated only 18% is now used. Zambia has lot of water (42% of all resources in southern Africa). There is scaling up potential, but the problem with ripping is in manufacture of equipment, link to industry is weak. Big companies do not do make rippers. It is also difficult to get hard steel; this goes to industry. There is tax on steel. Farmers need to make money. If market is there, people will upscale. Maize is staple, is political crop, prize is controlled by government. Need permit to export it. Need cash crop that can pay for investment. Selling maize cobs green gives much more money than mature. Changing age distribution mentioned by Frank is there. Young leave the farm, but on the positive side there are also retired people that start a farm, these can be targeted.

Arefe: WAHARA is relevant, e.g. on how to form a stakeholder platform. Integrate research and development. Before this was separated, in WAHARA it was integrated. This results in lot of activities. Also get knowledge from WAHARA. Link with market needed for what is produced. There is also need for technical support, government to introduce small scale machines for main bench terraces. WAHARA should support that. Other technologies are also accepted, but needs supervision and support because they are more technical. Also start from top catchment.

Mike: Need to look at variability rainfall. Slopes --> collecting area. If not steep larger collecting areas are not used because the land is used for agriculture. Economic status of farmers is important too. Farmers with no money should go for best results in a bad year, not for highest income. Also variability within the season is important. Wet April does not make up for a dry February. Scale-up downstream/upstream effects considered. Need to consider where to use the water best (unless looking at scale Amazon). Agriculture should be done where there is the best sun and the best soil, water should be brought there. In semi-arid areas there are less problems with weeds. Water is going to be a scarce resource. If technologies are to be adopted within Wahara countries there needs to be a similar distribution rainfall. We should also not think we know better than farmers. Evap/rainfall ratio is a starting point.

Frank: Tunisia driest, also most developed. Future for rainfall based agriculture in Tunisia?

Noureddine: need to evaluate what was done in ancient past. New strategy to be developed based on that. We should not forget to evaluate. We need techniques for that. Now mostly questionnaires are used, but more exact methods are needed. Runoff collecting is important. Exchange countries: it is interesting to learn from them.

Frank invites discussion, thoughts on the same issues.

Kifle: when got Wahara we thought there would be money for implementation. Stakeholders selected technologies, but we did not have enough funds for implementing. Needed investment. Had meetings with NGOs, TBOARD etc, who decided to implement. Hence, we had research based development. Gave lessons also on these issues. Were used to plot level, now landscape level. Researchers benefited also, gave new thinking on how research should be done.

Mongi: For relevance look at different levels. National: 1) research for development 2) partnerships among stakeholders. In Wahara all stakeholders take part in results. 3) multidisciplinary is important. Issue is complex. Regional: Agrees with new perspective expressed by Ethiopia. Mutual learning. Share info on challenges, and some on solutions. Impact Wahara is 1) improvement of social benefits at local scale 2) upscaling across countries, and within, 3) possible uptake by policies. Question: How strong are findings Wahara to give hope for uptake in policies? We need to convince policy makers also. International level collaboration is also important; it results in capacity building of everyone.

Frank: So, importance of co-creating, multidisciplinary, policy making and cross-cutting issues. Can farmers from Zambia provide feedback?

Farmers: partnership with GART is important. Food security improvement. Implements will probably continue to be used. Strip tillage planter will remain. People will remain to benefit from that.

#### *Poster session*

Participants walked around and could write comments/suggestions on the posters. Afterwards, panel members provided feedback.

#### *Dissemination*

Mike: dissemination 3 categories: to whom, what, how. To whom: both downwards and upwards, to farmers and end-users. What: yield & uncertainty, but difficult to communicate. Might need more thought. Advise on how to adapt to new forms of water harvesting, documentation of new techniques with supporting data. How: many answers. Use all sorts of communication methods, films, field days, manuals. Make sure there is local ownership of knowledge. (action 1: WP leaders to think about what to disseminate)

Noureddine: 2 points seem simple but are difficult to do well: dissemination + workshops. Also mentioned posters, technical sheets, policy briefs, theatre

Frank: audience experience what is most effective?

Mongi: farmer to farmer. School.

Eyasu: reach out to many with design manual in local language.

Luuk: The 'what' is important. Documenting how exchange between sites was done.

Hamado: exchange farmers to improve adoption.

Kifle: to make it work should go beyond pilot. Training farmers.

Farmer Zambia: always need a result. Should be approved by someone outside. Look at the issues, e.g. food security.

Hamado: EC checked INERA. First question: what is result? How many persons benefit? EC say we need to do training farmers. Need to increase number of beneficiaries.

Mongi: Is director of extension since 15 years. Most of the time not sufficient to get real results. Training is not enough. Need to go farmer to farmer, be patient. Cannot see impact now, but in 10 years. E.g. 1990 project. Few applied then, but later (3-4 years) other farmers had adopted because they saw it worked. Is now spreading naturally, without outside effort.

Frank summary: real success is with farmers, several ways to do that. If farmers convinced it will go on its own. Assisted by several methods. Do not start from scratch, but use what we already have.

### *Upscaling*

Noureddine: demonstration, training. Open days. Need to look at real scale, not demonstration scale.

Lungu: 5 points: 1) have entry point in up-scaling. Wahara sown some seed, can grow. Champion farmers are entry point. Can be used to multiply effect. Facilitate them, so they can teach others. a) source of contract service to others, b) policy incentives. Benefits take a long time to take effect. 2) need government support. Should be sought actively. To do that need hard evidence of things that are working. Get questions from them, we answer these. 3) Need market, gives incentive to expand. Link farmers to private sector. 4) strengthen government private sector partnership. There is sometimes mistrust. GART is an example of such a partnership 5) better weather forecast so that farmers can plan.

Farmer Zambia: Time management is important too. Field is 2 km from home.

Arefe: need to have commitment from government & scientists. Create platform, awareness.

Rudi thanks GART for hosting the meeting & the participants for taking part and for contributing. He then closes the stakeholder meeting.

## **Thursday**

### **Morning**

Visit to Victoria Falls on Zambezi river. Guide explains the hydrology of the Zambezi river basin and its importance for Zambia. At the falls, part of the water is used to generate power.

### **Afternoon – WAHARA plenary meeting**

Rudi opened the WAHARA plenary meeting.

Group discussions of WP4-6 with all 4 study sites were held. Feedback on these discussion was given by WP leaders on Friday.

## Friday

### Management Session (Rudi)

#### *Publications*

Scientific key results

Publishable summary

Key results should be published

WPL one page summarising key results --> one month (**action 2**)

Comment RH/MK: Feedback co-authors is required to understand if data used correctly

Earlier planned publications (see presentation):

1 cancel

2 yes

3 under review

4 no

5 yes MK + LF

6 yes, 60% draft

7 Dereje – will write, still need to start

8 Fredu left MU – not sure yet about paper

9 Yes, 80% draft

10 Yes, 80% draft

11 Berhane: yes probably (and has more papers)

12 Yes

13 Yes, draft available

14 Who to lead

Mohamed has more papers. **Action 3**: send to Rudi

#### *Dissemination*

Abraham: Farming Matters article Kifle + Frank

#### *Finances*

No assurance that overspending by individual partners will be accepted, but Rudi spoke to multiple people with experience in these matters and they said that as long as the total project budget is not overspend it should not be a problem.

Abraham: possible to still spend more time Simone on translations EN-FR.

Simunji: details on budget finalization not visible: RH can discuss on individual basis, is not in presentation.

Rudi: All partners have been paid more than they spent. These costs need to be claimed (if not partners will have to pay back). Beware the EU just pays 75% so actual spending needs to be higher

Brian: Claim to be made after project ended, only costs eligible until 29 February

## Reporting

Rudi to check what happens if C-form not provided on time. But in any case prevent this! (action 4)

Final report due 29 April. 22 April because Rudi on holiday (no objections, action 5)

We have to provide the results promised, but costs can only be spent until March 1st.

Possible strategy to record hours now and work on it later. Otherwise need to complete report without time being funded.

9 deliverables still to be completed. Official due date 29 Feb but unofficial all needs to be ready by 22 April

Pending reports:

4.3 ok, will be completed

5.1 (didn't capture it)

5.2 50% ready

5.3 ready

5.4 Piet needs input study sites who do the evaluation. Process followed needs to be made clear

6.1-6.4 but will all be completed on time

Mention completion of milestones in reports (action 6)

Deadline for draft deliverables April 8<sup>th</sup> (agreed, action 7)

Final report: There seems quite some overlap between different sections – hopefully some double use

FS: What is foreground: RH: results obtained by the project

Final report will also include a table of publications (Actually 2 tables, hopefully automatically synched), list of dissemination activities.

FS: also important to report on uptake of results. Should we prepare a list of ongoing upscaling efforts. RH: yes, will include in report, but cannot be reported in lists

Check and complete all lists (e.g. of dissemination activities) as we have not been exhaustive in keeping an overview, but data needs to be provided in the lists explained (action 8)

PS: Actual implements (magoye ripper) missing in list of dissemination products, include in report too (action 9)

Gender questionnaire; RH thinks we will score badly regarding consortium statistics. But KW states that on stakeholders involved, and MSc thesis completed there has been good gender balance. Partners need to submit data for the questionnaire

In summary, active and timely participation for the reporting needed from partners

Website in the air until 2021.

WAHARA database (what/where/how?).

KW: monitoring will continue by other funding sources, at least the next 2 years.

LF: often required to have data available for scientific publications

FS: good to put all data on the website

Some discussion ensued as to what is possible, relevant, allowed, etc.

RH to come up with a proposal after general consensus some kind of data compilation will be helpful (action 10)



## Feedback WP discussions

### WP4

Does approach fit to case studies? Yes, but also specific situations. Want to answer real questions. Some sites landscape approach, others more field approach.

Scenarios: baseline, technology (where feasible), Time series analysis to get probability yield --> risk aspect covered. Downstream effect: start with using measures where best feasible, what impact does this have downstream. Different: what if adoption rate is 20%. Across all sites assessment of change climate.

Burkina: zai organic matter; this might be limiting. Availability manure

Piet: replace manure with inorganic? Can use manure, but not depend solely on it. Lungu: combination is best. Organic not for nutrients, but for water storage. Luuk: will look at exact formulation scenario.

Tunisia: regional economic effects of different investment options. 2 things could do: productivity agriculture higher in part of the catchment, or maximise recharge. Mohamed Arbi working on this. Also feed in supplemental irrigation.

Ethiopia: getting to work measures together in a watershed. Gule data useful for that. Also bench terraces, where applicable, where most benefit.

Zambia: discussion on data available. Use data from other work than Wahara as well. Look at yield and biomass. Still need costs of conventional system. Flexibility provided by Magoye ripper; look if model detailed enough time dimension for this. Look at return to labour, rather than return to land, as land is amply available.

Overall: Now have more detailed ideas about scenarios. Have Quick Scan, try to make specific for each kind of intervention. Incorporate aspects from Quick Scan, e.g. catchment/cropping.

### WP5

Useful discussions. Face to face helped to explain e.g. the tables that have been sent around. SS still need to update these tables, could now explain what WP5 is looking for. Qualitative data is also important. 2 kinds of adapting, areas and climate. Emphasis on first one. E.g. what if someone from Zambia visits Ethiopia and sees interesting technology. What should be considered. SS agreed to work on this and send ASAP ([action 11](#)). Draft guidelines adaptation. Feedback from stakeholders will be sought not in workshops, but more on individual basis. Suggestion to include some pictures; if have relevant ones, please send ASAP ([action 12](#)). Discussed whether people happy with approach; everyone happy with it.

Abraham: pictures, see video and posters can provide these. Also has pictures shared by study sites

Piet: also question for SS. Pictures should help explain, not just look nice.

## WP6

2 basic questions:

1. How to best use WP6 deliverables to disseminate wahara
2. How to continue promoting WHT so the Wahara work is built upon

Looking for follow up with Wahara members.

Zambia: 1) link with educational institutions, 2) use events planned for 2016, 3) link with mainstream media, 4) share materials/resources complementing WAHARA work. General interest in link WAHARA, food security. policy brief: WH--> Maize --> food security. Because maize is staple.

Burkina: translation videos. Have WAHARA videos & others as well, will provide these as well, and translate where possible. Policy brief: impact WH on maize, sorghum yield. Role WHT in climate change adaptation. Connect with socio-economic council

Tunisia: policy brief at provincial level, otherwise wasted efforts as they are about big topics. Need to identify practical topics. Still need to identify (action 13). Translation videos. Road water harvesting might be interesting

Ethiopia: practical documentation guidelines bench terraces, have material for it. Soil fertility management also important, but less grand and spectacular than bench terraces. Will think about if further.

General: all 4. By working together build connections, have network. Do not let this be dismantled. Figure out ways to be in touch, update on work. Understand context. No specific ideas yet, except email list.

Piet: policy brief became manual for bench terraces. Other things to bring to attention policy makers? Eyasu: activities Gule selected by partners, farmers etc. There is policy foundation as policy makers were involved. Need more technical info. Kifle: example bench terraces. Stakeholders are doing it themselves, TBOARD started immediately. Piet: don't take for granted. Nurture best results. Kifle: need to learn continuously. Has been taken up, look at performance & provide support. Asefe: target policy makers for implementation. Have taken up the idea in Ethiopia.

Rudi: Notices that the topics identified for the policy brief link well to the challenges mentioned in the Wahara proposal: climate change, water security, food security

## Feedback Lungu

Important lessons harvested during meeting, hope we can use these. Thanks colleagues for project & their contribution. Project not gender sensitive.

Lot achieved, there is a lot info. Should be able to see some impacts:

1. Concern regarding attitudes. Need change of mindset; take ownership of projects that we embark on. SSA received more aid than Marshal plan, but little to show for it. Donor dependency. Wahara is now finished. People should not ask does it continue, but should move forward themselves. Do not depend on donor funding. Wahara document WP6 goes into that direction; not beneficiary but client. Client does not get free of charge.
2. Need to make research results available to farmers, convince them to use it. Increase linkage with farmers. Start: participatory project identification, not top-down. Was done in Wahara. Give farmer opportunity for farmers to evaluate. Give options to farmers, do not prescribe. Can pick the appropriate ones. Training of extension people, heard about connection training programmes. Emphasize practical part of it. Higher education should not mean less able to do practical work. Use social media platforms, put info there. Use cell phone etc. Content of the message should be cast in language that people can use. Not just reports; that is talking to ourselves.
3. Uptake and adoption. Relevance, appropriateness, affordability important. Go to farmer, love, them, start with what they know, build on what they have. Help farmers to help themselves. Stand on their own feet. Empower farmers. Mechanisation is needed, no hand hoe. Animal draft already better, move to motorised. Why did Africa miss out on green revolution? Some packages were not relevant. E.g. maize instead of millet, sorghum. Need to convince farmers of benefits; do not do enough about that. We do not really demonstrate it. Need quantitative data, not 'do it because it is good'. Stable yields are important, across seasons & regions, give proof. Markets important too. Needs to be included in package. Intra-Africa trade just 4%, huge potential to do that?

Wahara produced good results, take care of these issues.

Piet: liked bigger picture

Rudi: maize question. You said that millet and sorghum were grown before, but now it is maize. Is this a good development? Lungu: Maize is good crop, but has become a political crop. Abraham: India rice & wheat already. Green revolution on these crops. Increase cultivated area. Before more coarse grains. Has had impact on water use in country.

Piet: ownership. Well developed in Ethiopia? Is that true? Rudi: government important role in Ethiopia also. Kifle: compared with Zambia; here things are more individual. In Ethiopia, the main driver is the government; if it stops situation might go back again to what it was before. Government is very important. Individuals cannot start the system, especially for systems at landscape level. Asefa: The government leads, the rest follows.

Eyasu: end of wahara, how pursue legacy? Selected 4 countries on purpose, how to scale up. Implement proven technology. How reach out to greater Africa? Which mechanisms? How influence government? What do we have on the table. Lungu: selection is good, need to explore other platforms. FARA Africa wide, CAADP (slot during meeting). R: agrees, see DOW also to check if organisations mentioned there are still the appropriate ones ([action 14](#)). Need some effort. Piet: education. Secondary schools something about WHT in school books? Needed for long-term efforts. Lungu: end project. Should be writing now. FARA made

something with many pictures; farmers of the future. Abraham: is scope to do this. Example Ethiopia videos for 10 WHT, simple language. Piet: use radio; community stations.

### **Closure**

Rudi thanks Prof. Lungu for his role as Advisory Board member. Rudi also thanks GART, and Silenga in particular, for hosting the meeting. He briefly looks back on 5 years WAHARA, and expresses thanks for collaboration. He warns that a significant amount of work still needs to be done, but is confident that the project will be a success. He then closes the meeting.