Final Workshop Proceedings

Volta Basin Development Challenge: Management of Rainwater and Small Reservoir for Multiple Uses

Final Science Workshop Proceedings

Ouagadougou, Burkina Faso. 17-19 September 2013

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Lists of Acronyms

AWM	Agricultural Water Management
BF	Burkina Faso
BL	Basin Leader
CIRAD	Centre de coopération Internationale en Recherche Agronomique pour le Développement
CLE	Committee de l'Eau
CPWF	Challenge Program on Water and Food
CSIR	Council for Scientific and Industrial Research
EC	European Commission
ECOWAS	Economic Community of West African States
GH	Ghana
GIS	Geographic Information System
GPS	Geographic Positioning System
HH	Household
IFAD	International Fund for Agricultural Development
ILRI	International Livestock Research Institute
INERA	Institut de l'Environnement et des Recherches Agricoles
IP	Innovation Platform
IRD	Institut de Recherche pour le Developpement
IUCN	International Union for Conservation of Nature
IWMI	International Water Management Institute
IWRM	Integrated Water Resources Management
KNUST	Kwame Nkrumah University of Science and Technology
LBDC	Limpopo Basin development Challenge
MoFA	Ministry of Food and Agriculture
NBDC	Nile Basin Development Challenge
OLM	Outcome Logic Model
Ouaga	Ouagadougou
PGIS	Participatory Geographic Information System
PL	Project Leader
Q&A	Questions and Answers
R4D	Research for Development
SARI	Savanna Agricultural Research Institute
SEI	Stockholm Environment Institute
SR	Small reservoir
SSI	Small Scale Irrigation
SWC	Soil Water Conservation
TAGMI	Targeting AgWater Management Interventions
VBA	Volta Basin Authority
VBDC	Volta Basin Development Challenge
WASCAL	West African Science Service Centre on Climate Change and Adapted Land Use
WLE	Water Land Ecosystems

VBDC science meeting

17-19 September 2013, Joly Hotel, Ouagadougou, Burkina Faso

Workshop Objectives

The objectives of the meeting were three-fold and are specified below:

- Share results from the three-year program across the VBDC research community and partners as well as with wider group of key actors;
- Highlight lessons learnt and implications for future research for development programs;
- Give recommendations to key actors interested in both the application of our results as well as opportunities to build on the research itself.

Participants

There were 82 participants including 65 males, 17 females, and 15 graduate students or young professionals associated with the program. We also had some participants from other African basin programs: NBDC and LBDC as well as RIU project participants. See annex 1 for detailed participants list.

Outputs from the meeting

- Press Release in English and translated into French
- Workshop report – detail notes
- Workshop report – summary
- PowerPoint Presentations Slides

Welcome Address

The workshop participants were welcomed by the following panelists on 17th September, 2013, which was the first day of the meeting. These were: Charles Biney, Alain Vidal and the Hon. Minister for Water, Hydraulics and Sanitation, Mme Mamounata Bélem and the Basin leader, Dr. Olufunke Cofie. Slides of the presentations are displayed in Appendix II**.**

- **Charles Biney (Director of the Volta Basin Authority),**

He thanked the participants despite their busy schedules. He stated that Volta is shared by six countries with rain-fed agriculture being a dominant practice. He stated that though the CPWF research program is coming to an end, the VBA will continue to carry on with the story of the Volta Basin Development Challenge (VBDC) and add value to what the scientists have done over the last three years. VBA will also provide the necessary platform for necessary action and spread of CPWF VBDC findings over the next year; so that the outcomes and findings are accessible.

- **Alain Vidal (Director of the Challenge Program on Water and Food)**

"It is a pleasure to be back to the VBDC", he said. The CPWF was launched in 2002. It has made use of the work of its first phase (2002-2008) to implement an innovative research for development program in six river basins around the globe including the Volta. The Volta faced administrative and financial challenges yet it is very impressive how much has happened in the projects, with great team spirit. Thanks to Dr. Cofie for maintaining the spirit and enthusiasm that enabled the program to achieve success. The new CGIAR research program team on WLE who are on a transect mission to define their regional focus and strategy are welcome to the workshop".

- **The Honourable Minister, Burkina Faso, Water, Hydraulics and Sanitation, Madame Mamounata Bélem/Ouédraogo**

"The way the room is arranged is very different and shows a very good interaction between researchers and users/ stakeholders". Thanking and welcoming everybody in the room, she wished them a nice stay in the capital of Burkina Faso (Ouagadougou). The reduction of poverty is a main goal of the government of Burkina Faso.

Burkina Faso has access and benefits of three basins; Volta, Niger and Comoe Sub-basins, with the Volta being the most important. It is therefore an honour to host the VBA in Ouagadougou. We have more than one thousand (1000) small reservoirs in Burkina Faso and this has brought diversification in agriculture and helped in developing our country. The ministry of water, hydraulics and sanitation has the mandate of addressing and linking all issues pertaining to water. The recognition of the importance of water is why the office was created to support at the national level. Water supply is a major constraint in the Volta but the promotion of several water management policies has improved the instability of water availability. It is important to learn what we can pull out in terms of necessary investment that needs to be made. It is great to see that several stakeholders were involved in the research program, example Ministry of Agriculture, and I will be very attentive to the results of this workshop as I declare the workshop opened. She continued to stay on despite her busy schedule. The lead facilitator introduced the objectives of the meeting, an introductory exercise of the participants and some house rules; followed by an introduction of the general science meeting and progress so far given by Olufunke Cofie, the Volta Basin Leader.

Introduction to the Volta Basin Development Challenge and Research Progress

By Olufunke Cofie, Basin Leader CPWF-Volta

The Volta Basin Development Challenge (VBDC) explores institutional, socio-economic and technical options for improving the management of rainwater and small reservoirs so that they can be used equitably for multiple purposes. This challenge was selected along the criteria of high impact potential and a ranking of importance by the stakeholders consulted. The Volta Basin covers an **area of** approximately **400,000 km^2** with a **population of** approximately 20 million (70 % rural); with a 2.5 % growth rate. Most of the populace depend on **rainfed agriculture with supplementary irrigation with** an **annual rainfall** ranging from 500-1,600mm. There are three large reservoirs for the generation of hydropower and over 2000 small reservoirs for multiple uses. **The population that lives below $2/day is greater than** 70 % in five out of the six riparian countries.

In 2009, there were Stakeholder Consultations which emphasised the need to improve soil water management under rain-fed condition; improve small reservoirs management, develop tools for water quality monitoring and improve the management of groundwater. This resulted in the formulation of Phase II program the Volta Basin Development Challenge implemented from 2010 – 2013 in with five projects.

The key elements of our R4D are: Multi-institutional multi-disciplinary team involving research, academic, policy and implementation organizations; Multiple scales of intervention - farm household, community, watershed, country, basin; Partnership in various forms (19 contracted institutions but wider engagement of stakeholders); Engagement with end users; Flexible space to adapt our methodologies; Participatory action research; A focus on outcome, reflection and learning.

In the five projects researchers collected data and generated information and better understanding about **Processes and practices** and **R4D implementation;** they developed tools and Methods for **Dialogue and Negotiation** and **Decision Support** as to where to investment in agricultural water management**.**

Highlights of the presentations in the next two days fall into five result categories which correspond to the five projects, V1, V2, V3, V4 and V5 of the VBDC:

- **Targeting agricultural water management interventions**
- **Using innovation platforms to strengthen value chains**
- **Options for equitable and sustainable use of small reservoirs**
- **Water governance options in West Africa**
- **Lessons learned on implementing research for development**

In conclusion, significant progress has been made, although not as far as originally planned. Main reason being time and funding constraints. Nevertheless, adaptive management was necessary and allowed us to focus on the most relevant research questions.

For the presentations that follow, discussions in groups on each set of presentations were focused on three guiding questions:
a) What is the message and how strong is its evidence?
b) Who could use these messages to do what?
c) What might be missing in relation and put up discussions on the flip charts with observations?

1. Session 1 : TARGETING AGRICULTURAL WATER MANAGEMENT INTERVENTIONS IN THE VOLTA BASIN

1.1 An Interdisciplinary Decision Support Tool for Targeting Agricultural Water Management Interventions and Out-scaling in the Volta River Basin

By Jennie Baron, SEI, Project Leader

An online decision support tool was collaboratively developed together with national partners from Ghana and Burkina Faso for the Volta component. This tool supports investment and action in smallholder farming in Volta & Limpopo via an interdisciplinary Bayesian approach, open source web-based interface, and accessible to the public. It includes:

- Biophysical and socio-economic conditions that influence out-scaling
- Multiple sources of expertise & knowledge
- Measure of strength of decision

It answers the question of what Agricultural Water Management (AWM) intervention can work, where and why by establishing the likelihood that a given AWM intervention will be successful at a given location. The approach involved stakeholder consultation to decide on what AWM is relevant and what is "success". We generated results of likelihoods of "success" for soil water conservation (SWC), small-scale irrigation (SSI) and small reservoirs (SR). The results showed a weak correlation between likelihood of success versus location of small reservoirs and soil water conservation.

The model is more a proof of concept (a different approach to modelling for a decision support system/tool) than a complete and fully validated model. Which AWM technology is relevant was debated over the whole project span. Anyone can play with the model using own weighting of the criteria and factors. Currently the strength of evidence is still low and would need to be carefully considered and improvement of evidence would be necessary by adding other sources into the model to improve current level of evidence. For example, the reality of where small reservoirs are built does not overlay well with the prediction of where it could be successful (as validated at the household level). One reason for that could be that where small reservoirs are set up was not decided by communities but by decision makers at a higher level.

Lessons:

- Data on social-human layers are critical, but rarely available
- High agreement between factors affecting out-scaling across technologies, countries and basins
- The importance of Best Practice In Implementation ('Due diligence')to achieve successful out-scaling
- There is opportunity for out-scaling of soil water conservation, smallholder irrigation and small reservoirs but prediction strength is low

Recommendations to potential users

- Consider carefully the weighting of factors that contribute to success and the implications on the generated map output
- Opportunities to verify / cross check TAGMI prediction
- Improve data especially on human-social domains
- Identify potential geographic spaces is only half the story: more effort in design of appropriate implementation is required
- Visit the website www.seimapping.org/TAGMI and comment so that your knowledge can be added and help improve the quality of the data.

Discussions & Questions

Questions

Andrew Noble: extremely interesting and such a tool has huge potential and opportunities for application.

1) *What is the linkage between TAGMI and IWMI's AgWater Solutions project funded by the Gates foundation which did some very similar thing*? ➔ AgWater Solutions was mainly done at their desks, work on the continental basis and CPWF has worked with stakeholders and did include the social human component.

2) Predictability is essentially low and that has implications on the usability of the tool. *How can we improve this and what is needed to do so?* ➔ Not a perfect ready product but a proof of concept and it is not fully calibrated and worth improving and testing it.

Fabrice DeClerk: The combination of the socio-economic and the bio-physical aspects is interesting. 3) *How transferable is the model to other regions?* ➔ What was done here is a merging of different sources of knowledge which can be built around any issues (AGW or health or anything), the stakeholders would have liked it to be on a much lower level of community rather than district but it has been difficult to find the data.

Prof Odai: 4) *Who wants to use the tool and what is the minimum of resolution*? ➔ The tool was intended for quite a high level broader national scoping and not as much on the local level.

Discussion

What are the key messages: Modelling tools support decision makers in selecting appropriate research interventions at a basin scale. It is a framework for formalizing multiple forms of evidence into a flexible online tool. This has the potential to have direct and lasting impact. A decision aid tool, but not that evident, for high-level decision.

Who can use it? Tool targeted at high level- national (sub-national but may be most useful at local level). Planners, researchers, donors; academics as a way to improve the socio-ecological system understanding and framework for integration; for large basin scale planning.

What is missing?

- Low predictive power; are the factors at the wrong scale? How are data flowing to the model? Is there an open source data flow tool? The absolute predictions might not be as important as the relationship formulations and capturing of data.
- The tool requires all actors' knowledge to improve prediction efficiency.
- Participation of rural people would be good; ownership of the intervention, technical support; - Farmers have sense of ownership to participate.
- Important missing factor is the marketing, selling post-production of agricultural produce.
- How the modelling tool takes into account innovation; what is the adaptive potential?
- How can (new) factors that may come up in the future be taken into account? (Example climate change information and regional change and demand for energy), what time dynamics? What weight, at what scale, homogeneous? What failure analysis?
- TAGMI tool is not user-friendly for communities.
- Improvement of the predictability level of the model as it is currently quite low.

Considerations for WLE: its potential for interactive open access data provision (discussion with Alex Fremier) to be explored with SEI/ Jennie Barron, given current Volta data limitations.

1.2 *Setting up Successful Agricultural Water Management Interventions - An Analysis of a Consultative Approach in Volta and Limpopo Basins Using Participatory GIS (PGIS)*

By Frank Annor, on behalf of V1 team

Key message is:

- Technical support is critical including training, financial and material input
- A clear demand or need for the technology is crucial
- Creating the sense of ownership is critical

AWM technologies over the past 50 years, little evidence of the successful scaling out of interventions.

Methodology used was:

1) *Expert consultations in four countries* - 'What are critical factors to success?'
2) *19 in-depth case studies using Participatory GIS* - 'What were the benefits?' and 'What contributed to the success in this case?'
3) *Qualitative text analysis using Nvivo software* - 'What are similarities and differences between 4 countries, two basins and 19 cases?'

Expert consultation definition of success: adoption and positive impact on well-being, continue to use approach two years after intervention.

Enabling factors

- previous knowledge, dynamic, functional & peaceful social setting, communities open to innovation
- South Africa and Zimbabwe people got involved because they realized that this is an option to help them improve their livelihoods. Creating awareness is critical.
- Training, demonstration, observation, extension should be continuous, not one time off!

Project management related factors are critical enabling factors. These include:

- Early engagement
- Community owned initiative
- Continuous support
- Clear objective
- Appropriate design & implementation

Labour can be both enabling and limiting factor, e.g. AWM interventions can increase labour demand. Inputs enable uptake but involve investment costs. Some enabling factors can become a barrier for scaling out, e.g. fertilizers, implements

Conclusions

Both expert consultations and in-depth case studies highlighted that the enabling factors for successful AWM interventions were:

- Technical support including training and financial and material inputs
- A clear need or demand for the technology in the community
- Creating a sense of ownership of the technology
- Some enabling factors (provision of inputs such as fertiliser and equipment) can become barriers for scaling out

Discussion & Questions

What are the key messages?

- Factors that determines project implementation success
- PGIS of AWM intervention is needed for research and development (R&D) in AWM.
- Technologies that are likely to be adopted are those emerging from communities and understood by them. Recommendation: make the link between communities and policy makers
- Question: How do we measure success? What are the indicators to measure success? Who decides/measures success? Difference between success and impacts?
- Success is local, complex, unpredictable. Participation is necessary but not sufficient. Multiplication of factors involved. Development agencies, NGOs / all who are working in the field (research and development institutes). Failure analysis: links between "method" and "outcomes"
- The success of an intervention depends on technical and financial support as well as on social and institutional factors.

Who can use it? Donors, project proponents, project evaluators, governments and development participants, can inform researchers about potential gaps; implementers

What is missing?

- A useful approach but the results are not that obvious. This is an assessment tool that informs for other actions. Since the criteria differ from one project to another, the application differs as well. The presentation deals with the findings of surveys but does not give research outcomes.
- How are the «enabling» factors embedded? Research commitment to place.
- Clearer linkage of technologies location in the landscape with the study. Question is that was it purely socio-economic?
- Enabling factors can be out-scaling barriers
- Question: How are these data being integrated seamlessly into the TAGMI model? How do you create 'technology ownership' in community? What drivers are we looking at to address 'research fatigue'? Solution must be long term engagement.
- We need a data flow protocol, including an online tool, for capturing and storing data for future projects. Data is being generated and analysed but not stored for future analysis. TAGMI is a codified framework for integrating data, but we need a process for getting data and analysis into one stable place to improve data capture and reduce research fatigue and development organization amnesia.

1.3 PGIS Synthesis on Agricultural Water Management Technology in Burkina Faso

Nine sites were identified through a consultative approach, to identify cases of success and their enabling factors. The sites covered a diversity of actors, water storage structures, uses, climatic zones and duration.
Four indicators of success were identified;

- Revenue of beneficiaries
- Food security
- Number of beneficiaries
- Sustainability / durability of benefits resulting from the intervention

Results were presented as a hierarchy of cases, with the "ideal" as the reference point
The conclusions presented from this study were quite generic including:

- "The impact of factors was variable across project locations"
- "Success was more important where conditions were favourable"
- "Each actor has to take these results into account to decide on the actions to undertake in each intervention in order to guarantee success and its sustainability".

Discussion & Questions

Who can use this? – Planners who implement research projects and want to evaluate potential for successful implementation of a particular technology.

What is missing?

- What is more interesting is not just the priority of each factor, but to know how each factor improves or impacts on success- if you improve that factor. Important to take into account : socio-cultural context- may be have a risk assessment for factors that are not quantifiable
- The result is site specific but what are the generalizable factors? At what scales are these variables important? Is equal weighting of all these factors appropriate?
- What is the role of the farmer in defining success of the technology?
- How does the intervention lead to impact?

If the metrics for success are variable by site, how can we generalize these results? Starting to have concerns that the data and analyses are not well managed past the interest of the report and manuscript. It would be nice to have these data and the new knowledge captured in some structured way. Presentations on PGIS are good but the specific development related lessons need to be elucidated. Conclusions tend to be general and academic. This is not the place for methodological findings or academic discourse; international academic meetings are for that. One suggestion might be to require future presentations to have a specific format that outline specifically how the results inform the grand challenge question

1.4 Agricultural Water Management Technology Expansion and Impact on Crop Yields in Northern Burkina Faso (1980-2010)

Joanne Morris, SEI, and Issa Ouedraogo, V1,

Main messages …

- Multiple evidence of province-scale adoption rates of at least 20-40 %, and a minimum of 10-20 % in other provinces with >700 mm rainfall since 1990s
- Regional cereal yields and adoption of soil water conservation and small reservoir expansion have similar rates of increase (ca 3 %)
- The causality at scale between agricultural water management adoption, crop yields and poverty /food security impacts needs further evidence
- There are multiple methods to develop knowledge on adoption of AWM technologies, but current data is not summarised for efficient use in research or policy

Background:

- Parts of Sudano-Sahel and Sahel have + 10 years of 're-greening contributing to the land degradation debate: are landscapes changing by climate or by humans? And in which direction?
- There is little systematic evidence of scaling out AWM successfully (Douxchamps, 2012) but adoption rates are higher in areas with less than 800 mm of yearly rainfall

Purpose of the study

- Quantification of the real extent of AWM adoption at sub-national scale (region) in northern Burkina Faso
- Assessment of the impact of AWM expansion on crop production and poverty (causal link)

Approach:
Different sources of data: National statistics (agricultural census), remote sensing analysis (ASTER), peer-reviewed and grey literature

Results:

- From remote sensing - 33 to 39% of total crop area in northern Burkina is under SWC, but it is difficult to map as soil water conservation is not explicitly spatially defined
- From the Literature review … the figures are more difficult to translate into a map because they are not geographically defined. Collation to regional level and comparison of trend lines of normalized data
- From Census (ENSA): 2006 (average in %) Sahel 18.2 -- Nord 21.8 -- Centre-Nord 27.9 -- Plateau-Central 21.9 -- Mouhoun 8.3 -- Est 8.3
- From yield curves: Yield (kg/ha) by region, for major cereal crops**:** Calculated from production (tonnes) and agricultural area (ha) for time period 1984-2008 (5 year moving average, normalised values) Source: DGPER 2008 and INSD 2012 [e.g. yield data for rainfed crops: red line is millet and blue is sorghum ... then crop yield production as a measure for food security]

Lessons:

- Better knowledge on AWM needed for setting R4D agenda
- There is use, but not enough documented, knowledge is not synthesized in an accessible form
- AWM technology goes beyond documented cases.
- More work is needed on causal pathways of AWM for food security & poverty alleviation

Discussion & Questions

Key message(s) - Drivers of project adoption occur at multiple scales. Understanding those drivers, for example precipitation, will change smaller scale driving mechanisms. This is a very good study finding that is working to scale-out projects and adoption rates; clear study design with the potential to scale-up results.

Who can use this? Multiple people can use this information – policy makers, researchers and program administrators.

What is missing?

- Again, how is this data being saved and made available to the next project. This is a good way to capture and store data for the long term.
- Input costs

1.5 Speed talks by Young Professionals on an overview of their posters

- Structure, specific composition and diversity of timber in two contrasting areas of the Sahel in Burkina Faso, http://www.slideshare.net/CPWF/cpwf-maurice-posterfinal-portrait-volta-26334269.

  They listed wells in the Sahel and wanted to show that the areas that are getting greener are mostly in the farms

- Impacts of Agricultural Water Management interventions on the hydrology of the White Volta River Basin: the case of dams and dugouts, http://www.slideshare.net/CPWF/impacts-of-agricultural-water-management-interventions-on-the-hydrology-of-the-white-volta-river-basin-the-case-of-dams-and-dugouts

  Explored the potential of hydrological intervention in the White Volta Basin surface. Used small reservoir – water evaluation assessment model looking at the state (condition) of small reservoirs that have no

sedimentation, no seepage and about 85% are in good conditions. Would have a major impact on the livelihoods beyond 2020.

- Analysis of market gardening and their contribution to household income can help reduce poverty.
- Impact of small reservoirs and dugouts in the Ghana portion of the Black Volta basin on hydrology and water allocation in the Basin, http://www.slideshare.net/CPWF/impact-of-small-reservoirs-and-dugouts-in-the-ghana-portion-of-the-black-volta-basin-on-hydrology-and-water-allocation-in-the-basin

  Impact of small reservoirs and dugouts in the Black Volta Basin using the Water Evaluation and Planning (WEAP) model show no significant impact coming from the upper catchments while still meeting the downstream needs. It is possible to construct at least five more small reservoirs with no impact on downstream usage.
- Use of rainwater in fruit trees and cereal cropping in western Burkina Faso, http://www.slideshare.net/CPWF/utilisation-des-eaux-de-pluie-en-cultures-pluviales-association-arboriculture-fruitiere-et-cultures-cerealieres-dans-l
- The peasant management of water resources in lowland Dano, http://www.slideshare.net/CPWF/cpwf-poster-palekiemdesept2013

  Management of small reservoirs in Dano and how farmers are able to manage rainwater by using phone-Work based on field surveys and literature review.

Synthesis of session 1 as given by selected participants

By Augustine Ayantunde (Project leader V2)

- Positive cross basin learning with the LBDC
- The great potential for the TAGMI tool – it is work in progress and there are challenges with data improvements
- Replicability - Some of the tools have limited use, they are not quite specific enough
- Some of the factors of success and their weighting are questionable: are these factors equally evaluated?

Fabrice De Klerck (WLE scoping mission participant)

- Modelling approach was quite interesting because it used a basin scale approach and it was enlightening
- Models outcomes is an interesting result
- Interesting for researchers as well as users and implementation partners and hopes that we get some time to interact with them and hear from them (i.e the implementation partners)
- Critical factors for success – a note of caution is that it needs to think more of the external drivers not only as challenges to overcome but as opportunities to scale-out the adoption.

Korotimi Sanoy, University of Ouagadougou

- We learnt a lot concerning the TAGMI models development and adaption potential
- The approach is quite relevant if we can channel it better to fit the social needs.
- With respect to the synthesis of the PGIS, four indicators and 14 drivers; need to give weights to the drivers
- The fact that greening of the Sahel is effective at the crop level is also very interesting.

2 Session 2 (V3): IMPROVING SUSTAINABLE USE OF SMALL RESERVOIRS

Chaired by Prof. S. Odai (KNUST)

Introduction to Volta Project

By Philippe Cecchi

This Volta project (V3) was a composite of the following components, which will be presented in more detail by a representative of the respective work packages:

1. Debate on water evaporative losses (Binaba, Ghana)
2. Modelling water balance in ungauged basins (Boura, Burkina Faso)
3. Assessing performance of irrigated schemes (Boura and Binaba)
4. Linking livelihoods and small reservoirs' economy (this has been dropped because no impact of small reservoirs on economy and health in Boura)
5. Agriculture intensification and aquatic ecology (Boura)
6. Pilot on seeds improvement (Binaba)
7. Self-assessment of participatory processes (Binaba and Boura)

The project's objective covered a wide range. They needed to build on past experience and for individual small reservoirs considered within their biophysical contexts and their economical dynamics, the project planned to:

- Develop integrated management options to enhance productivity & ensure equitable allocation of water resources.
- Identify uses and users, assess their needs, clarify social and ecological determinants, and control health consequences.
- Study processes on integrated water management at local scale - Integrated management aim at several objectives: perpetuating infrastructures, protecting / improving water quality for various uses, reaching / enhancing water productivity potentials, seeking for equity and thus require: Knowledge on processes at the adequate scales, in their dynamics, in their context, to be discussed and compared with stakeholder's perceptions and expectations

2.1 Monitoring Small Reservoirs in the Volta Basin of Ghana

Frank Annor

Small reservoirs are for multiple uses. In particular, rainfed farming is not enough. There was drought in the 1970s and 1980s

What are the issues with small reservoirs?

- Lack of adequate storage facilities (design and capacity problems!) as well as low productive use of existing facilities
- Large (?) Evaporation losses
- No monitoring of hydrological data of small reservoirs in place
- Sedimentation is not really a problem with the estimated rate of about 3400t/year

Approach used in this study with a focus on hydrological monitoring

1. Development of basic algorithm
2. Evaluate polarization diversity with basic algorithm. To analyze which polarization modes are less affected by Bragg scattering and gives best contrast.

3. Improve delineation algorithm

Methodologies: Satellite and GPS i.e Satellite imagery and ground measurements

To improve the monitoring Network is one initiative taking place with the help of the local people to design affordable weather stations. Size of reservoirs varies between 1 to more than 20 ha.

Small reservoir delineation was with RADARSAT-2 SAR technology; Pauli decomposition. 3 pixels moving average, evaporation estimates, compare with flux measurements, scale effects and optimization of dry season storage

Discussion & Questions

Message(s): Evapotranspiration is important; scaling evapotranspirative losses, affecting the design of small reservoirs.

Who can use this? - Dam builders and planners

What is missing? - Results are still coming in. Are there other simpler ways to measure this? Can we come up with ways to help villagers' measure water losses themselves? Sediment influx not quantified. Potential for an online tool for government organizations to help small reservoirs manage their water by understanding losses and grains? Not sure the feasibility but worth writing the idea down.

2.2 Hydrological Modelling of the Boura Dam Burkina Faso

(Bilan hydrologique a l'échelle locale de la retenue d'eau de Boura)
Tazan Fowe,

Small reservoirs have good potentials. The Boura reservoir is in a catchment shared by Burkina Faso & Ghana;
But has not benefited from any hydrological monitoring (hence an absence and lack of available information on water volumes and what different water users take. Lack of adequate information contributes to poor management.

Lessons:

- Boura has a lot of water resources, (almost 80 cm at the end of the dry season);
- Local ownership of infrastructure: "stable" activity calendar for different water user groups in Boura is important
- Strong recharge contribution of the flush water (well behind the dike source of water supply for the local population).

Recommendations

- Maintain the monitoring system
- Local people must take greater ownership of their dam including: regular maintenance of the dam, irrigation canals and drains, respect for the protection zone of the dam;
- Ministry of Water (MEAHA) through its decentralized services should sustain at least monitoring the dynamics of filling and emptying the tank at Boura;
- The problem of hydrological monitoring and management of water in small containers must fit into a larger scale in the countries of the Volta Basin program.

Discussions & Questions

Q1 (Alain): Infiltration volume on Boura is used upstream by pumping, do we have an idea of the underground storage of other reservoirs in the region?

➔ Concerning infiltration we have 2mm. They keep water even during the dry season; very important relation between small reservoirs and ponds.

➔ (Philippe) Each year is different.

Q2 (Alain): Uncontrolled out of 12 mio; seems too much. Is there any information about this?

➔ Where do the 6 mio go? The Boura dam renews its resources by itself through spillage, a tributary with no other dam downstream.

Discussion points from the group buzzes

Messages - How much water is stored in the dam? Lots of water resources from the dam; water is stored for evapotranspiration… "Those that give the dam should maintain the dam" – A villager's comment. They still do not feel they have ownership over the dam.

Who can use this? - Researchers, maybe program managers, definitely not villagers.

What is missing? –

- No hydrological monitoring is in place for small reservoirs
- Sediment influx and loss of storage capacity. How will they measure groundwater losses?
- Online calculation of water losses given villagers' measured data.
- Water used by animals and people are not included in the model.
- VBA needs to be included more in the discussion.
- Research fatigue, lack of people that stay here and continue the research. Where is the capacity building to leave a legacy in the country? For example, can these countries continue to make these measurements using this equipment? Further discussions around the issue of research fatigue and appropriate feedback to the participating communities and if "we want impact – don't make it a research show". Have dreams and ambition for the future.

Prof. Odai: To guide against research fatigue and a need for a stronger presence of the authorities and building their knowledge and maintaining the continuity, five years from now VBA should be more knowledgeable. **Message for VBA:** reminding the authorities to get involved and guarantee continuity and reminding people that things were done and are building upon each other. Send relevant scientific staff to get involved with researchers of programs like the CPWF. VBA's presence and active role should be stronger. ➔ Jacob Tumbolto (in response): VBA has limited resources also considering the many countries.

2.3 Performances of Irrigated Scheme Downstream Small Reservoirs: the cases of Boura (Burkina Faso) and Binaba 2 (Ghana)

Performances d'aménagements irrigués depuis un petit réservoir cas de Boura et de de Binaba

By J.C. Poussin

Had discussions with the members of the producers (men and women) association in groups in search of households that can feed themselves. Different performances of the irrigation schemes in the right and left bank of the reservoir- There is a plot that is performing so much more efficiently; indicating potential improvement although the reasons are not clear.

The market value chain is very important. Where there is a higher production it also requires a market.

Impact of small reservoirs cannot just be evaluated by direct uses but other related ones.

How to evaluate irrigation performance:

- Type of plots
- Weight of the types of plots
- Scope
- Validation with farmers

Two seasons – market gardening. Difference in marginal profit between left bank & right bank- Profit from rice is low – more for market gardening

Two types of problems

- Crop management and commercialization
- Water management problem

Discussion and Questions

Messages - What are the benefits of irrigated agriculture downstream from the dam? Irrigated agriculture is a key benefit and this work aims to quantify specific benefits. Economic impact quantified to address the benefits between reservoirs. What are the real benefits to and from dams?
Who can use this? - Potentially a significant impact for an individual dam. How will this information be used by the governments, the development agencies and the villagers? The results are probably not scalable to other small reservoirs; however, the methodology could be applied elsewhere.
What is missing? - Is this scalable to other dams? What are the larger consequences of this? Socially and what happens when the dam fills and there are more people in the area? Long term viability of these reservoirs and the chemical exposure are not considered.

2.4 Agricultural Intensification and Aquatic Ecology: Impact and Trade offs

By Philippe Cecchi, IRD

Boura stakeholders were involved in the diagnosis of potential problems and remedies. Problems identified in Boura are:
-Eutrophication and presence of macrophytes; *Ceratophyllum submersum*
-Allelopathy – interaction of phytoplankton and macrophytes

Two upstream inland valleys; Bala 'pristine' versus Bama 'impacted' were studied in parallel with Boura in terms of:

- Pesticide residues
- Fertilizers & eutrophication
- Macro-invertebrates
- Allelpathy (natural herbicide)

Discussion & Questions

Messages - Eutrophication and chemical contamination. Presence of *Ceratophillum submersum*. Describe and model the system to understand what is going on and what to do for the local communities
Who can use this? - For researchers, villagers and policy makers. Yet, the results are not prescriptive enough to suggest a solution, but they do help define the problem.
What is missing? - Mainly describing the impacts but not suggesting a solution. However, the results again are general and somewhat descriptive in nature. Initial study on the ecology and ecotoxicology of small reservoirs, but needs more development to become effective.

2.5 Analyzing the Evolution of the Knowledge of Water Users in Boura Dam to Assess the Effects of a Participatory Approach: Methodological

(*Analyser l'évolution des savoirs des usages de l'eau du barrage de Boura pour rendre compte des effets d'une démarche participative : proposition méthodologique)*
By William's Dare, V4, V3.

Assess the effect of participatory approaches. We have a great variety in approaches and in the analysis derived. It is difficult to capture.

Summary presentation for Session 2

By Philippe Cecchi

Results

- Debate of water evaporative losses (Binaba): 1.4 < 1.2 mm/day, Minimum to Maximum for Wet – Dry period
- Modelling water balance in ungauged basins (Boura): Runoff = 9.70 Mm^3, Evaporation = 2.76 Mm^3, Seepage= 1.16 Mm^3 , Outflow = 6.24 Mm^3 and Uses = 0.84 Mm^3
- Linking livelihoods and small reservoir economy - dropped for Binaba, because no impact of small reservoir on economy and health, although Boura was by far, a more attractive place with diverse activities than the compared neighbouring rural eastern region, it is, not proven that small reservoirs can be attributed to the better livelihood indicators.
- Overall: Teams + 4 PhD + many Master students produced a lot: PhD theses, Scientific papers, Communication materials, Boura Synthesis, Feed-backs to Stakeholders

Lessons
Interactions with other VBDC Projects: worked well with V4 and V5, while nearly zero with V1 and V2
Interactions within V3: no "team spirit" (not a crew but an assemblage of interests), Boura field site may be an exception with its forthcoming synthesis
V3 design: too complex (lack of integrative framework/model for the aggregation of multi-disciplinary results collected) and too ambitious (lack of time)
V3 animation (management): not enough (absence of cross-fertilization), not adapted (proactivity in an adaptive management context)
Delivery of results: Not too good as CPWF required early communication when we have not validated our results.
CPWF pressure: understandable (from research: '*Outcome Logic Models*' …), but excessive (… toward extension: '*Impact Pathways*')

Recommendations
''The challenge lies not merely in reducing vulnerability [against Climate Change] but also in getting the structures in place so governments and investors can tackle adaptation in the most effective manner possible. The good news is we can improve lives today while building the crucial infrastructure needed for tomorrow.''
Source: ''*Global Warming and Adaptability*'', Wall Street Journal, 12 Dec. 2011

CCI: *Controlling the Consequences of agricultural Intensification*
IPI: *Improving the Performances of Irrigation*
CWB: *Closing the Water Balance (of Small Reservoirs)*
RDCS: *Replicating and Diversifying Case Studies*
MDE: *Modeling the Determinants of Externalities*
Among others…

Discussion & Questions

Key messages – lots of detail but the key point was not very clear;

- Monitoring: Community not having ownership, people stated "those who built the dam should fix it"
- Best suited location for agricultural activities near main drain
- Diversification around hydrological processes (high rainfall is key)
- Importance of assessing the impacts of the participatory approach
- For an efficient integration of stakeholders and water users.
- Equipment, use of advanced technologies for improving monitoring of small reservoirs (water balance)
- Hydrological balance of the Boura Dam
- The frequency of data collection is important for improving data quality (variation are mostly captured)
- The full potential of water use in Boura dam is not yet realized
- Community participation not perceived from the presentation

Who can use it? Policy makers – to foster and realize the potential

What is missing? -

- Interesting that it was a lot of work done at the intermediate level – not very local but not so high that it is lost in the clouds – not many studies do that (meso level)
- Technical potential - it is there to make small reservoirs good/profitable, so what is missing is policy changes - market linkages, input support (quality of fertilizers/pesticides)
- High potential once completed to inform water resources planning for effective use of small reservoirs
- Need greater integration of the projects. What are the areas that need to be improved?
- It is important to know opportunity cost by using water in time and space.
- Question: What are the immediate benefits to the community?
- Question: How does this relate to management interventions? – Good science but now what?
- Question: Can it be scaled up?
- Question: How important is wind? – could you manage this?
- Question: What about human water harvesting? Why not in the model?
- Question: What do you mean by closing the water balance? What decision would it impact?
- Question: What is the catchment area in relation to dam size and rainfall zone? – To design, of siting and size of reservoir.
- Question: Are there redundancies in the work?
- Challenge of coordinating projects in the program – confusion amongst stakeholders
- Question: What is the most opportune time to use small reservoir water to maximize benefits and value, and avoid loss of water and loss of benefit?
- Question: Is seepage from a small reservoir really a loss? Maybe recharge shallow groundwater which is a more efficient type of storage.

Fish bowl comments on session 2

Tim Ellis and Guillaume

Small dams and water balance: Remote Sensing and Geographic Information System; good tools but there are time constraints. Beyond management of small dams itself there are other things to be done, example the control of pesticides. Tim noted the lack of coordination but it is very hard to pull it all together and encouraged an overarching study. Evaporation and design of reservoirs; missing an overall design process. Revisit some of these engineering principles, and then ask the question "do we revise". You really want to increase soil water storage? There are scales typically not looked at; example Ghana fosters rice production but also cheap imports - urban food security versus political factors.

Jennie: 30 – 40% of the area is already under infiltration structures. The challenge: a mismatch between soil water storage and patterns of rainfall. Simon noted that the afternoon session was about supply of water, but what about the demand? Representativeness and AWM solutions messages are similar to those in the Nile BDC. The complexity of projects and partnerships – need to learn to adapt quickly.

Response by Philippe: The original aim of the Volta BDC was to look at four clusters of reservoirs, two along the Black Volta and two along the White Volta: 1 each in Ghana and Burkina Faso. There were plans for a large field study of 40 to 50 reservoirs, on pesticides, residues, sediments etc. But these were not followed due to budget and time constraints.

Bio Torou: the power point presentations clarified what we mean by small reservoirs and four presentations on monitoring for hydraulic and water balance, agro-economic analysis and aquatic ecology. There is a time constraint for the approach of the remote sensing but there is a need to measure also manually with local resources.
Recharging of the dam is important for the wider water downstream hydrological system.
Beyond the management of the dam itself there are other elements that need to be controlled or regulated.
With the participatory approach it is difficult to assess its effectiveness and depends and varies by socio-economic context. With regards to agro-economics in Ghana, there is a potentially good performance while in Burkina Faso agro-economics performances are low.

Tim Ellis: A lot of really good studies were done which were poorly coordinated. Common thread; the overarching study from what we have seen is needed. The evaporation of the small reservoirs and its design, there is a missing proposition to an overall small reservoir design. Catchments volumes changed and now we need environmental flows which have changed. From Nicolene; the scale of these observations in the studies, do farmers have a voice, do they have an influence? There is a lot to think about there.

Participants come in to bring up: a) discussion points from the session and b) on the entire day
Tim Ellis: Mismatch of soil water availability and the distribution of rainfall is not a good combination – so we would need to think about improvement options there.

Simon Lagan: table discussion on small reservoir selection, connectivity with other projects a lot of work on small scale Agwater solutions, afternoon was a lot of supply water – how the demand for the water vary with time, would be good to map that.

Simon: Cross basin (personally), interested in the messages which are very similar to what is coming out of the NBDC complex systems, varying partnerships, the need to learn to adapt and that should be done quite quickly.

Philippe: the question of representativeness, what have we designed four years ago, was to work on four clusters of reservoirs, two each in Ghana and Burkina Faso. Sedimentation was not a point of interest in the project but the focus was on pesticides and how to improve water quality and productivity to small reservoirs which is very relevant to all the reservoirs in Burkina-Faso. The large Volta basin study of 40-50 small reservoirs looking at the water quality including sediments and address issues on the Volta scale.

Tim: on the north east coast of Australia into the Great Barrier Reef lagune, politicians stood up and said that they will reduce the sedimentation load by a particular amount. Funders were much more willing to invest in modelling work. Always the question in sedimentation tracing, i.e. what was it before human settlement and grazing. Time is right to spend a bit of time and money on a sedimentation study.

3 Session 3: WATER GOVERNANCE OPTIONS IN GHANA AND BURKINA FASO

Chaired by Dr. Naamiong Karbo (Director Animal Research Institute Ghana)

3.1 Crossed contributions of two participative approaches in Burkina Faso and in Ghana: example of the project V4 to support IWRM policies

William's Dare

- Bring support to organization that exist already was the aim; not to create new ones
- Future is unpredictable – is important to acknowledge that
- The issue of institutionalization was raised
- How participatory was V4? 7 scales of participation have been defined by pretty (1955)
- How to breach gap between rhetoric & practices
- Objective was to support IWRM
- BF supporting existing platform CLE Bougouriba 7
- Ghana upper east – accompanying concerns of emerging watershed management
- Importance of process rather than results - multiple viewpoints all legitimate
- ComMod approach – analyse issue, conception model, participatory simulation – iterative
- Model built with different stakeholders – transparency – adaptive - process

1. partnership with policy makers & water management institutions
2. Build participatory strategy

Participatory approaches – *Monsieur Daré*

a) Aim to support ongoing implementation of IWRM projects. How the participatory approach will help to inform how and where projects should be implemented. All studies are only valid within the local context. The future is not predictable. Aim to define the local issues and what groups are there to help organize people.
b) Defining of action plan to strengthen organization; interdisciplinary process to incorporate multiple perspectives.
c) What do we do with this information? Social knowledge and approach is sound but the focus of the presentation is the approach/methodology and not the results. It is difficult to connect the research to the important findings for development. Social science remains descriptive in nature. This is ok, but some focused questions and answers would be helpful as we move forward. Too often the results are said to only be relevant in the specific context. True, but how does gaining this knowledge help us answer specific questions for specific development actions.
[I found out on Thursday, that the integration across this work and Kizito's work actually was completed. Nice methodology; could be expanded on to include other interventions, not just buffers].

3.2 Targeting Interventions to Reduce Catchment Sedimentation: The Case of a Sub-Watershed in the White Volta Basin

By Fred Kizito

- Combination of bio-physical methods and participatory approaches.
- Major contributors are from upstream to downstream (sedimentation upland yields etc.)??
- Aim is to find the intervention to reduce the impact of erosion (NE no erosion)
- Presence of SR was also … high population shifts

Recommendations

- Look for linkages with V1
- Targeted interventions need to be context specific
- Interventions to consider associated with environmental consequences and use of ecosystems based approaches would be appropriate

Participatory combined with biophysical, hydrological modeling, participatory methods

Key message – illustrated the relevance of distributed erosion models 2 target erosion control

Climate variability, reduced storage capacity small reservoirs

Sediment major contribution upstream catchments

Findings: small reservoirs, quick transformations. With vegetation buffers in place up to 15% reduction in sedimentation

Recommendations

- Explore linkages scaling out V1
- Targeted interventions context specific
- Appropriate use of ecosystem based approaches
- Upward rather than downward accountability undermines legitimacy of structures vis-à-vis users of the resources
- Setting up water management entities is functional rather than political (process secondary to purpose)
- Users seen as beneficiaries rather than participants – weakened capacity building
- Shortcomings "built in" concept of IWRM

Sedimentation – *Monsieur Kizito*

a) Targeting interventions to reduce catchment sedimentation in the White Volta; using of erosion model to target erosion control models; buffer strips reduce erosion by 10-20%.
b) Implications for targeting interventions; funding agencies and aid agencies; this work were folded into the work of Dr. Dare.
c) What about roads and urban areas in the model? Might be missing these erosion processes. Not sure the scale is correct. Taking a smaller scale might help target more specific areas for implementations; no integration of disciplines, but they tried to do it; funding structure makes it difficult to integrate across disciplines; how will these data and findings be used? Will these findings be taken up and by whom? How confident are they in their findings? Can we put the biophysical model first and then ask the community about the findings – specifically, which implementation would work? And what do they think they could or would implement?

Fred K.

1) "Buffers" may reduce sedimentation
2) Local Community Spontaneously or accompanied by development services / expanding
3) Field data measured
4) Cost / analysis of such interventions (participation) costs / benefits

Key message: Mapping the potential levels of soil erosion to target most vulnerable areas.
Who can use it?: Government, development partners, NGOs
What is missing?: densité humaine et (population densité and techniques culturelles associées à la pente.

- Data is missing
- Evidence missing
- Will a buffer strip work?

- No concrete action to verify the 15% reduction of siltation.
- Probably, a projection based on the model / tool.
- Question: What are the limits of both tools for this kind of projection?

3.3 Building Water Citizenship - Practices of Integrated Water Resource Management in Burkina Faso and Ghana

By William's Dare

IWRM in the Volta - background
V4 focused on how to strengthen participation, how IWRM can strengthen citizenship
We looked at it from three angles: …, autonomy, accountability
Structures of representations from national river basin and community level (the last one only in BF not in GH)
4 types of decision-making powers

Water citizenship – *Moniseur Daré*

a) Does IWRM enhance water citizenship? Participations remains limited, legitimacy of the user is present, but not the other way? Implementation is up to them; WVBB is to enhance awareness of water issues. "The process of making decisions is secondary to the purpose of the decisions"
b) Local, regional and national government structures.
c) Interesting, but too general for implementation. What are the specifics implementable conclusions? [Now I know more about this after the open sessions]

V4 – III. *William's*

1) Review of IWRM (in the construction of institutions in charge of…)
2) Message to the "Political leaders"
- Message to the "Donors"
3) Concrete proposals to know "How to get a better:
   - Representativeness
   - Involvement of users

Key message:
- It was not IWRM
- Accountability was low (both Burkina Faso; Ghana) participation local users were not participating beyond administrative (national) and government was low (esp. in Ghana) users were beneficiaries not participants.

Who can use?: Water managers, development agencies, governments training the level of participation helps better practice next time.

What missing?: No way forward?

Message: Interaction between participatory approaches
Participatory approach, whether at high level (Ghana) or local level (Burkina Faso) result in effective water.
Who can use it?: It can be used at all levels interested in water management.
What missing?: Had two levels (high; local) which one is more effective?

- Study didn't capture the representation of actors such as researchers in Basin committees, Basin, board members.
- No one can use it without field studies / more date needed?
- It is a guide.

- Top-down approach of policy lacks details
- How to convince local communities to own their catchment areas? (Work in synergy).

3.4 Constructing Space: The Practices of Water Policy in Burkina Faso

By Bio Mohamadou Torou

Two step (phased) approach: 1. 60 units …. 2. Complementary information was collected for 3 CLE (with 50 units for Chacun Bougounita7 and Kou2 (Mouhoun) et Itenga (Nakambe)

Finding 1:
Finding 2: Designation of the users within the CLE administration
Level of selection of the users has power to decision making

V4 – IV. *BIO*
1) CLE: lack of legitimacy and power of decision. / / Satisfaction / Terri Briaw
2) Ministry (Ministry of Water, Hydrodevelopment and Sanitation in Burkina Faso)
3) Concrete proposals:
   - Representation / Legitimacy
   - Administrative boundaries versus hydraulic ones

Bio:

Key message: CLE system is just a structure – not working as it says – ownership and management are problematic because chiefs and elders in community want to be represented, so other groups not so well represented.
Who can use? UBA, gout, NGOs, and the CLEs.

What missing? Suggestions on how to improve the CLE system.

Table discussions – capture comments to which presenters. Flip charts on session 3 (V4):

Key message: top down approach is not favourable to local IWRM
Who needs it?: Decentralized government agencies who dominate Natural resources management in the field?
What is missing?: the legal implications of the findings e.g. in Fred's presentation on watershed sedimentation, upper east region of Ghana (UER) is highly populated and impacting on the natural resources. What is the legal implication of the population growth/density in the UER region?

Session 3: Continued

1) CLEs focus on spatialization. Presentation 2 much referred to territorialization, how does he justify it?

Representation of the various actors is not codified. The study did not show what was done to explore this institutional issue.

Session 3

- Importance of participation
- Representation in participation (button up) – influence of "leaders"
- Good attempt at start of integration but reverted to disciplinary approach (Social – Biophysical)
- How and where findings (e.g. of sedimentation) fed back to participation and recommendation?
- What is next stage – up take?
- How confident in results both participation + biophysical?
- What other interventions and how acceptable?

Presentation 1 & 2

- Poor presentation of water policies.

Nominated Synthesizing Reviewers' Summary

Nicolene: we had a very diverse group, complement the group of how much was done in the team, a lot achieved on a very complex issue,
Wider range of issues from the wider rights and powers issue to actual engagement of people and lastly how to use science to actually enhance/engage the social context and how to bring the science into it and make it useful, how do you engage a very diverse group to all work with you on the same projects?
Issue of time – participation means time building, trust issues with transparency, partnership and participation, not everybody needs to participate all the time but we would need to listen to what is out there.
The whole issue of the different ways of looking at it, IWRM is constraining this in its conceptual framework
How far and to what level can you engage is an important point and then leading into empowerment of people.
We talk a lot about participation, but on the society level we do not know what we want to get out of it - as a society what do we want to get out of it on a bigger level/scale?
The technical and the social: how do we use technical biophysical knowledge for our social community and engagements?

Marloes Mul, IWMI West Africa Office (VBDC external):

- Participation in research should be done from the beginning till the end (setting research agenda is very important to secure research uptake in the end). This process takes time and there is therefore a need for long term research projects rather than short projects.
- IWRM - Participation of local stakeholders is essential for the local stakeholders but they should also feel they can influence decision making (legitimacy), making it relevant, rather than participation as an end-result.
- What is the role of the new institutions (are they new, the CLE's?), do they have mandates, how do they relate to the existing institutions, what is the difference between Burkina and Ghana and how does it influence the efficiency of the institutions (potential future research questions)

Judin (YP): *1st ppt Very important questions on water management - there are different levels of engagements with communities in BF and GH. Collective action and community engagements – really who has been participating was not clear. Can see how these models can take on some global driver challenges, like climate change.*
2nd ppt: participation and how it can best play out. What options can be given for the way forward?

Open up to comments on the floor:
Prof Odai: *Embedding these findings into institutions/organizations. We have 3 - 4 years timeframe. SO how can these findings be nationally owned so we have this and how can we make use of this? People get their PhDs and no impact on the ground.* ➔ *Longer funding timeframe left uncommented*

Jennie: *what are the ethical and morale consequences of participatory work, where are the limits and responsibilities of our work? V4, have they any cases where it worked – you need an issue to do your science, are there any examples where there were no issues?* ➔ *examples of where the management actually works? We have several cases; collective stake defined at the beginning, the CLE takes count of shared local stakes.*

Jennie : *Work on sedimentation and erosion is very interesting to see the solutions we do not have a good management policy there were three ppts that can say that we have participation at the level of local level in Ghana they have traditional authorities instead of being able to fill that gap.*

Alain: *Two comments from this morning and yesterday 1) Problem definition is an essential step of research for development, R4D constantly needs to redefine and have an iterative process and evolution of it. 2) What are the transboundary issues that we put forth as a program, transboundary is a myth. Most of the policies are made on the national level with its specific governmental structures Burkina-Faso - Francophone and Ghana Anglophone*

Brief responses from William's: *We understood during the course of the implementation of participatory approaches in V4 that it is necessary to involve stakeholders at the higher level in order to achieve sustainability. In Ghana, we are partners with the WVBB to help them.*

Fred: *Cases of where it has worked – a lot of cases which are not documented – regional planers came up with request to have a report where bylaws translated into positive change (in knowledge, attitude, skills and practice). Little has been done in documenting post-scoping findings – how it has been taken up and needs to be paid more attention to.*

Session Comments

Nicoline- All the way from rights & power to engagement of stakeholders, very different stakeholders. No sense of time scales. Participation takes trust, time and Transparency. However, not all stakeholders need to participate always in everything, but we should listen to people.

Different ways of looking at things, constraints related to IWRM structures & functions. How can you engage, to what level, Empowerment? At societal level, there was no discussion on what we want from resources.

How do we use technical information to engage stakeholders?

Marloes: It takes too much time in getting stakeholders involved and in the finding of research questions. We should look at long-term involvement; long-term engagement could be focus of donors.

Concept of IWRM & improving stakeholder participation, legitimacy, do stakeholders feel they can engage in decision making?

New institutions coming up as part of IWRM process, how does this link the existing institutional framework?

Young professional x: Refers to Ostrom. Defining level of engagement did not come out well? Challenges of approaches such as ComMod

Interventions are context specific, exact circumstances, socio-economic and biophysical

Differences in levels in participation in Ghana and Burkina-Faso? More political incentives than functional? Did not see alternative options, what is the way forward?

Contributions from Participants

KNUST: Most donors give 3-year projects "quick fix". Institutions: how some of these things could be properly owned in the region and at the national level. Talked about research fatigue – being used as laboratories, without impact?

Jennie: What are the ethical & moral consequences, boundaries and limits we should be aware of in our participatory research? Where did it work, cases where no issues arose due to successful management?

Through the 4 presentations: Sum up problems and management

We don't have good management policies, bad xx at local management committees, do not have these in Burkina-Faso; only traditional authorities.

Vidal: Problem redefinition is essential part of R4D. Research is NOT a linear process. R4D means redefining your problems continuously. What are the transboundary solutions on the table? "Transboundary" sort-of myth or utopia?

Responses to questions

Williams: Beginning at local level but sustainability for results needs to involve higher and political levels as it was done in V4. There are quite a number of practical challenges as well as big methodological difficulties. Yes, there are cases of success. We fully support existing institutions and do not wish tocreate new ones.

Fred: A lot of cases not necessarily documented, example given by one regional planner indicating that something was successful. Little has been done as far as post-scoping of research is concerned. Moving this program forward, we need to think about future interventions.

4 Session 4: USING INNOVATION PLATFORMS TO STRENGTHEN CROP-LIVESTOCK VALUE CHAINS

Chaired by Dr. Karbo, Director Animal Research Institute, Northern Ghana

Overview of V2 - CPWF Volta basin project "Integrated management of rainwater for crop livestock agro-ecosystems"

By Augustine, ILRI

4.1 Agricultural water management and livelihoods in the crop-livestock systems of the Volta Basin

By Sabine Douxchamps

Not here to present the review, it is documented in a working paper and available online.
Here to present the quantification of crop-livestock systems for livelihoods based on a household survey done within V2.

→ *Introduction*
Factor of housing index, quality factors (5) floor, roof, electricity, no. of rooms,
Food security scaling consumption score taken from WFP (good above 25) 12 factors frequency day / week etc.
Access to water access for livestock, sources

→ Results
AWM practice and AWM impact
Making linkages between the different indicators- Access to water, practice, income, assets, food consumption, labour, access to information and services.

→Conclusions and key messages
Income will increase if access to services and information are provided.

Presentation - *Sabine Douxchamps*

Hypothesis - Access to water and to services and information improves AWM practice thus improves livelihoods

Set of indicators to characterize livelihood practices and assets, and access to water, information & services.

Findings:

- Farmers themselves assess AWM as having strong positive impact on their livelihoods
- Diversity of sources of water & sources of info plays an important role in increasing intensity of AWM
- Improved access to information & services would increase income for 75% of households

AWM and livelihoods in the crop-livestock systems – *Douxchamps*

a) Is there a link between AWM (ag water mgt) and livelihood? Assumption is that AWM improves livelihoods. They mention risk, but I do not think this is a positive relationship. Quantitative approach to evaluation. Understandable for me and I like the approach. I wonder what the social scientists think. There are differences across sites, and distance to water. Very clear presentation and study design. Information is key to improvement in livelihoods. High variability in the dataset, therefore more data collection is necessary (not surprise there).
b) Broad implications - Water is important, however, information is also very important.
c) Solid study, Bravo. What is the long term horizon for AWM?

- Key message: AWM are making impacts on livelihoods and people – good to see the quantification of linkages.
- Who can use it? Ministry of Food and Agriculture; NGOs / Development agents.
- What is missing? Very comprehensive study – now we need a way to do the same for wider scales.

4.2 Farm-level Best-fit Rainwater Management Strategies and Soil Improvement Methods for Seed and Biomass Yield in a Maize-soy bean Intercrop

By Panyan E.K.

Key messages: the Participatory Action Research (PAR) as a tool
Objective of the study

Methodology: On-farm experiment - two districts, two communities

SAS???
Treatment comparisons
Results by community
Comparison of the two districts (Tolon doing better → why?? and Lawra)
Comparison female male comparison (male did better, the poorer land given to the females)
Lessons learnt: farmers are motivated
Conclusions

Q1: how did IPs fit into the PAR? ➔ IPs were included into the Participatory action research process

Presentation: Farm Level Best-fit RWM Strategies & Soil Improvement

Hypothesis: Integrated RWM can close yield gaps on smallholder farms

Participatory action research methodology

IPs to validate value chain commodities & problems identified from PRAs

Lessons learnt

- Farmer experimenters more willing to apply AWM interventions on poorer lands
- IPs important in PAR for problem identification & information sharing
- Farmers motivated by increased yield to have a voice in selection of treatments
- For the resource poor, good agronomic cultural practices could be a means to achieving good yield

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Farm level best fit rainwater management. – *Emmanuel Payan.*

a) Classic farm scale soil management study with control and various treatments and across crops. Multiple sites with men and women. Interesting findings that yields are higher with the interventions; women seem to do better if you consider that they are farming on less productive land.
b) Not a scalable solution but an important farm scale one.
c) How might this change across sites and in other communities? How does the information transfer to other farmers in the community?

Panyas:

- Key message: Rainwater management interventions can dose yield gaps if implemented.
- Who can use it? Extension agencies, NGOs (ONG), development agencies
- What is missing?: what is making some technologies better for different crops than others?

1) Agricultural productivity (for better food security) can be improved.
2) Technical Departments + NGOs / Development partners and actors themselves.
3) Stronger statistics

4.3 Impact of innovation platforms on marketing relationships - the case of Volta Basin integrated crop livestock value chains in Ghana

Presentation …..

Main messages: IP created additional options along value chain

Agricultural innovations as multidimensional and co-evolutionary process

Limitations with conventional methods: Difficulty to check cause-effect relationships; few econometric method; low availability of statistics in LDCs

Regression results

Improvements in access to in- and output market related to improved access to innovation

Some results hard to interpret, e.g. access to markets inversely related to household (hh) size

IP played a 'role' in improving communication and information sharing, opened new options

But proximity to markets & level of income still strongest determining factors

Impact of IP on marketed relationships

a) IP has created additional options for value chain actors; reduction of losses in the system; no market increase but potential for the future.
b) Government officers should be interested in this research; aid agencies and extension workers.
c) Scalability, why might IP work better in some landscapes then others? They started down this line… How would this study interact with the AWM study? Does the IPs have a different effect in areas with and without water infrastructure?

4.4 *Performance of Innovation Platforms in Crop-Livestock Agro-Ecosystems in the Volta River Basin in Burkina Faso*

By Kees Swans

Introduction

Linear approach to agricultural innovation has had limited success

Productivity increases through improved agricultural innovations does not always lead to improved livelihoods

Method

Monitoring IPs – Monitor IP meetings every quarter. Assessment focused on IP functioning

Only access to credit perceived as weak (Koubri) where they hardly participated in the IP

Key: Training, soil and water conservation, linkage to services

- Scores for indicators (performance of IP) increased over time
- Conflict resolution scored higher
- Gender only significant in terms of participation in decision making

Lessons

- IP improves linkages between different actors
- Not a quick win – need for long-term plan
- Issues should be of common interest, clearly articulated
- Quality facilitation critical
- Systematic monitoring and documentation indispensable

4.5 *Impact of V2 Innovation Platforms on Improvement of Crop and Livestock Production in Four Villages of Yatenga Province, Northern Burkina Faso*

By Gabriel Teno

It would have been interesting to include non-beneficiaries of the IPs since the study was only done with beneficiaries.
Members should have a legal status …

IA realized through FGD and Likert Scale measurement. Triangulation of qualitative and quantitative approaches more appropriate

Limitations / recommendations

- Counterfactual analysis to overcome limits of study approach
- Data collection – not easy for participants to link to Likert scale
- IP members should consider warehouse receipt system

Group discussion:

Capture from group discussions' flip charts session 4 (V2) & session 5 (V5)
1) On the second presentation comparing the results of Tolon to those of Lawra :
How to explain Tolon's best results in terms of climate difference between Tolon and Lawra?

2) Men always give bad land to women, but is it the only reason?
3) The methodology for impact assessment is very complex and unbalanced depending on the volume of activities carried out and their duration.
4) Has anyone checked why the IPs have a lower impact on women compared to men?
5) How do you explain household members' access to the market? Not adequately explained

5 Session 5: LESSONS ON INNOVATION AND CHANGE

5.1 Change and Innovation in the VBDC

By Karen Greenough

Lessons

a) Not getting the innovations to the poor. Comprehensive training is necessary for adoption.
b) Directed at development and research for developing the world, i.e.
c) I agree, but show us an option. I have lived in the village like her for 3 years and now know how they think of us. I get it. But Karen, please offer a solid scalable solution. None offered. Alas… just another SS crying foul. We need to work together to find equitable solutions. Sitting on the side and righteously crying out for change is not enough either.

5.2 Summary of the reviewers

Hekele (YP): Two presentations were on management strategies for agricultural water management and two on IPs
Biomass is also very important for both livestock and crop production to increase yield and income.
IPs - We can move from qualitative to quantitative data, access to market is the area of women.

Koumulani: Presentations were very informative. First to define livelihoods, what is the principal source of food? With respect to impact on livelihoods, we learnt that such innovations helped and that incomes increase where access to water, information and services increased.
Soil improvements – male performance higher than women due to the lower quality of the land given to the latter.
With regards to information sharing on IPs that were only effective over a shorter period of time, improvement of human and social capacity within the IPs helped. It is important to continue to receive support.

Alexander: How can this be out-scaled? – Results were in general positive and what are the next steps? What are the resources to do this with? What are the roles of the governments and NGOs resources into extensionservices? Who trains the IP facilitators and who trains their trainers? What is the success in the environmental impact assessment? Where to put your investment, is it into IPs or agricultural and fisheries development?

Summary where we have come so far

Timothy Williams (IWMI Africa Director) - Over a year ago we were also in this room and reviewed the VBDC progress. Achievements were then still at a very initial stage and work only starting on the ground. Looking at trials and model and the connection to outcomes and impact, but today it was most impressive what the projects have shown in the light of against all odds to reach as far as they did. Very surprised and impressed of the work today (whilst disappointed last year). Focusing the attention on what is mostly needed. Philippe was complaining about Impact pathways and outcomes pathways, but also in his presentation it showed how it helped them to reach as far. It is obviously work in progress while the program is coming to an end. The results can be categorized into two:

- Research results very robust and that can be shared
- Work not yet satisfactory drawn to a very good conclusions as it is for now

To 1) **Robust results** - Look beyond the merits and experimental results (eg. Irrigation from SR, technical work of that work and also the economic outcomes that is circumscribed by the many layers, the probability of rice in Ghana and some parts of Burkina-Faso) what would be the implications for the decision makers? We need to narrow the range of the implications for the decision makers at the various scales.

To 2) **Work in progress** – Problems with the methodological approaches and the collected data in the field match available data. We need to link your data and research outputs to development outcomes.
There is an irony we generated a momentum – there is really something generated and created something interesting R4D the greatest asset is the platforms with a convening power. IT is a good opportunity to launch a new program and take this (the social capital) further.
On the other hand there are also other calls from donors out there where you can collectively work on to raise new funding and attract other donors to build on the work and results that has been done and presented. Congratulating all the PLs in nurturing and building up the young professionals. Their improved performance and development and maturing has clearly shown in their presentations.

Alain: Thanks Tim for the inspiring words and measurement of progress. Mid-term reflections – asking for the extra mile – posing some questions – to keep in mind during the reflection spaces – what is the potential of groundwater storage in the Volta basin? An answer is important to fulfil his task when raising funds. For our R4D to be convincing we need to engage policy makers at the national level. It is extremely important – what is shown in the other basins.
Three questions:

1) what is the confidence we can invest in our research replicability possibility of impact (changes in improved livelihoods)
2) How can we ensure that the political makers change their behavior in practice? Support innovations Those involved in the projects are in the best position to circulate the political messages
3) How many people will benefit in what we are proposing? When we talk about SR, IPs, etc. how many people are we talking about? – We care for the people; we need to tell the policy makers, the poor people are that many. People in BKK, in Laos, and you want to talk about agricultural food production? We need to say how many people and other income sources –

5.3 Lessons from Implementing an R4D Program (as part of session 5)

Four group discussions around key elements of R4D in the VBDC

1) Participation team members and engagement with stakeholders

Host: William's group members, a representative from each VBDC project: Mariam, Hubert Dr. Karbo, Jean-Christopher;
Different participatory approaches in the VBDC: different versions of participation?

2) Capacity Development of Young Professionals

Host: Jennie, group participants from the big group

Capacity Development

- Good project ideas
- Training for students
- Introduction of new farming technologies (CES)
- The value chain approach as a way for building producers' capacities

Co-learning of students (PhD, Master…) is:

- An obligation for researchers (part of their job)
- A good student's research is always a positive output of a project
- Effective involvement of students by researchers in the project

Things that didn't work or could have been done better:

Training of professionals working in water-related agencies on the use of decision support tools coming out of the projects.
Introduction of retention strategies for the trained professionals in the water related institutions.
Too busy to mentor – quality of research outputs
Strengthening of national researcher's capacities and skills

Challenge: capacity development beyond the individuals (organizations)
How demand (versus supply) driven was the training – needs assessment?
Pas de restitutions des resultats aux farmers
How does capacity building for individuals translate into institutional capacity building?
Need for more cross-basin learning

3) Adaptive Management Use of OLM and other tools like that

Host: Tonya, with group members from the big group

Adaptive Management

- Researchers not the leader but partners in the process – good with medium size, difficult with large scale landscape projects.
- What are the effects when having an integrated program (of five projects) – task for the BLs and C+C projects
- Core tasks are the responsibilities of different partners: Researchers – research, development partners – development, but there is cross over
- PGIS Google Earth images brought and shown to the farmers to illustrate their environmental setting ➔ good entry point for engagement, improved relationships with farmers, they asked what they would need to do to improve, conservation of their environment and adopted suggested practices, not yet monitored, etc. because project was cut short budget and time wise.
- People doing the evaluation should be external (=more credible)
- Participation important – who and how is important
- Donors buy-ins are important, e.g. the CRP 1.3 AAS
- Farmer working on improved rice crop systems – and how they were able to adapt
- Include both traditional and new rice varieties allowed risk reduction with the high uncertainty
- We should start with pre-validation to avoid duplication, engagement with farmers' right from the start, create a common understanding.

4) Communication and Knowledge Sharing

Host: Mahamoudou; and members from the participants

Communications

- There has been inadequate sharing of project results and processes among the project members.
- Make sure communication tools are well understood by researchers and build their capacity to use (demystify) and exploit them successfully.
- A single person should be responsible for communication activities within each project. And there should be an overall communications focal point person.
- Make more use of telephone communications.
- Improve communications between researchers within a program (strategically plan from the beginning, establish platforms, etc.)
- Have clear internal and external communication plans and strategies at the project and program levels.
- Recognize communication efforts in researcher evaluations

- Build confidence among researchers and farmers (beneficiaries) on communications through peer review of communications activities and materials, evaluations, customized tools (for example for the media, etc.)
- Work with stakeholders to produce suitable communications materials.

Flipcharts write-ups			
Group	**What key messages and recommendations are coming out?**	**How can we use these findings most effectively, through what platforms and formats - and beyond VBDC?**	**What gaps have been identified and what can we do to address these?**
I	• Importance of "participatory approaches" and Innovation Platforms. • Identification of actors involved (which will impact results). • Importance of individual commitment + collective action + adaptation regarding predefined questions but that may change. • AWM positive impact on agricultural productivity. • Difficult to operationalize research outcomes in changing socio-political contexts	• Participate in policy dialogue Organize advocacy events Communicate to political leaders • Get closer to the private sector Use wider audience - media • Visit media immediately accessible for producers (radio, telephone, ...) • Hold decentralized open house days. (Ex: touring caravans) • Promote scale changes (adoption) through CSOs (Civil Society Organization).	• Inserting the project in long term dynamics. • Inserting the project in institutional dynamics (what forms of institutional support?). • Lack of integration between the various Vs: • Too ambitious / too complex / too short • Progress of the project did not allow achieving the original objectives (impacts on end users).
	- Involvement at communities from svert? - Participatory approach is key! - System approach to development of livelihoods. - Use people "within project" to take messages / lessons forward. - Engagement with policymakers critical. - Innovations are there, local institution need support (markets / policy, etc.). - (Strict key role in recharging ground water). - Water use around small reservoirs instead of direct (shallow wells). - Most approaches can be used to build adoption capacity. - Use water more effectively.	- Translate them into interesting messages for policy makers - How to make use of data available / generated / data management - Policy document? / Briefs? - Convince / engage Donors? (may listen to countries) - Looking at existing policy / entry points / what do they need? - Which level do we target? Bottom-up? When do decision makers meet? - Link with planning cycles. - Improvement of multi-stock holder presentation / take ownership- of intervention / key messages. - Synergy / Linkage of W4E with other programs / Buvalso integration between components.	- Engagement with policy makers. - Fragmented? Not clear bigger picture? Integration? How to build a common story? - Decision support model at local level? - Transboundary issues - Link between policy and implementation 1. Integration (projects, components, levels) 2. Bundle of innovations, but need support (markets, policy, services, institutions) 3. Participatory approach
	1) A lot of good work has been done, detailed studies. Did not shy away from tackling	1) Good work – Who? Done with integration of bigger picture? R4D etc. Approach WLE	1) IPs- a good initiative to take forward. 2) A lot of good work was done and should be

Group	What key messages and recommendations are coming out?	How can we use these findings most effectively, through what platforms and formats - and beyond VBDC?	What gaps have been identified and what can we do to address these?
	complex systems, and with all the financial challenges (budget cuts) taken into consideration. 3 years is too short. 2) CLE- **For BF:** CLES need to be ensured as a mechanism, CLE good plan, but implemented as a policy the benefits are not clear; to give community a role + voice in decision making processes. **For GH:** Involvement of communities into policy implementation 3) IPs-a good process for up-scaling, mainstreaming into district authorities, agric. extensionists, adaptation. Market access is an enabaling factor, but still a good way also for less market proximity communities. 4) Messages: VBA playing a bigger role in providing continuity and coordination.	(Water Land and Ecosystems CRP) and other donors 2) CLE -**Who?** NGOs + local government organizations (to community members) **How?** GH can learn from BF. Use the partners to take the messages ….. to communities to produce some documents (e.g. flyers, reference materials) 3) IPs - **Who?** Extension services, MOFA (GH) MOA (BF)	continued - Improve + Get new data - Find already available partners who have data - Strength of evidence - Do it yourself with new funding - Counter facture study (Gabriels) - Taking some studies to other sites 3) Proper HAND OVER Exit Strategy, Invite people to the table / shaping meetings, continue outreach + feedback to communities and people we worked with, Dissemination plan of V5

5.4 Presentation of results and final reflections on lessons learnt during the workshop

Summaries of the day

By Alain: *Great ideas were coming out of the group work: Philippe's caravan tour to share results, Use the mobile phones – which is very much of interest to donors and WLE.*
Thank you to all for the hard work

By Funke: *Thanks for all the participation, and good comments and presentations. Thanks to the WLE for joining us.*
Tomorrow is equally important if not even more so to demonstrate and show how our work can be useful to them. It is an attempt to tell WLE what they would want to do with the results; WASCAL also shows what they do and what can feed into their work. The demonstration of TAGMI, IPs, ComMod.

6 KNOWLEDGE FAIR

Components of the Knowledge Fair

Video - Anglophone with translation + Q&A, suggestions. These are displayed in three booths:

1) TAGMI
2) ComMod
3) IPs

Poster Titles and presenters

VBDC

1. Farmer led-innovation toward rain water management and crop-livestock production systems in the Volta Basin: Lessons learnt from Orbile Community, Northern Ghana. -- ***Dr Karbo***
2. Structure, specific composition and diversity of wood products in two contrasting areas in the Sahelian zone of Burkina Faso - ***Mr Maurice Savadogo***
3. Socio-economic impacts of dams in the northern region of Burkina Faso: Case of Ziga, Ninigui and Ouahigouya - ***Mr Joachim Ouedraogo***
4. Increasing Onion bulb size and yield through IPM strategies at the Binaba Dam 2 in Upper East Region of Ghana -- ***Mr Yirzagla Julius***
5. The peasant management of water resources in the lowlands of Dano. - ***Mr Pathe Sié***
6. Use of rainwater in rainfed crops: association of fruit tree growing and grain crops in western Burkina Faso - ***Mr Kekele Adama***
7. Impact of agricultural water management interventions on the hydrology of the White Volta Basin: the case of Dams and Dugouts -- ***Mr Joachim Abungba***
8. Impact of small reservoirs and dugouts on the hydrology of the Black Volta Basin, Ghana -- ***Mrs Joahna A. Atuley***

General Spaces

1. West Africa S… Climate Change Adaptation and Land (WASCAL), ***Dr Barry***
2. Water Land and Ecosystems (WLE), team
3. Nile BDC, team
4. Limpopo BDC, Khumbulani

Displays for VBDC materials

Feedback by participants

1) VBDC movie

Appreciation	Counts	%
Fantastic	**5**	12
Very Good Movie	**24**	56
It was Ok	**13**	30
Err…Not my cup of tea	**0**	-
A waste of my time	**1**	2
Totals	43	100

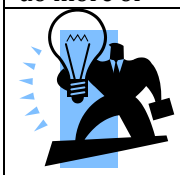
Feedbacks on IPs Booth

- Good documentation on IPs
- Educative at all levels
- The IP work was fantastic, but more time is needed to see the results: Great job!
- I am impressed with what I have seen (Jacob)
- Nice explanation of an innovative approach to address a problem along the value chain. Good attention to how to gain real results (connect to all levels of policy making).
- Very good explanation of platforms / Documentation is very illustrative and easy.
- SNV's work is great .What this organization is doing contributes to alleviate poverty. I will personally use this booklet to sensitize my people at home.
- Good presentation of the shea sector; the potential of certain areas is still not valued particularly in Boura in the Sissili.
- Many activities were carried out. The beneficiaries are the most represented stakeholders. Set a complete value chain of all stakeholders involved in the success of an activity. Elucidate the financial or non-financial impact for each stakeholder.
- SNV shows us a good impression through its activities. Technology transfer and capacity building are really commendable.

Feedbacks on TAGMI Booth

- Nice presentation on the results and the method used
- Would be nice to see how the model corresponds to existing / failed dams.
- Correlate with dam development instead of historic. Add a metadata on dam characteristics and functionality.
- Where/what are the sensitive indicators?
- Ability to change threshold values and see what the implications will be.
- Feed in fine resolution data at the local level and make it possible for people to input own data. So is it possible to just have the model structure?
- For the model to be used, for prediction and planning it seems to be important to take climate change scenarios.
- At what level will the TAGMI be applied? District or local? (Jacob Tumbulto/VBA)
- Create the possibility for users to hold their own factors or variables for out-scaling different interventions
- Need for improved calibration considering the weights of indicators + other socio- political factors such as government regimes could be considered. (Frank Annor)
- Validate based on dam functionality not location. Is the dam providing desired benefits? Or has it failed as means of validation?
- Crop-livestock system need/can be addressed/ integrated systems/conserve [RWH] stone in dry season? Sand dams/banks? (Mr. Peter Ayoreko Tamale area/NE Ghana)

Synthesis session: Feedback by getting the four quadrants. Participants were asked to use the acronyms below to indicate how well the workshops met their expectations. These are presented in Table 1 below:

☺ Process and Content What did you like? worked well Keep do more of	Δ Process and Content How to improve? Recommendations Suggestions
 "aha" Moment … Novelty?	⇒ What needs to be done next and by whom?

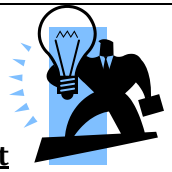
Let a few people share one of their feedbacks on voluntary basis → then collect all their sheets

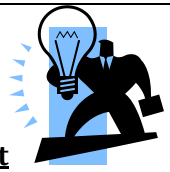
Knowledge Fair comments shared in plenary

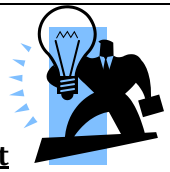
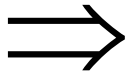
- Develop a catalogue of the posters from all of this research and coordinate this through V5 and in partnership with the VBA. This would be very helpful in enabling continuation of the communication of the research and its results.
- It would be good to have a synthesized policy, focused document or set of recommendations to take to decision makers. So far this seems to be missing from CPWF in the Volta.
- Turn these materials into training materials in both languages.
- Make sure that information is disseminated along with the water agencies because they're in charge of operationalizing the AWM solutions.
- Direct exchange between research and INERA around onion production.
- Obtain information on how the information has been disseminated, used, and acted upon rather than just dissemination.
- Very much like the level of consultation that has been done by the researchers among the communities allowing them to own the process, rather than imposing what researchers think is good for the communities. This helps to ensure that the outcomes are well received and relevant and more likely to be acted upon.
- In some of the socio-economic presentations there's not enough biophysical elements and vice versa. (Fabrice) <=> (Alex) had the same impression, but learnt through the booth companion modelling that there was integration. Coupling and integration didn't seem to be there but after discussions in knowledge fair it became much more clear than from the presentations alone that this had in fact taken place/been a focus. (Alex)
- Fair was good but need to bring all the posters together and bring everyone into the same room for more exchange. (→ Ewen: rationale for taking the posters into another room was because we expected more external participants*)*

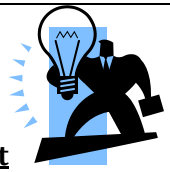
….

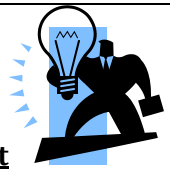
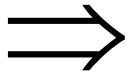
Table 1: Notes on the feedbacks of participants on the "Knowledge Fair" in detail:

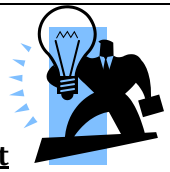
What I liked	**How to improve** Δ	**Lessons learnt** 	**Recommendations for the future** ⇒
All exhibits are rich in knowledge -	- Enhance capacity building in the field of training -Sometimes, the translation is not consistent with the context	Researchers , NGOs, producers involved	-Dissemination of outcomes to help decision-makers to make appropriate decisions regarding management - Researchers need to feedback to producers.
- Interactions with other Vs; it allowed a better understanding of their activities. -Discussion on participation - Dinner on Thursday evening - Place given to students	-Allow people who animate the stands to see what has been done by others. -Invitation of stakeholders who are not CPWF members to participate in the fair (to have stands): ensure their presence. This contributes to the dissemination of outcomes. Why was the political leader absent on Thursday evening (at the closing ceremony)?	IPs and their vision of participation have generated a rapid change in practice. There is still the question regarding the sustainability of these changes in practices	Many results are not yet final and require 1-2 additional years to be transferable. There is a need for donors to change the structure of their financing: a 5-year project vision. Link with WLE? For V4, pursue the completion of the CLE action plan (in Burkina Faso) and the establishment of a small "board" (Ghana) This will therefore require that these results are put in legislation or at least in the work plan of some institutions (WVBB and water agencies.)

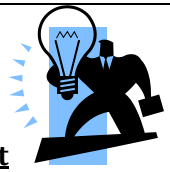
What I liked	**How to improve**	**Lessons learnt** 	**Recommendations for the future**
Discussion on posters	-More posters needed -Too general messages -Not enough oriented solutions	Watersheds in Northern Ghana for breeders	Relevant State departments: Ministries (DGADI), Ministry of Water.
Open discussion in small groups around the booths	The amount of tools presented	Idea for my next project Idea of a conference may be interesting	Why forward?
-The film -Facilitation Presentations and research outcomes, especially the results of innovation platforms	The duration of projects to have more tangible outcomes	I discovered TAGMI and the COMMOD approach	Leave room for better capitalizing and up-scaling the innovation platforms by SNV with CPWF/WLE specifying teaching materials.
Organization per linguistic group	Exchanges time Different work to be put (together) on USB stick or CD	Participative Approach	-Continued training of young researchers Feedback to structures, project and NGOs/Associations working in the field

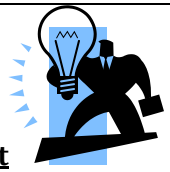
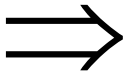
What I liked 	**<u>How to improve</u>** 	**<u>Lessons learnt</u>** 	**<u>Recommendations for the future</u>** 
			Rural extension. (Pr Da)
Innovation platforms for the development of the value chain	*Posters :* *Introduction of Galmi onion by CSIR* *Research on small reservoirs (White Volta and Black Volta) in Ghana*	*Rich documentation on the various applications*	*Ensure greater dissemination, a sharing of outcomes* *Communicate results to water agencies in Nakanbé and Mouhoun in Burkina Faso.*
Good presentations *The knowledge fair was quite rewarding*	*Presentations have not received many comments and questions for clarification*		*There was a lot of friendship between participants* *The question that arises is the post-workshop: what is the next step?*
	Questions about the characteristics of the images used in the study *Think about improving certain techniques like Zai and stone bunds (lack of stones)*	*I think it was interesting but there was a language problem which prevented some English speakers to visit our stand* *French-speakers may develop posters in English and explain them in French and the same for English speakers.*	*Researchers must find less costly and less painful techniques for producers.* *For example, using mechanized Zai can lead us to a staggered system*
In terms of content	*-develop more confidence with producers*	*The dedication of the program to assist communities in effectively managing*	*- CPWF should communicate its results through several forums, media.*

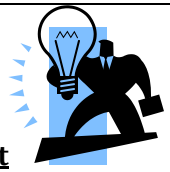
What I liked ☺	**How to improve** Δ	**Lessons learnt** 	**Recommendations for the future** ⇒
Importance of research outcomes *In terms of process* *Organizations of the workshop that will help make a full assessment without omitting some outcomes.*	*-Review the intervention scale of projects, their integration to prevent resumption of activities already carried out .* *Decision-makers must be more decisive in their actions to the communities.*	*water resources*	*-Set up a monitoring and evaluation team for field work.* *-Continue studies while involving students.*
I liked the students' posters (Burkina Faso and Ghana)	*Add other data*	*The participatory approach is crucial in any development activity.*	*Researchers must support students, train them, actually involve because they are also future researchers.*
All exhibitors were all there next to their exhibitions. Ok ! *Diversity of topics presented* *Good idea for this fair because we could exchange directly*	*For documents in English, try to translate them (as some have done it); this can favor interaction.*		*Capitalize results as extension materials for beneficiaries of our research.*
Organization per language and theme *-The Approach*	*-Students' posters* *The involvement of more stakeholders*	*- Objectives of SNV* *-Activities in Limpopo*	

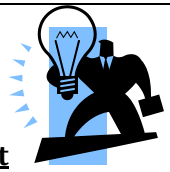
What I liked 	**<u>How to improve</u>** 	**<u>Lessons learnt</u>** 	**<u>Recommendations for the future</u>** 
-The research outcomes	*Presentation of outcomes : have tangible data*		*Researchers need further work taking into account comments* *The leaders of the project should involve politicians and peasant leaders in the communication of research outcomes* *Exploit the research outcomes through development projects.*
I appreciated	***We could improve approaches and organize feedback to the base***	***Moments of discovery both in content and in the process.***	***Disseminate the various results for maximum impact.***
Consideration of the bilingualism of presenters and facilitators.	***Time***	***At the level of stands : No significant impacts of small reservoirs on the capacity of the Akosombo Dam in Ghana***	***This is a research project; you should therefore think about the academic valuation of results. University curricula.***
Mastery of the various topics developed in stands by the presenters. *Various topics on water resource.*	*Synchronization of passages in the stands was not well respected*		*Capitalize and produce materials to allow the continuation of activities* *Training and information* *Feedback from beneficiaries.*
Good setup with the booth allowing for interaction in groups.	*Keep as much as possible all aspects of the fair on the same hall.* *Some peripheral presentation did not*		*Perhaps consultation between CPWF and WLE in advance of such activity could help plan for how outcomes and promising research can be forwarded*

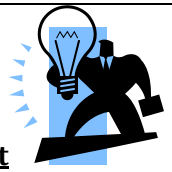
What I liked ☺	**How to improve** Δ	**Lessons learnt** 	**Recommendations for the future** ⇒
No overload in Information	*receive any attention mainly because they were on the annex.*		*under WLE after 2013.*
Learnt much more about individual projects and saw the presentations. Specifically, the work by William's Daré was clearly explained with examples. *I believe this was also true for the TAGMI model. Demonstration of the tool and findings are a good way to transform knowledge.*	*Summary information was provided and helpful but finding document, specific findings for development might improve knowledge transfer.*	*I met with two researchers and found out model needs more information in this informal setting.*	*Capture data, publication and main findings online!* *One step shipping keep it alive so as research emerges it become catalogued online*
Researchers' efforts to allow ownership of the process by communities and of stakeholders do not agree that a problem exists; all other efforts will be futile.	*Current publicity of these laudable research findings are very low.* *Development of zone communication strategies for each project will allow usage of findings as well as feedback for improvement.*	*A research program that means struggle the whole value chain of selected irrigated crops* *Multidisciplinary team required.* *Water resource management lead to a process in which are production, market issues.*	*Efforts are all about getting money into the pockets of the rural poor especially.* *Research should move towards maximization of profit use for irrigation water.* *Provide various alternatives /options for farmers to choose degrees on rain availabilty*
Good session, more themes, more booths	*People upstairs were isolated.* *Where were the posters?*	*The dialogue at one session , new methods for validation and feedback from audience*	
Opportunity to share research	*A lot more time for group learning*	*Young professionals presentations*	*How to link various results/outputs and*

What I liked 	**How to improve** 	**Lessons learnt** 	**Recommendations for the future** 
methodology with other teams			*translate to session.* *V5 team and high level policy group. Forever build capacities of young professionals.*
Expositions were good especially the Posters *Documentation by SNV is good for sharing on IPs.*	*Translate French posters into English and vice versa.* *Reproduce leaflets of posters for sharing with stakeholders.*	*Publish all the posters for sharing." Posters album from Volta basin. This can be done by V5 in partnership with VBA.*	
A lot of water management and modeling tools as well as impact evaluations of the VBDC have been developed or presented. *-This shows that a lot of effort has been put in the last three years.* *-However there is a time factor to realize the change* *- The studies also did not show change for the future interventions or practices.*	*Putting the research outcomes into practices is one of the options.* *If they are to be used only for documentation, only showcasing it will be a terrible mistake or can be seen as a failure for the project.*	-	*Let development partners see the results while at the same time emphasizing to them the importance of enough time to realize the development goals.* *They and the communities concerned* *Aspire to see.* *Help these research outcomes to be applied in means that support sustainable change in livelihoods.*

What I liked 	**How to improve** 	**Lessons learnt** 	**Recommendations for the future** 
	Need to improve communication within and without (intra and Inter) with reference to timeliness and clarity of information relay *Communities or policy makers needs to be fed with information to make the process complete; else the research findings will be useless or left only on shelves.* *In subsequent projects communities / beneficiaries should be involved right from the planning stage , not implementation*	*The potential of small reservoirs to improve livelihood of rural populace* *Importance of IPs in the lives of the community members.*	*In subsequent projects communities / beneficiaries should be involved right from the inception, planning and implementation synthesis of the VBDC main results from research activities carried out in the VBDC over the pass 3years by researchers and students.*
			Issues for consideration: *Representativeness: It's important to ensure adequate representation of stakeholders of agricultural value chain when designing/implementing interventions.* *Multi-stakeholder participation:*
			For stakeholders to take ownership of interventions it is crucial to involve them right from the planning stage of research.

What I liked ☺	**How to improve** Δ	**Lessons learnt** 	**Recommendations for the future** ⇒
-The provision of adequate handout information on VBDC project *-Video Clip presentation* *-The facilitation process*	*Effective incorporation of the livestock component into scientific workshops: eg: small ruminants, pollution, especially guinea fowls in northern Ghana.*		*Scaling out of success stories to other participants of the communities not involved in the project.*
A forward thrust does not only limit resources to agriculture that does not harm environment, but to agriculture that improves soil and water quality, conserves biodiversity and increasing resilience of rural communities that depend mostly on Ecosystems.	*Knowledge fair needs diverse audience.* *Knowledge fair, a systematic access to booth approach – otherwise some booths won't be visited.*	*TAGMI demonstration!!!!*	*Results consolidated by VBA* *Results taken to community by:* - *Local authority* - *Extension officers.*
Lot of information interesting	*May be all in one room is better*	*Not the moment*	*What outcome is expected from knowledge fair? Just share information or actually some call to action?*
-Young professionals have looked at the effect of small dams on downstream users. Very good ideas have even looked at the effect of climate change on the impact of these dams/reservoirs. *-Only information on Ghana was used whereas the basins are transboundary.* *TAGMI was good.*	*-To improve the results integrate the data on small reservoirs in Burkina Faso-+ their growth rate) to get the real impact.* *-Considering that land in owned by clans and families it may be interesting to have the tool developed further down (at local level)*		*Some information and tools developed should be made available to the local administrations for use.* *Data generated should be put together for future use.*

What I liked ☺	**How to improve** Δ	**Lessons learnt** 	**Recommendations for the future** ⇒
Presentations were good, posters good. Excellent dinner	*More funds to continue the work started.*	*Nothing yet!*	*Let's continue the good work started.*
Development research and academic research. *Improving local stakeholders' participation in water management through innovation participation (Platform?)* *Access to market increases income and food security for local farmers.*	*More in-depth and applicable research should be given enough time and resources.* *Complete all models developed which are not complete.*	*Improve development research in the basin* *Enhance the involvement of development projects* *Publish posters album for the Volta basin.*	*VBA, coordination institution of CPWF* *Various partner research agencies should publish research papers.*
Good mixture of activities *Good opportunity to disseminate publications*			*The knowledge fair could be used by Phillipe's "caravon workshop"???? Travelling around Volta-.A good representation of the VBDC. VBA can do it for local governments, implementers.*
Informal discussion around POSTERS. *Share fair principles.*	*All Good!*	*Potential for TAGMI scaling up*	*Post Posters on CPWF web.* *Invite booth holders to blog on web blog about their experience when engaging with others today.* *Improve movie with TV channel, eg TV5 Afrique*

What I liked ☺	**How to improve** Δ	**Lessons learnt** 	**Recommendations for the future** ⇒
Poster session was interesting and original	*Poster session was too scattered (2 100ms with different importance(stands vs posters)* *More Posters* *One "stand"=booth per project would be initiative* *One "stand" VBDC with "integrated views".*		*What are the perceptions of "beneficiaries"(decision makers, farmers) VBA should organize this activity*
Information good *Useful information exchange*	*More exhibitions* *More external visitors/participants*	*no*	*N/A*

7 High panel meeting for policy-makers

Presentation of key (meta) messages as introduction and before the panel

By Olufunke Cofie

Other comments from later in the day:

- WLE hopes to build on the networks and relationships developed through CPWF. These are invaluable. (Andrew)
- I haven't heard much about 'sentinel' landscapes in relation to research in the Volta.

Panelists feeding back their impressions and suggestions

ECOWAS, Water Centre Burkina Faso (Anna)

West African Water Resource Policy (2008) with Action Plan to be validated this year. This research appears to be in line with the region's priorities according to this (above). For example, IWRM implementation is a key focus area for the Water Resource Centre here in Ouaga. IWRM plans support so it's nice to have this represented in the CPWF research here. Water quality – V3 focus, which is interesting from our perspective. Connecting research to policy, making what ECOWAS wants to do is to establish policy norms; CPWF therefore has the opportunity to feed into these regional initiatives. 2nd priority of action plan is to promote investments; therefore CPWF appears to have some good practices to share in this regard too. 3rd priority is promotion of regional integration = 3 new river basin organization's establishment, so this is another good opportunity to share good practices among river basins and across these river basin organizations. Key role of water centre is to share good practices and interventions, capacity at the moment is still building up – regional water observatory is planned, CPWF could feed into this perhaps? Key aspect underway is the directive on large scale infrastructure for West Africa developed with IUCN. There are six recommendations, one of which is on how to ensure local participation; actors are represented as beneficiaries etc. Challenge is to work out how to best share experiences, lessons, ECOWAS seeking a good tool/mechanism to ensure that the policies and research is aligned. How best to achieve this (mechanism). This is another opportunity.

Volta Basin Authority, Charles Biney

Four main points:

1st point - Relevance of the CPWF Volta initiative from the point of view of VBA has strongly participated. CPWF effort's is very relevant to the Volta basin because VBA has strategic plan of five strands, CPWF work relates to four of these five. Four are to do with strengthening of knowledge base of basin, harmonizing policies, coordination of management and actions, as well as dealing with stakeholders.

2nd point - we have to practicalize the results. This is because you have worked in selected areas but from the basin point of view we need to improve livelihoods across the whole basin as well as improve sub-regional integration. 3rd point – we can only do this with all the stakeholders including scientists so don't think you can now just pass this onto policy makers and walk away. Last comment – how are we going to move forward? A systematic way is needed. VBA can move forward taking some of these things but we cannot do this indirectly, we need to be in partnership with you on this. So now we need to prioritize in the short and long term, if you add that to what we can do directly then we can see where we can find the most effective way of moving forward for impact.

Burkina Water Ministry Representative

The objectives set by the government include: ensuring food security across the country and sub region. Burkina is said to be a Sahelian country across two regions; we know that our agro pastoral production is subject to climate impacts. So we want to improve productivity and production and this can only be possible if we have control over water. Because then we can secure, intensify production, and increase it. Water mobilization in Burkina is a key concern of the government. We don't only have agriculture that needs water, there are many other things we need water for, so we need to avoid conflicts. Both at the national and among our neighbors we are looking at avoiding conflict in the use of water especially in the use of water resources that are shared among West African countries. The value of water – very rare and valuable with so many uses; we also don't have access to the sea and even then we'd need to treat this water. We are therefore very early working in IWRM so we want and need to engage all stakeholders, we need to engage at the local level primarily, government can't be responsible for the daily management of water so we are engaging in capacity building of local water groups/managers. Mobilization of water resource, scarce so we need to mobilize it; without that we can't have any activity, and this can be done by building dams and other infrastructure. So we have been interacting with Ghana since 1993 to discuss Bagri dam, this was before the construction of Ziga dam. We aim to avoid conflicts like this over water by having regular visits to discuss and we want to collaborate on the building of the new damsWe also need to collaborate on the quality of water resources as well.

Ghana MOFA Representative

We accuse Burkina Faso of giving us too much and too little water. The use of innovation platforms is really thinking outside the box. This will help with national security by reducing potential for conflict over water. Policy has a role to play. I see that fantastic research work has been done through CPWF. AWM and water governance as well as value chain focus is great. But the question is where do we go from here? More people need to know about the results. What is the communication strategy now? Sometimes researchers think and deliberate too much about whether the results of their research are 100% correct; they worry too much about potential uncertainty. So they hesitate to share their results, but governments want quick fixes. We need things that improve livelihoods now. It's all about putting more money in the pockets of farmers. Schemes that make money for farmers are successful. Therefore we need to begin by asking what the market wants. Then work back from that to get buy-ins from farmers. In this way governance structures will also be strengthened. Let's try to publish and communicate now and see what we can do now with all this research. Let's use the networks we've established to achieve positive results for everyone. Multidisciplinarity is the way forward.

WASCAL

Barry Boubacar

Congratulations to all of the CPWF team. WASCAL can learn from these findings. There is no model for climate change in Africa or in West Africa. WASCAL is working on this and on integrating changes in land use in the model. The issue of small reservoirs as a climate change adaptation measure as highlighted by this research is interesting. WASCAL findings show that there is no negative impact on water resources by using small reservoirs for water storage. This research has helped to reduce the potential for conflict between Ghana and Burkina Faso. I was impressed by the innovation platforms. How to bring everyone to the table was a key question for us. It seems that innovation platforms are a useful way to achieve this. These platforms allow us to know exactly what the farmer's concerns are and to be more informed towards helping them address their food insecurity. I propose the development of a platform, through WASCAL, so that these models can talk to each other, so that the socio-economic models and the bio-physical models are integrated is such a way as to be useful to policy makers in planning and decisions. Important to remember that the first and primary decision maker is the farmer. Therefore we need to focus there first.

16.15 Thank you and Official closing

Overall Workshop Evaluation

1) How useful was this meeting?

Question/Appreciation	**Totally Useless**	**Useless**	**Useful**	**Very Useful**	**Total**
Counts	0	0	11	16	**27**

2)

Question/Appreciation	**Not relevant at all**	**Not very relevant**	**Relevant**	**Very relevant**	**Total**
Counts	0	1	17	8	**26**

3. Did you have any breakthroughs or "aha moments" and if so, what about? (Total responses 12)

- A lot of breakthroughs including sharing experiences acquired with others and getting to know that about others
- Some results achieved with very little resources and time
- What will be very useful is to link the very detailed case studies to the national mapping in TAGMI upscale the sampled data to improve data underlining TAGMI. It should be possible.
- There is still need to generalize research outcomes towards development actions. I really enjoyed the discussions around the table.
- Not an "aha" moment, but realizing that all the work presented is in context for asking bigger picture question regarding projections of ecosystems, agriculture, soil, water resources + societies. We must identify these + be bold regarding promulgating these findings. Well done.
- The decision tool TAGMI- good initiative and a clear indication that people would actually want to influence decision makers. The trial was a step in the right direction.
- Yes : evaluating session/ discussions/ reflection concerning participation
- In our team (project) these was a miss Coordination
- I came to know that the VBDC program followed only on Ghana and Burkina Faso although the basin is shared by other countries too.
- Science has revealed a lot but we need to move forward with the result for impact.
- Combining development research with academic research.

Question/Appreciation	**Too Much**	**Just about enough**	**Not enough**	**Totals**
Counts				
Information/Power-points	6	19	1	**26**
Reflection/group work	1	16	9	**26**
Plenary synthesis	2	15	8	**25**

5. What other suggestions do you have to improve the content, structure and logistics of the meeting (Total responses 15):

- The light off has somehow affected some presentations. The conference room might have a private power plant (generator) to avoid disruption of the presentations.
- Kle should try to stick to time!
- Because of so much information/presentations it was good to have only 10 -15 min each – encourage just key points. If aren't more details, need to have one more day maybe
- More insight into how all the research ties together.
- I am very happy to provide more feedback re: 1, 2 and 3 +.ellis@cgiar.org 4 was great.
- Involve farmers' leaders in debate.
- Improve the food. Print Agenda
- Have a joint discussion of the whole team asking thought provoking questions. Perhaps a platform to offer solutions to the problems raised.
- Was quite perfect. No additional comment. Next year! Why? When? Where?
- Open discussion of questions would have been useful. Feedback from the reflection group work could also have been useful.
- Better back toppling, synthesis, feedback for next time. For this meeting it was not structured.
- The meeting was well organized and the logistics are quite fine.
- More feedback on any group work.
- Improve on the time allocation for student presentations.
- I recommend that we involve representatives of the beneficiaries of projects to similar future meetings.

Appendix I: List of participants and Addresses

N°	NOM & PRENOMS	ORGANISATION	ADRESSE EMAIL	Sex		17/9 /13	18/9 /13	19/9 /13
1	Karbo NAAMINONG	CSIR-ARI	minongkordam@yahoo.com	M		X	X	X
2	Frank Ohene ANNOR	KNUST/TU-DELFT	annorfrank@yahoo.co.uk	M	YP	X	X	
3	Emmanuel PANYAN	CSIR-ARI	emmanuelpanyan@gmail.com	M		X	X	X
4	Hubert SOME	SNV-BF	hsome@snvworld.org; hubsome@yahoo.fr	M		X	X	X
5	Philippe CECCHI	IRD G-eau	philippe.cecchi@ird.fr	M		X	X	X
6	Jean-Christoph POUSSIN	IRD G-eau	poussin@ird.fr	M		X	X	X
7	Grace NUINGA	ICRAF-WLE	g.muinga@cgiar.org	F		X	X	X
8	Ewen Le BORGNE	ILRI	e.leborgne@cgiar.org	M		X	X	X
9	Souleymane SANOGO	UPB	souleymanesanogo29@yahoo.fr	M	YP	X	X	X
10	MARIAMI Zewdie Adane	ILRI	zewdieadane@yahoo.com	F	YP	X	X	X
11	Marloes MUL	IWMI/WLE	m.mul@cgiar.org	F		X	X	
12	Fabrice DE KLERCK		f.declerck@cgiar.org	M		X		
13	Tim ELLIS	IWMI	t.ellis@cgiar.org	M		X	X	
14	Aaron ADUNA	WRC	aaronaduna@yahoo.com	M		X	X	X
15	KEKELE Adama	UO/BF	kekeleadama@gmail.com	M	YP	X	X	X
16	Savadogo O.Maurice	INERA	savadogoouango@yahoo.fr	M		X	X	X
17	PALE Sié	UO/BF	palesie@gmail.com	M	YP	X	X	X
18	OUEDRAOGO Joachim	UO/BF	ouedraogo_joachim@yahoo.fr	M	YP	X	X	X
19	TOGO Hermann	FNGN/BF	sidbeemeht@gmail.com	M		X	X	X
20	BALIMA/DAMA Mariam	INERA/V1	balimaria@yahoo.fr	F		X	X	X
21	Alex FREMIER	WSU, USA/WLE	alex.fremier@wsu.edu	M		X	X	X
22	Tazen FOWE	2iE, Fondation	tazen.fowe@2ie-edu.org	M	YP	X	X	
23	Korotimi SANOU	UO/IRD	sanoukoro@yahoo.fr	F	YP	X	X	
24	NAPON Katian	Université de Koudougou/BF	katia-napon@gmail.com	F	YP	X	X	X
25	Samuel NII ODAI	KNUST/Kumasii Ghana	snodai@yahoo.com	M		X	X	
26	KOUTOU Mamadou	AUC/SAFGRAD	kout38@hotmail.com	M		X	X	
27	KARAMBIRI Harouna	2iE V3	harouna.karambiri@2ie.org	M		X		
28	Larba NABA	MEAHA	hadjaboayema@gmail.com	M		X	X	X
29	Tonya SCHUETZ	CPWF/IWMI	t.schuetz@cgiar.org	F		X	X	X
30	Nicoline De HAAN	WLE/IWMI	n.dehaan@cgiar.org	F		X	X	
31	SANA Seydou	SP-PAGIRE	sanaseyd@yahoo.fr	M		X	X	
32	Joanne MORRIS	SEI	joanne.morris@york.ac.uk	F		X	X	

N°	NOM & PRENOMS	ORGANISATION	ADRESSE EMAIL	Sex		17/9 /13	18/9 /13	19/9 /13
33	ABUNGHA Joachim	KNUST	joachimayiiwe@yahoo.fr	M	YP	X	X	X
34	KAMBIRE Sami Hyacinthe	INERA	hyacinthekambire@yahoo.fr	M		X		
35	Thor Windham-Wright	IWMI	t.windham-wright@cgiar.org	**M**		**X**	X	X
36	Jennie BARRON	SEI	jennie.barron@sei-international.org	F		X	X	X
37	Martin L. van Brakel	WLE	m.vanbrakel@cgiar.org	**M**		**X**	X	
38	Khumbulani DHAVU	ARC-IAE Limpopo	DhavuK@arc.agric.za	**M**		**X**	X	X
39	Fred KIZITO	CIAT	f.kizito@cgiar.org	M		X		
40	TRAORE Amélie	Water Aid (RLC-WRM)	traoreamelie@wateraid.org	F		X	X	
41	Gabriel TENO	ILRI	G.Teno@cgiar.org	M	YP	X	X	X
42	Augustine AYANTUNDE	ILRI	a.ayantunde@cgiar.org	M		X	X	X
43	OUEDRAOGO Blaise	INERA/KBSE	blaise32fr@yahoo.fr	M		X	X	X
44	KEITA Denis Mathurin W	UO/BF	keidmat@yahoo.fr	M	YP	X	X	X
45	Moussa SY	Consultant/V5	msy2870@gmail.com	M		X	X	X
46	Mohamadou Torou Bio	Assistant recherche V4	btorou@gmail.com	M	YP	X	X	X
47	Joan Akandi Atulley	KNUST	akandejoan@gmail.com	M	YP	X	X	X
48	LAMIZANA Issa	INERA	lamizissa@yahoo.fr	M		X		
49	Jacob TUMBULTO	VBA	jwtumbulto@gmail.com	M		X	X	X
50	Samuel Yao ATIKPO	VBA	samuel.atikpo@gmail.com	M		X		
51	Issa OUEDRAOGO	INERA	issadeh.ouedraogo@gmail.com	M		X	X	X
52	BONOU Alphonse	MASA/cab CT	alphonse.bonou@yahoo.fr	M		X		
53	BARRY Boubacar	WASCAL	b.barry@cgiar.org	M		X	X	X
54	Dapola Da	UO/BF	evaristeda@gmail.com	M		X	X	X
55	Williams DARE	CIRAD	williams.dare@cirad.fr	M		X	X	X
56	GUIGMA Brahim	Ouverture Télé	guigsti7@yahoo.fr	M		X		
57	SOME Crépin	MRAH	nazinasb@yahoo.fr	M		X		
58	Timothy WILLIAMS	IWMI/CPWF	t.o.williams@cgiar.org	M		X	X	X
59	Alain VIDAL	CPWF	a.vidal@cgiar.org	M		X	X	X
60	Camilla ZANZANAINI	BIOVESSITY	c.zanzanaini@cgiar.org	F		X	X	
61	THIOMBIANO Foldia Jean-Paul	CRA/EST	thiombianofoldia@yahoo.fr	M		X	X	X
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80	Peter Ayoreko	SNV	A.Peter@snvworld.org	**M**			X	X
81	TENGNAS Anna	ECOWAS	annatengnas@gmail.com	F				X
82	VOKOUMA Edith	DGEAP/MRAH	vokedith@yahoo.fr	F				

Appendix II: Social Media Coverage by Thor Windham-Wright

CPWF – Volta Basin Development Challenge Final Science Workshop – Ouagadougou, Burkina Faso - Social media report – 23.09.2013

Slideshare

The following Power-point presentations and poster presentations were uploaded onto Slideshare, during or immediately following the workshop. The figure in the right hand column is the number of online views of that presentation to date (10/10/2013).

Farm level best fit rainwater management strategies and soil improvement methods http://www.slideshare.net/CPWF/farm-level-best-fit-rainwater-management-strategies-and-soil-improvement-methods-for-seed-and-biomass-yield-in-a-maize-soy-bean-intercrop	1972
Impact of innovation platforms on marketing relationships – the case of Volta Basin integrated crop livestock value chains in Ghana http://www.slideshare.net/CPWF/impact-of-innovation-platforms-on-marketing-relationships-the-case-of-volta-basin-integrated-crop-livestock-value-chains-in-ghana	2151
Performance of innovation platforms in crop livestock agro-ecosystems of the Volta basin in Burkina Faso http://www.slideshare.net/CPWF/performance-of-innovation-platforms-in-crop-livestock-agroecosystems-of-the-volta-basin-in-burkina-faso	348
Impact of innovation platforms on improvements increase of Crop and Livestock Production Burkina Faso http://www.slideshare.net/CPWF/impact-of-innovation-platforms-on-improvement-and-increase-of-crop-and-livestock-production-in-four-villages-of-burkina-faso	391
CPWF INERA synthesis of PGIS on technology – (CPWF INERA synthese de PGIS sur les tech) http://www.slideshare.net/CPWF/cpwf-inera-synthse-de-pgis-sur-les-technologies-de-gestion-de-leau-agricole-au-burkina-faso	39
Agriculture Water Management technology expansion and impact on crop yields in Northern Burkina Faso http://www.slideshare.net/CPWF/cpwf-basin-science-volta-awm-review	533
Setting up for successful AWM interventions http://www.slideshare.net/CPWF/cpwf-basin-science-awm-interventions-using-consultative-approach	951
Introduction to CPWF – Volta Basin Development Challenge http://www.slideshare.net/CPWF/introduction-to-cpwf-volta-basin-development-challenge	479
TAGMI – an interdisciplinary decisions support tool in AWM out-scaling for the Volta River basin http://www.slideshare.net/CPWF/tagmi-an-interdisciplinary-decisions-support-tool-in-awm-outscaling-for-the-volta-river-basin	56
Agricultural intensification and aquatic ecology impacts and trade-offs http://www.slideshare.net/CPWF/agricultural-intensification-and-aquatic-ecology-impacts-and-tradeoffs-26457353	64
*Water balance at local scale in the Boura dam – (*Bilan hydrologique a l'echelle locale de la retenue d'eau de Boura) http://www.slideshare.net/CPWF/bilan-hydrologique-lchelle-locale-de-la-retenue-deau-de-boura	42
Evolution of water users' knowledge to assess effects of a participatory approach in Boura dam http://www.slideshare.net/CPWF/evolution-of-water-users-knowledge-to-assess-effects-of-a-participatory-approach-v3-in-boura-dam	88
Integrated management of small reservoirs for multiple uses in Volta	73

Monitoring small reservoirs in the Volta basin of Ghana http://www.slideshare.net/CPWF/monitoring-small-reservoirs-in-the-volta-basin-of-ghana-26458820	70
Performances of irrigated scheme downstream a small reservoir: the cases of Boura and Binaba (Performances d'aménagements irrigués depuis un petit réservoir cas de Boura et de de Binaba) http://www.slideshare.net/CPWF/performances-damnagements-irrigus-depuis-un-petit-rservoir-cas-de-boura-et-de-de-binaba-2	32
AWM and livelihoods in the crop livestock systems of the Volta basin http://www.slideshare.net/CPWF/awm-and-livelihoods-in-the-crop-livestock-systems-of-the-volta-basin	52
Different participatory approaches in the VBDC: different versions of participation? http://www.slideshare.net/CPWF/different-participatory-approaches-in-the-vbdc-different-visions-of-participation	53
Building water citizenship? Practices of IWRM in Burkina Faso and Ghana http://www.slideshare.net/CPWF/building-water-citizenship-practices-of-iwrm-in-burkina-faso-and-ghana	209
Crossed contributions of 2 participatory approaches in Burkina Faso & Ghana -_example of IWRM policies http://www.slideshare.net/CPWF/crossed-contributions-of-2-participatory-approaches-in-burkina-faso-ghana-example-of-iwrm-policies-26461274	52
Targeting interventions to reduce catchment sedimentation -_sub-watershed in the White Volta Basin http://www.slideshare.net/CPWF/targeting-interventions-to-reduce-catchment-sedimentation-sub-watershed-in-the-white-volta-basin-26461374	74
CPWF Volta basin project "Integrated management of rainwater for crop livestock agro-ecosystems" http://www.slideshare.net/CPWF/cpwf-volta-basin-project-integrated-management-of-rainwater-for-crop-livestock-agroecosystems-26460077	48
Change and innovation in the Volta Basin Development Challenge program http://www.slideshare.net/CPWF/change-and-innovation-in-the-volta-basin-development-challenge-program	162
CPWF research in the Volta - Volta Basin Development Challenge - a summary http://www.slideshare.net/CPWF/cpwf-research-in-the-volta-volta-basin-development-challenge-a-summary	142

MSc Student Presentation Posters:

*The peasant management of water resources in the lowlands of Dano – (*La gestion paysanne des ressources hydrauliques des bas-fonds de Dano) http://www.slideshare.net/CPWF/cpwf-poster-palekiemdesept2013	81
Use of rainwater in rainfed crops : association of fruit tree farming and cereal crops in western Burkina Faso - Utilisation des eaux de pluie en cultures pluviales: association arboriculture fruitiere et cultures cerealieres dans l'ouest du Burkina Faso http://www.slideshare.net/CPWF/utilisation-des-eaux-de-pluie-en-cultures-pluviales-association-arboriculture-fruitiere-et-cultures-cerealieres-dans-l	113
Structure, specific composition and diversity of wood products in two contrasting areas in Sahelian zone of Burkina Faso - Structure, composition specifique et diversite des ligneux dans deux zones contrastees en zone Sahelienne du Burkina Faso http://www.slideshare.net/CPWF/cpwf-maurice-posterfinal-portrait-volta-26334269	67
Socio-economic impact of dams in the northern region of Burkina Faso : the cases Ziga, Ninigui and Ouahigouya - Impact socio-economique des retenues d'eau dans la region nord du Burkina Faso: cas de Ziga, Ninigui et Ouahigouya http://www.slideshare.net/CPWF/impacts-socioeconomiques-des-retenues-deau-dans-la-	453

region-nord-du-burkina-faso-cas-de-ziga-ninigui-et-ouahigouya-26333912	
Impact of small reservoirs and dugouts in the Ghana portion of the Black Volta basin on hydrology and water allocation in the Basin http://www.slideshare.net/CPWF/impact-of-small-reservoirs-and-dugouts-in-the-ghana-portion-of-the-black-volta-basin-on-hydrology-and-water-allocation-in-the-basin	63
Impacts of Agricultural Water Management interventions on the hydrology of the White Volta River Basin: the case of dams and dugouts http://www.slideshare.net/CPWF/impacts-of-agricultural-water-management-interventions-on-the-hydrology-of-the-white-volta-river-basin-the-case-of-dams-and-dugouts	70
Territorialization or Spatialization : Practices of water policies in Burkina Faso - Territorialisation ou Spatialisation: Pratiques des politiques de l'eau au Burkina Faso http://www.slideshare.net/CPWF/territorialisation-ou-spatialisation-pratiques-des-politiques-de-leau-au-burkina-faso	24

Twitter

The following Twitter posts were made during the workshop:

Sent day 1

- Madame Mamounata Bélem/Ouédraogo, Minister of #Water, Burkina Faso, opens #CGIAR Challenge Program on Water and Food Final Science Workshop, Ouagadougou
- Results of the #CGIAR Challenge Program on Water and Food, #Volta, being presented today in Ouagadougou: wle.cgiar.org/blogs/category/river-basins/volta/
- Madame Mamounata/Belem, Ministre l'#eau , Burkina Faso, a ouvert l'#Atelier Scientifique Final du Programme de Defi pour l'Eau et l'Alimentation a Ouagadougou
- Resultats du Programme de Defi pour l'Eau et l'Alimentation du #CGIAR, #Volta presents aujourd'hui: wle.cgiar.org/blogs/category/river-basins/volta/

Sent day 2

- Overview of #CGIAR Challenge Program on #Water and Food #Volta Basin. View presentation: http://slidesha.re/1eoa6Ds
- Analysis of consultative approaches to #agricultural #water management interventions - #Volta & #Limpopo Basins: http://slidesha.re/19drOSQ
- Day 2 of #CGIAR Challenge Program on #Water and Food, #Volta Basin, Final Science Workshop, Ouagadougou – more at: wle.cgiar.org/blogs/category/river-basins/volta/
- #Agricultural #Water Management technology expansion & impact on #crop yields, Northern #BurkinaFaso, CPWF Workshop - slidesha.re/151XEq2

Sent day 3

- Presentation on #Impact of #innovation platforms on improvement and increase of crop and #livestock production in #Burkina Faso: slidesha.re/16hGsqz
- #CGIAR Challenge Program on Water and Food (CPWF), #Volta Basin Development Challenge workshop #knowledge fair in Ouagadougou: http://bit.ly/158sCrb
- #Impacts #socio-economiques des retenues deau dans la region nord du #Burkina Faso cas de Ziga Ninigui et Ouahigouya http://slidesha.re/16byx4P
- Performance of #innovation platforms in #crop livestock #agroecosystems of the #Volta basin in Burkina Faso http://slidesha.re/1aVLz8v
- Impact of innovation platforms on marketing relationships the case of #Volta basin integrated# crop-livestock #valuechains in #Ghana http://slidesha.re/18cgQA1

- Farm #rainwater management strategies & soil improvement methods for seed & biomass yield - #maize #soy intercrop http://slidesha.re/16byk1v

Yammer post (day 3)

- Day three of the CGIAR Challenge Program on Water and Food (CPWF), Volta Basin Development Challenge final science workshop in Ouagadougou.
- https://sites.google.com/site/vbdcscienceworkshop2013/home
- Interesting to see the range of research being conducted under the CPWF umbrella in the Volta Basin. Presentations are up on CPWF Slideshare:
- http://www.slideshare.net/CPWF
- Research abstracts here:
- https://sites.google.com/site/vbdcscienceworkshop2013/presentations
- The workshop, involving over 90 stakeholders and program participants, was officially opened on Monday by Madame Mamounata Bélem/Ouédraogo, Minister of Water, Burkina Faso. Today we've got a knowledge fair including: a screening of the Volta Basin Development Challenge Video, poster presentations on establishing local water committees, CPWF's experiences of setting up innovation platforms in the Volta, and more.

Photos

Photographs of the workshop were also taken and posted on a Dropbox folder for use in posting, materials and reporting. This folder can be accessed here: https://www.dropbox.com/sh/bmdlahjks6kxjaz/pgQlAi1fY

Blog

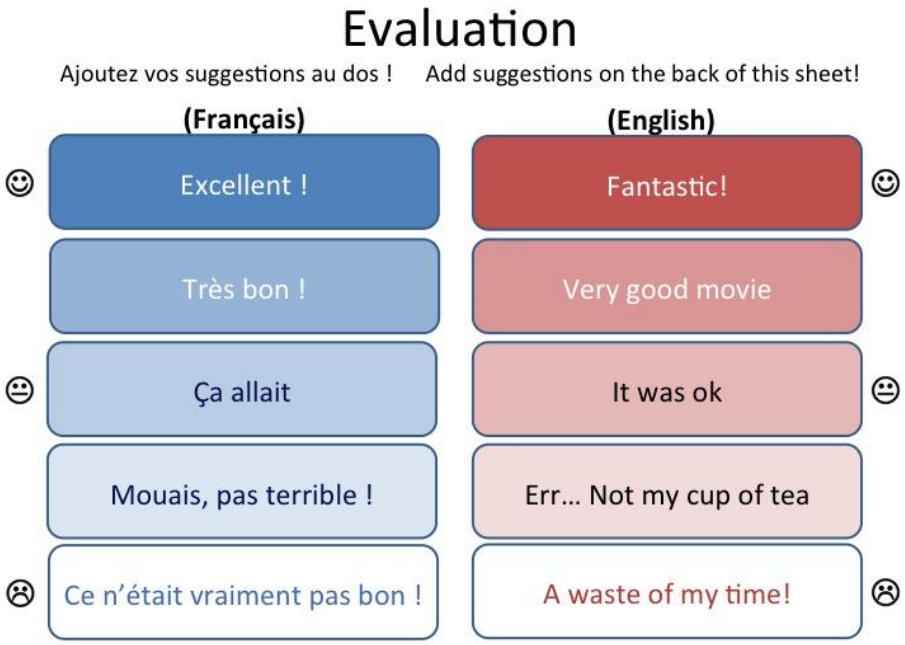
A blog post on the workshop has been posted on the CPWF/WLE blog here: http://waterandfood.org/2013/10/10/final-science-workshop-highlights-opportunities-for-improved-water-management-in-the-volta/.

Media Coverage

TV

TV Broadcast on Volta Science Workshop (17-19 Sept. 2013)
Burkina's national television coverage of the opening ceremony of Volta Science Workshop held on 17-19 September in Ouagadougou, Burkina Faso: http://www.youtube.com/watch?v=8NBXi4OfVPc

Appendix III: Evaluation Templates



Acknowledgments

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