

**CPWF SMALL GRANTS PROGRAM  
FORMAT FOR PROPOSAL SUBMISSIONS**

**Proposing Institution: SAVANNA AGRICULTURAL RESEARCH INSTITUTE**

**Project Title:** Improving catchment and use efficiency of water for high-value dry season crops

**Brief Title:** Improved water catchment and use-efficiency

**Budget Requested:** (min \$25k max 75k) US\$66,000

**Project Duration:** (up to eighteen months) **Target commencement date:** February-01-2006

**1. PROJECT TEAM**

**1. Lead Institution: SAVANNA AGRICULTURAL RESEARCH INSTITUTE**

**Name of Project Leader:** Mr. Cecil Osei

**Postal Address:** P. O. Box 52, Tamale, Northern region, Ghana

**Email:** [cjosei@hotmail.com](mailto:cjosei@hotmail.com)

**Telephone number:** Land line: ++233-71-23197

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**Primary discipline/experience of importance to this proposal:** Fifteen years experience in working with farmers in Northern Ghana. Currently leads the component under "Domestic water harvesting for empowerment of women under CPWF PN6.

**Type of Institution:** NARES

**2. Institution: Winrock International**

**Name of Principal Investigator:** Mr. Peter Mahama Danlogo Abugah

**Postal Address:** c/o Woilrd Vision International, Savelugu, Northern region, Ghana

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**Telephone number:** land line: ++233-22-910117

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**Primary discipline/experience of importance to this proposal:** Has over 15 years experience in developing smallholder irrigation schemes using micro-irrigation equipment for rural communities. Currently, he is the Winrock Project Leader of the West Africa Water Initiative (WAWI) based in Northern Ghana.

**Type of Institution:** NGO

**3. Institution: SAVANNA AGRICULTURAL RESEARCH INSTITUTE**

**Name of Principal Investigator:** Dr Francis Kwame Padi

**Postal Address:** P. O. Box 52, Tamale, Northern Region, Ghana

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**Primary discipline/experience of importance to this proposal:** Crop breeder with years of experience in field testing of crop varieties with farmers in Northern Ghana.

**Type of Institution:** NARES

**The project leader confirms that official representatives of all the institutions listed above have agreed to execute the proposal as described if it is selected for funding. YES**

<b>2. LINK TO CPWF RIVER BASINS</b>
<b>CPWF Benchmark basin in which the project will be conducted:</b> Andean / Indo-Gangetic / Karkheh / Limpopo / Mekong / Nile / Sao Francisco / Yellow River / <u>Volta</u> (mark the basin that applies)
<b>3. THE PROJECT</b>
<b>3.1 Provide a summary of the background leading to your proposal</b> (maximum 300 words justifying why your proposal is important and the work, or lack of it, that it builds on).
<p>In the driest regions of Ghana that lie within latitude 9-11° N, dry season gardening is a central activity for the majority of households. The bulk of a household's income is derived from vegetables produced to meet urban demand or from production of sweet potato vines that are needed as planting materials for a succeeding cropping season. As water for gardening is typically not allowed from a community's water point, the majority of households who do not own land near large water bodies cultivate the valley bottoms where water is obtained from excavating dugouts manually. A household excavates more dugouts as earlier ones dry out until a crop is successfully produced. Crops are irrigated manually using buckets.</p> <p>Aside the environmental degradation that accompanies the seasonal excavation of arable land for water, production is constrained by four factors. First, excavating dugouts adds considerably to the labour wage of production. Second, yields are reduced by inadequate water particularly during the later stages of crop development. Third, the need to get adequate water prompts early establishment of nurseries, coinciding with periods of high humidity that favor disease development in the nurseries. Fourth, the method of irrigation does not take into account a crop's water requirement as farmers irrigate their fields in volumes restricted only by water availability.</p> <p>Surveys we conducted in sweet potato farming communities under the CPWF PN6 revealed that availability of water to produce vines in the dry season (which serves as planting material during the succeeding cropping season) is the single most important limitation for sweet potato production in Northern Ghana.</p> <p>Innovative ways to improve the capture, storage and use of rainwater will lead to more sustainable and profitable production of dry season vegetable crops and of sweet potato production in Northern Ghana.</p>
<b>3.2 Who is/are the target group/s of your project?</b> (maximum 100 words)
The Project will target two groups of small-scale vegetable producers. Dry season vegetable production in the lowlands is the preserve of men (because only men typically gain access to scarce land in these areas); the Project will concentrate activities in the lowlands on the fields of male farmers' groups. Second, existing women groups who produce sweet potato will be supported. Project activities will be conducted with female farmers' groups to gain increased access to water around the homestead, and to improve the efficiency of use of the water for producing sweet potato planting materials
<b>3.3 What specific agricultural water management strategy or technological/dissemination innovation does the project intend to address?</b> (maximum 100 words)
The current practice of creating a series of dugouts each season to irrigate crops degrades the environment and a change from this practice is the focus of this Project. The pooled water resources around which households privileged to own land cultivate vegetables in the dry season are poorly managed, underutilized, and conflicts among users are common. To prompt shifts from

reliance on pooled water resources alone, and discourage individual households creating dugouts every season, we will demonstrate the utility of ferro-cement tanks (similar to the type currently in use under CPWF PN6 as domestic water reservoirs) to store harvested rainwater for vegetable production.

**3.4 Provide a summary of your project methodology/approach activities for achieving the project results** (maximum 500 words)

The Project will seek to improve the efficiency of agricultural water management at two levels. First, we contend that local level (District assemblies) legislation is needed on ways of accessing water for dry season vegetable gardening in the lowlands of Northern Ghana: the current practice of creating series of dugouts for irrigation must be replaced by a more sustainable and environmentally friendly system of accessing water. We intend introducing a modified form of ferro-cement tank as reservoirs in the lowlands. Second, we will facilitate the adoption of low cost methods of capturing rainwater, and enhance the use efficiency of rainwater for dry season crop production.

We will establish demonstration sites for water capture, and efficient use at two sites; one each for vegetable cropping in the lowlands and for production of sweet potato planting material around the homestead. The Savanna Agricultural Research Institute as the lead Institute will partner the Winrock International (an NGO) in executing this Project. To create awareness on the extent of environmental degradation created by the seasonal digging of the land for water, the Project will involve local level policymakers: the District Planning Officers and Assembly-man/woman for the area. Leaders of the various farmer-based organizations in the community will be involved.

Demonstration site will be on a plot owned by one of existing vegetable farmers' associations. At the fringes of the lowland where farm storage barns are typically located, we will establish the water harvesting unit by roofing existing storage barns with aluminum sheets. This will serve as rainwater harvesting surface. We will construct adequate units of ferro-cement with a total capacity to hold adequate water to irrigate the vegetable crop of choice. Water will be supplied to fields through drip irrigation equipment. To show the efficiency of this system, we will assemble data on labour (Man hours spent on irrigating plots), crop growth and yield data on this demonstration plot and on adjacent plots under typical farmers' irrigation practice.

For dry season upland crops (typically sweet potato) we will install ferro-cement tanks around a household, and rainwater will be collected from the roofs of the building. Crops grown around the household will be irrigated using the drip irrigation equipment. We will demonstrate to households the profitability and sustainability of rainwater harvesting for producing high value crops in the dry season. In our ongoing work under the CPWF PN6 we realized that the cost of a 5,000 litre size pot we used was equivalent to the cost of acquiring a bicycle (the brand typically used in Northern Ghana). We intend to increase the size of a unit of reservoir and show that the initial cost of installing the pots can be offset within three years of production.

**3.5 What results will your project provide to the CPWF?** (maximum 200 words)

Water management for agricultural production and ways to enhance productivity of water remains important problems that affect livelihoods in most semi-arid/arid regions of the world. The Project will demonstrate that in water limited regions, alternative systems of harvesting and storing rainwater for agricultural production should be more aggressively pursued. We will show from cost/benefit analyses of crop production from harvested rainwater that the use of our type of ferro-cement pots as water reservoirs for dry season production of high-value crops holds promise for enhancing food security and alleviating rural poverty.

Considering that there are conflicts arising from the multiple use of pooled water resources (such

as large dams and wells around which dry season vegetables are produced), that there are low incentives to actively manage water resources in the commons, and few institutional/technical interventions exist to change this situation, policy shifts to provision of smaller water schemes that offer poor households absolute rights of access will have a better impact on household incomes. By creating awareness among local policy makers and farmer-based organizations, the Project will show that such a change is possible.

**3.6 What elements of your proposal are innovative and why?** (maximum 300 words)

The usual practice of water harvesting for crop production involves collecting surface runoff, with its attendant problems of soil erosion. In this project we propose harvesting water from roofs of existing structures – either a household’s roof or farm storage barns that will be roofed.

The use of ferro-cement pots as storage structures for dry season crop production is technically innovative, at least for Northern Ghana. Water is typically accessed from dams or wells which are water resources held in common. With the proposed water harvesting system, individuals will have direct control over access to, and use of water for dry season crop production. The conflicts that arise from multiple users of shared water resources will be eliminated for farmers who adopt this system.

Irrigating crops on per need basis in the dry season for small scale farmers is non-existent in Northern Ghana. We expect that the demonstration on enhancing use-efficiency of water through drip irrigation equipment will encourage efficient use of water, and increase yield per unit area.

**3.7 How, if at all, does your proposal address issues of** (maximum 600 words total in this section)

**1. stakeholder involvement** (demand by them and their inclusion in project activities; acknowledgement of their contribution)

Response from households that benefited from the domestic water harvesting component under the CPWF PN6, and requests from neighboring households who are not direct beneficiaries convince us that interventions that are based on provision of water for use during the dry season will have a positive impact on rural livelihoods. Based on this conviction, this proposal is developed to extend the innovation further for dry season crop production. The activities in this proposed Project will be based entirely on the fields of participating Farmers’ Groups, as we expect such farmer groups to function as focal points of dissemination and adoption of the innovation by individual households.

**2. gender** (for instance, in data collection and analysis, farmer group activities)

Land around the large water bodies and in the lowlands where dry season vegetable cropping is mainly owned by men. Based on this realization, we are targeting two Farmer based groups based on gender. We will base the demonstration site in the lowlands on Farmers Groups that are predominantly men, and in the uplands (around a homestead) for a women farmers’ organization. There is also evidence for choice of dry season crop being influenced by gender based on the system of marketing and cultural values; as such, existing Farmers’ Groups (that are gender based) have choice crops that are of interest to them. We will assist these groups to manage water and produce their choice crops more efficiently.

**3. environmental security** ( e.g. biodiversity, water quality)

The current methods of accessing water through excavating the land are causing degradation of the farmlands. A shift towards harvesting rainwater and storage in more permanent structures will halt this degradation and sustain productivity of the lands.

**4. impact on the poor** (including food security and wellbeing)  
 In the Upper East Region of Ghana where this Project will be conducted, there is marked wealth differentiation between households based on access to opportunities for dry season cropping – a self-reinforcing cycle with access to land for dry season cropping allowing households to improve their income and hence to reinvest in further assets. Though the activities in the proposed Project will be based on Farmers Groups, we expect that the innovation opens up opportunities for those households with limited access to land for dry season cultivation to make their uplands productive during the dry season

**3.8 How do you intend to self-monitor the progress of the project towards obtaining the results?** (including the roles of institutions/groups involved (maximum 200 words)  
 As the fields to be used are owned by the farmers’ groups, monitoring of activities with the farmer-based organizations and local policy makers is inbuilt into the execution of the Project. Principal Investigators and supporting staff from SARI and Winrock International will in addition hold formal quarterly meetings with the farmers and policy makers to review the progress of work, and find further avenues to strengthen the dissemination of the innovation.

**4. BUDGET (Calculate in US\$)**

<b>Divided by institution as follows:</b>	<b>Lead Institution</b>	<b>Partner 2 Winrock International</b>	<b>Partner 3</b>	<b>Partner 4</b>	<b>Partner 5</b>	<b>Totals</b>
1. Personnel	\$5,000	\$2,500	\$0	\$0	\$0	\$0
2. Travel and accommodation (fuel & lubricants, vehicle maintenance, accommodation)	\$15,000	\$5,000	\$0	\$0	\$0	\$0
3. Other operational costs Construction of ferro-cement reservoirs at two demonstration sites (includes cost of training beneficiaries on constructing the pots & the artisan’s fees for training)	\$25,000	\$0	\$0	\$0	\$0	\$0
4. Demonstration on the use of micro-irrigation equipment for two farmer-based organizations	\$0	\$2,000	\$0	\$0	\$0	\$0
5. Field days with farmers and local policy makers	\$4,000	\$0	\$0	\$0	\$0	\$0
6. Communication and stationery	\$1,000	\$500	\$0	\$0	\$0	\$0
7. Overheads (10%)	\$5,000	\$1,000	\$0	\$0	\$0	\$0
<b>Total CPWF Budget</b>	<b>\$55,000</b>	<b>\$11,000</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>
5. Additional budget provided by partner as ‘matching funds’ SARI will provide vehicles for Project Team to execute	\$0	\$0	\$0	\$0	\$0	\$0

the Project.						
<b>Total Cost</b>	<b>\$55,000</b>	<b>\$11,000</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>

Notes:

- Leave blank any budget columns that are not required.
- Capital items are not allowable.
- Provide clarification against amounts that you feel need explanation.
- No overhead maximum is stated, but be aware that your budget must be competitive and show value for money.
- Matching funds are not required, but a contribution will be viewed favourably either in cash and/or 'in-kind'.

Is there anything additional you would like to say in support of your proposal? (Maximum 100 words)

**If supported, the adoption of the proposed innovation will positively impact on the lives of the poorest households in Northern Ghana. The innovation has potential for adoption in other regions/countries with similar constraints as pertains in Northern Ghana.**