Student Research Summary

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Title: Targeting and scaling up of Agricultural Water Management interventions in the White Volta Basin, Ghana.

Project #: Targeting and Scaling out (V1)

Institution: Kwame Nkrumah University of Science and Technology

Degree Programme: Master of Science of Water Resources Engineering and Management

Supervisor: Prof. Samuel Nii Odai and Mr. Frank Ohene Annor

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Please supply the following information—under the corresponding heading—in no more than 4 pages.

Research site(s):

Figure 1: study community in the Upper East Region of Ghana
Research question(s) addressed:

• What are the existing AWM Interventions in the Upper East region?
• What biophysical and socio-economic factors exist and/or affect the identified AWMI?
• Which areas within the UER could the successful AWMI be up-scaled to and what could be the challenges?

Key findings:

• From the PGIS survey, six of the interventions (two small reservoirs, earth bunds, stone bunds, treadle pump, water pumps and shallow wells) were identified with the help of key stakeholders to the study.
• Increment of farmers’ income- Education of their children, NHIS, roofing sheet for their building and reinvest in next season. Increase yield (e.g. to about 300% of rice at Beo), increase in crop diversity and raising of seedling
• With the exception of treadle pump usage which remains the same, the number of farmers adopting the interventions has increased spontaneously.
  o The high adoption of shallow well at Doba was due to its indigenous nature, increase population, migration of some Burkinabe into the area and the high water table during the early dry seasons.
  o The reason for stone and earth bunds adoptions increment is mainly due to the availability of the construction material and the apparent improvement in livelihoods of those who started first.
  o The adoption of the motorized pumps in Pwalugu has also increased from 2007 to 2011. However, due to the cost of pump, 3 women out of the 143 farmers are using pumps.
• Farmers and stakeholders consulted claimed apart from Involvement of communities in project, water availability, training on farm management and accessibility market, other input like fertilizer has contributed to the success of the interventions
• The developed suitability maps indicated that optimally/highly suitable areas for small reservoirs, stone bunds and earth bunds are located in the eastern part of UER as 5766km² (66%), 4410km² (50%) and 6071km² (69%) of the total area respectively.
Figure 2: **Number of Household (HH) started and still using AWMI**

**Recommendations:**
Based on the results and observations made during the study, the following are recommended;

- Access to credit, particularly informal systems, will continue to be important to ensure that irrigation equipment and inputs are sufficiently affordable and accessible to farmers.
- A close examination of the other factors determining AWMI success, such as socio-cultural environment, the possibility of adapting the population to agricultural innovations, the development policy objective of the country are important for consideration.
- National and local NGOs are more likely to reflect local needs for irrigation than government and so there is a need to link more strongly the activities of NGOs with the development programmes of government and aid donors for the benefit of all.
- National institutional arrangements (GIDA) should be made to co-ordinate the design and implementation of various AWM projects and to build a database to record the experience. There is need to systematically collect and collate data on soil, natural vegetation and land use, cropping pattern, rainfall amount and distribution, water resources and crop and water requirements as a national inventory of the potential of AWM.
From developed suitability maps, 66% of the area will be suitable for up scaling of small reservoirs.

**Methodology: summarize and concisely present methodology**

The data for the study was collected from key informants and stakeholders using Participatory Geographic Information Systems (PGIS) techniques which included administration of questionnaires, interviews, focus group discussion, mental mapping, field observation and transect walk with hand held GPS. The selected AWM interventions were chosen based on some criteria including: areas with high rural poverty, rain-fed areas, large group of beneficiaries, spontaneous uptake and large coverage in terms of area. The success of these AWM interventions was based on indicators including high adoption rates, improved livelihoods, gender and sound environmental management. The model builder in ArcGis 9.3 was employed using multi criteria overlay analysis to identify areas for up-scaling with soil, slope, landuse/cover and runoff maps being the main parameters. For the purposes of comparing the various parameters, all the input maps were reclassified into five suitability classes namely; optimally suitable, highly suitable, moderately suitable, marginally suitable and not suitable. Suitability maps for small reservoirs, stone bunds and earth bunds were then prepared.

**Related outputs: list other outputs from this research—articles, briefs, data bases, DSS, etc**