New Partnership for Africa's Development (NEPAD)

Comprehensive Africa Agriculture Development Programme (CAADP)

Food and Agriculture Organization of the United Nations

Investment Centre Division

GOVERNMENT OF THE REPUBLIC OF GHANA

SUPPORT TO NEPAD–CAADP IMPLEMENTATION

TCP/GHA/2908 (I)

(NEPAD Ref. 05/41 E)

Volume II of III

BANKABLE INVESTMENT PROJECT PROFILE

Small–scale/Micro–scale Irrigation and Drainage Project

September 2005

GHANA: Support to NEPAD–CAADP Implementation

Volume I: National Medium–Term Investment Programme (NMTIP)

Bankable Investment Project Profiles (BIPPs)

Volume II: Small–scale/Micro–scale Irrigation and Drainage Project

Volume III: Post–harvest Systems and Agro–processing Support Project

NEPAD–CAADP BANKABLE INVESTMENT PROJECT PROFILE

Country: Ghana

Sector of Activities: Irrigation

Proposed Project Name: **Small–scale/Micro–scale Irrigation and Drainage Project**

Project Area: National

Duration of Project: 5 years

Estimated Cost: Foreign Exchange ..... US$48.46 million
Local Cost ..... US$14.82 million
Total .....US$ 63.28 million

Suggested Financing:

Source	***US$ million***	***% of total***
Government (both Central and Local Governments)	10.13	16
Financing institution(s) (Grants and Loans)	48.72	77
Beneficiaries (User Communities)	4.43	7
Total	**63.28**	***100***

GHANA:

NEPAD–CAADP Bankable Investment Project Profile

"Small–scale/Micro–scale Irrigation and Drainage Project"

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Currency Equivalents

(June 2005)

Local Currency	=	Cedi (¢)
US$1.00	=	¢9,000
¢1,000	=	US$0.11

Abbreviations

ADB	African Development Bank
AEA	Agricultural Extension Agent
ADRA	Adventist Relief Agency
AgSSIP	Agricultural Services Sector Investment Project
ASIP	Agricultural Services Investment Project
BADEA	Arab Bank for Economic Development in Africa
BIPP	Bankable Investment Project Profile
CAADP	Comprehensive Africa Agriculture Development Programme
CIDA	Canadian International Development Agency
CSIR	Centre for Scientific and Industrial Research
DFID	Department for International Development (UK)
DDO	District Development Officer
EPA	Environmental Protection Agency
FAO	Food and Agriculture Organization of the United Nations
FSS	Farmer Support Services
GDP	Gross Domestic Product
GIDA	Ghana Irrigation Development Authority
GoG	Government of Ghana
GPRS	Ghana Poverty Reduction Strategy
GPRP	Ghana Poverty Reduction Project
HIV/AIDS	Human Immune Deficiency Virus/Acquired Immune Deficiency Syndrome
IDA	International Development Association
IFA	Irrigation Farmers Association
IFAD	International Fund for Agricultural Development
JICA	Japan International Cooperation Agency
KfW	German Bank for Reconstruction
LGP	Length of growing period
M&E	Monitoring and Evaluation
MFEP	Ministry of Finance and Economic Planning
MLFM	Ministry of Lands, Forestry and Mines
MLGRD	Ministry of Local Government and Rural Development
MOFA	Ministry of Food and Agriculture
MRT	Ministry of Roads and Transport
MTADP	Medium–term Agricultural Development Project
NEPAD	New Partnership for Africa's Development
NGO	Non–Governmental Organization
NMTIP	National Medium–term Investment Programme
PMU	Project Management Unit
PRA	Participatory Rapid Appraisal
SFIP	Small Farms Irrigation Project
SIF	Social Investment Fund

SPFS	Special Programme for Food Security
SSIDP	Small–Scale Irrigation Development Project
TCP	Technical Cooperation Programme
TOT	Trainer of Trainers
UA	Unit of Account
UK	United Kingdom
UNDP	United Nations Development Programme
VIP	Village Infrastructure Project
WB	World Bank

I. PROJECT BACKGROUND

A. Project Origin

I.1. The proposed ***Small–scale/Micro–scale Irrigation and Drainage Project*** was identified following the preparation of the draft National Medium–Term Investment Programme (NMTIP) for Ghana (MOFA/FAO, 2004) in support of NEPAD's Comprehensive Africa Agriculture Development Programme (CAADP). Several similar projects have already been prepared or are in operation.

I.2. In 1997, the Arab Bank for Economic Development in Africa (BADEA) and the African Development Bank (ADB) funded a series of small–scale irrigation project identification and design reviews by a foreign consultant working with some of the trained GIDA staff, resulting in the ongoing small–scale/micro–scale irrigation projects funded by the ADB (Small–Scale Irrigation Development Project, SSIDP – 2,590 ha) and BADEA (Small Farms Project – 820 ha).

I.3. In 2000, during preparation of the irrigation component of the Agricultural Sector Services Investment Project (AgSSIP), the Ghana Irrigation Development Authority (GIDA), prepared with the support of the Food and Agriculture Organization of the United Nations (FAO), a project covering small–scale and micro–scale irrigation as one component and public irrigation scheme rehabilitation as the other component. Nine schemes were designated for rehabilitation as follows:

- Afife, Aveyime and Kpando Torkor schemes in the Volta Region;
- Akumadan and Sata schemes in the Ashanti Region;
- Subinja and Tanoso schemes in the Brong Ahafo Region; and
- Bontanga and Weija schemes in the Northern and Greater Accra Regions respectively.

I.4. The estimated total cost for the rehabilitation is US$6.0 million of which US$3.0m has been secured from the World Bank. Other sources of funding are expected to be US$2.0m from the Food and Agricultural Budget Support (FABS) by CIDA and the rest from the HIPC fund. The Special Programme for Food Security (SPFS) pilot phase is another project whose water component implementation provides many positive lessons for this project. Annex 1 describes the current status of all these initiatives.

I.5. A national stakeholder workshop, convened in Accra in June 2004 to review the NMTIP and establish development priorities, re–emphasised the crucial role that irrigation could play with respect to food security and poverty reduction. In particular, the workshop agreed that the economic exploitation of surface and groundwater resources is a high priority step on the way towards increased cropping intensity and hence increased food production — particularly for smallholders. The project proposed herein builds on that agreement and is targeted at improved smallholder agricultural water management in the form of small/micro– scale irrigation, flood control, drainage improvement, flood protection and shallow well development. As such it relates directly to Priority Area 1 of the NMTIP which corresponds in turn to CAADP Pillar 1 *(Sustainable Development and Management of Land and Water Resources)*.

I.6. More in detail, the proposed project is intended to: (i) promote a range of improved agricultural water control technologies that are appropriate for small farmers according to their physical location; (ii) assist the communities to implement the infrastructural works on a participatory basis; (iii) strengthen their capacity to operate and maintain their schemes and to grow and market higher value crops, especially during the dry season; and (iv) strengthen the capacity of regulatory and service institutions including credit providers, extension workers and GIDA staff. The project aims at

developing some 22,590 ha of small and micro–scale irrigation and drainage systems to the benefit of around 16,400 households[1].

B. General Information

I.7. Agriculture is the main economic sector in Ghana, accounting for about 36 percent of GDP and generating 55 percent of foreign exchange earnings. The agriculture sector is also the main source of employment and income for 70 percent of the rural workforce. In addition, this sector contributes an average of 12 percent and 8 percent, respectively to tax revenue and total revenue. Ghana can therefore not achieve economic growth and poverty reduction without significant improvement in the agriculture sector.

I.8. The country has 13.6 million hectares of arable land, of which about six million hectares (44 percent) are cropped. There are three main agro–ecological zones. These are the Northern Savannah Zone which forms 62.8 percent of the total landmass of Ghana (including Upper East, Upper West, Northern and Brong Ahafo Regions), the Forest Zone comprising the sub–humid or transitional and wet evergreen zones (parts of Western, Eastern, Ashanti, Brong Ahafo and Volta Regions – 34.8 percent) and the Coastal Savannah Zone (mainly the Central, Greater Accra and parts of Volta Region – 2.4 percent). With the exception of the Northern Savannah Zone, which has one rainy season per year (1,100 mm mean), rainfall distribution is bimodal in the Forest and Coastal Savannah Zones with annual mean rainfall of 1,850 mm and 800 mm respectively (see Annex 2).

I.9. Although production levels of the major staple food crops in Ghana, in a normal–rainfall year, are adequate, with estimated self–sufficiency ratios of 100 percent for roots and tubers, fruits and vegetables, and fats and oils, and 90 percent for cereals (excluding rice), *seasonal* food insecurity is widespread. This is due to almost total dependence on rainfed agriculture, insufficient purchasing power of a large proportion of the population and inadequate storage, marketing and processing structures in most of the rural areas. With the present population growth rate and the growing demand for more and improved crops for local industries and for export, irrigated agriculture is an important factor in promoting agricultural growth.

I.10. Three main river systems drain the entire country. These are: (i) the Volta river system (which comprises both the Black and White Voltas); (ii) the South–Western river system; and (iii) the Coastal river system. All three are relevant to this project – see map in Annex 3.

I.11. The Black Volta project area lies between Lawra in the north and Bamboi in the south where the annual mean maximum flow rates are 216 cubic metres per second (m^3/sec) and 793 m^3/sec respectively. The corresponding minimum flows are 31 m^3/sec and 98 m^3/sec. The White Volta project area lies between Pwalugu in the north and Yapei in the south where the annual flow mean maximum rates at are 254 m^3/sec and 463 m^3/sec respectively, with minimum flows at 47.7 m^3/sec and 116 m^3/sec.

I.12. In the South–Western river systems, the Tano River of which the Kwasu River is a tributary, would contribute to the project's supply of water. The Tano has a mean maximum flow of 244 m^3/sec and a mean minimum of 68 m^3/sec at Alenda in the project area. There is no gauging station on the Kwasu River, but mean maximum and minimum flows have been estimated to be 30 m^3/sec and

[1] Pump Irrigation Schemes: 18,700 ha; Flood Control and Irrigation Improvement: 3,290 ha; Flood Protection and Shallow Wells: 600 ha. It should be noted that these ambitious targets are only to be reached within the five–year period of the project if the decentralized project implementation materializes as envisaged.

8 m^3/sec respectively. Together with the Oda River which is a tributary of the River Pra, they will support the irrigation of 3,900 ha.

I.13. The Coastal river system comprises Ochi Amisa, Ochi Nakwa, Ayensu, Densu and Tordzie Rivers. This system drains southwards to the coast from an escarpment forming the drainage divide at the southern limit of the Volta Basin. The coastal drainage basins have an area of 15,576 km^2 in southern Ghana. The average annual runoff from the coastal drainage basins is about 62 cubic metres per second. Mean monthly runoff varies from a maximum of an estimated 70 to a minimum of some 5 m^3/sec.

C. The Irrigation Sector

(i) Overview

I.14. Formal irrigation development in Ghana started in the 1960s under the then Land Planning and Soil Conservation Unit of the Department of Agriculture. In 1977, wishing to ensure that the agricultural sector was able to feed the population and provide adequate raw material for agro–industries, government promulgated a decree establishing the Ghana Irrigation Development Authority (GIDA). Specifically the GIDA was established to:

- Formulate plans for the development of irrigation in the country;
- Develop the water resources of the country for irrigated farming, livestock improvement and fish culture;
- Execute comprehensive programmes for the effective use of irrigated lands in cooperation with other agencies involved in producing extension services to farmers; and
- Carry out land–use planning in areas earmarked for development in order to conserve the soil and water resources in those areas.

I.15. Since its establishment and despite an estimated potential irrigable area of 500 000 ha (including valley bottoms), GIDA has become associated with the development of only some 8 745 ha of public schemes in 22 locations across the country. It is a matter of concern that these schemes are under utilized and deteriorating as the Table 1 below illustrates:

Table 1: Ratio of Utilization in Relation to the Type of Irrigation (2003 Rainy Season)

Type of Irrigation	No. of schemes	Area developed (ha)	Actual irrigated area (ha)	Ratio of utilization (%)
Pump	8	587	52	8.86
Pump & Gravity	5	457	192	42.01
Gravity	9	7,701	4,948	64.25
Total	22	8,745	5,192	59.37

Source: Dr Narihide Nagayo – *The Way Forward in Ghana with Farmers Participation for Sustainable Irrigation Management*, May 28th 2004.

I.16. The current poor status of irrigation has much to do with the inadequacies of the applicable policy framework since, other than the guidelines in the decree, Ghana as yet has no coherent irrigation policy for the development of the sector. As a result, the specific absence of clear guidelines with respect to encouraging active private participation in the development, management and indeed funding of the irrigation sector has meant that over the years, irrigation development has been affected by broader government agricultural policies and these have been as varied as the number and frequency of changes in government. Nonetheless, there was a rational and major change of focus

following the 1986 World Bank irrigation sub–sector review with its emphasis on small–scale/micro scale irrigation development. As of now however, government is finally engaged on drafting an irrigation policy and development strategy with the assistance of the FAO.

I.17. The Medium–term Agricultural Development Programme (MTADP) of 1989–2000 which guided government policies and programmes emphasized that the establishment of effective farmers organizations to operate and maintain the schemes would need to be a key component of any future irrigation development programme. Accordingly, MTADP programmes with irrigation components implemented during the period included this as an objective — they are listed in Table 2.

Table 2: Major Programmes with Irrigation Components under the MTADP

Project	Implementation period	Source of funding (million US$)		
		GoG	Donors	Total
Agricultural Services Investment Project (ASIP)	1992–1997	0.30	21.50	21.80
Smallholder Credit Import Supply and Marketing Project (SCIMP)	1990–1996	2.94	16.60	19.54
Upper East Land Conservation and Small holder Rehabilitation Project (LACOSREP)	1991–1997	2.00	13.04	15.04
Upper West Agricultural Development Project (UWADEP)	1996–2002	0.75	10.06	10.81

I.18. Finally, the Ghana Poverty Reduction Strategy 2003–2005 (GPRS) is predicated *inter alia* on a key role for irrigation in achieving national food security, alleviating rural poverty and equitable economic development overall. The steps towards this goal are indicated by the Food and Agriculture Sector Development Programme. Similarly, the Food and Agriculture Sector Development Policy (FASDEP) of 2002, which is the latest government policy on agriculture establishes a two–pronged irrigation development approach focusing on: (i) micro and small–scale irrigation development, in line with the earlier (1986) World Bank recommendation and (ii) the rehabilitation and construction of new dams, pumping stations and the development of the Accra plains.

(ii) Government Institutions

I.19. Principal government irrigation sector stakeholders include the following:

I.20. The ***Ghana Irrigation Development Authority (GIDA)***, which was established in 1977 has the main responsibility of planning the development of irrigation, livestock and aquaculture water supplies in the country (see paragraph I.13).

I.21. The ***Ministry of Food and Agriculture (MOFA)***, which includes specialist directorates[2] as follows:

- Policy Planning and Evaluation
- Crop Services
- Animal Production
- Plant Protection and Regulatory Services
- Agricultural Extension Services
- Veterinary Services
- Women in Agricultural Development
- Agricultural Engineering Services

I.22. In line with the government's decentralization policy, MOFA is also decentralized in all 10 regions and 130 districts.

[2] The former Fisheries Directorate is now a full ministry.

I.23. The ***Ministry of Lands and Forestry (MLF)***, which is responsible for regulating the use of land. Under this Ministry is the Land Administration Project, which is intended to make land acquisition and development easy for both investors and the general public.

I.24. The ***Ministry of Local Government and Rural Development (MLGRD).*** The MOFA, at District and farmer level, now operates under and is immediately answerable to the District Chief Executive of the District Administration under the MLGRD. Like other decentralized Departments, this is bringing decision–making closer to the door step of the rural farmer. GIDA, although not yet a decentralized department, is nonetheless working closely with MOFA technical staff in the districts with irrigation or water control technologies such as is happening in the SSIDP, SFIP and the SPFS programmes with considerable success (see Annex 1).

I.25. The ***Water Resources Commission (WRC)***, which was established in 1996 by an Act of Parliament is mandated to regulate and manage the country's water resources and coordinate government policies in relation to them. The commission has now prepared a draft national water policy which inter–alia recognizes the rights of various users in agriculture, water supply, power generation and industry. GIDA is represented on the Commission.

I.26. The ***Environmental Protection Agency (EPA)***, which has the overall mandate to ensure that developments do not impinge negatively on the local environment. With specific respect to irrigation and drainage, Schedule 2 of Legislative Instrument 1 652 requires mandatory environmental impact assessment and approval prior to the construction of dams, irrigation systems and wetland developments.

I.27. Research institutes that currently support irrigated crop developments include:

- The ***Crop Research Institute (CRI)*** at Fumesua–Kumasi. In particular, the CRI has been conducting rice varietal research on irrigation sites in the country.
- The ***Savannah Agricultural Research Station (SARI)***, Nyankpala, Tamale. SARI is the CRI's branch in the Northern Regions. It has been supporting irrigated crop development at several irrigation sites including Bontanga near Tamale, Vea and Tono in the Upper East Region as well as small–scale irrigation sites in the northern regions.
- ***Council for Scientific and Industrial Research (CSIR).*** The CSIR is a statutory body under the Ministry of Science and Technology. Its Atomic and Biotechnology Department at Kwabenya in Accra carries out crops research that benefits both irrigation and rainfed crop production.

(iii) Supporting Development Partners

I.28. A number of Ghana's development partners already support irrigation related initiatives aimed at food security and poverty alleviation. These include:

- The ***World Bank (WB)***, which funded the US$21.8m Agricultural Services Investment Project (ASIP) from 1992–1997. The project was intended to construct dams and supply pumps for irrigation as well as improve rural infrastructure such as feeder roads and access tracks from food production areas, among others. In addition, the WB has continued its support of the rural sector through the recently ended (December 2004) US$60.0m Village Infrastructure Project (VIP) and the Community Based Development

Project that is just starting and which has water for agriculture as one of its components. WB is also supporting the Land Administration Project.

- The ***African Development Bank (ADB)***, which is funding a number of related programmes in Ghana. They include the 2,590 ha SSIDP currently under implementation. Also just starting is the UA15.0m Inland Valley Rice Development Project in five regions, namely, Ashanti, Brong Ahafo, Central, Eastern and Western Regions. The ADB has also been involved in FAO's SPFS initiative in the form of a US$336,000 FAO funding and a US$1.0m extension phase support (ADB), which has a water/crop improvement and diversification programme in nine communities.

- The ***International Fund for Agricultural Development (IFAD)***, which is funding two major projects: (i) the Land Conservation and Smallholder Rehabilitation Project (LACOSREP II) [2000–2005; US$13.9m] in the Upper East Region and (ii) the Northern Region Poverty Reduction Programme (NORPREP) [2004–2009; US$12.3m]. Both projects aim at promoting sustainable food production, poverty alleviation and environmental protection and include small–scale irrigation and water management.

- The ***Arab Bank for Economic Development in Africa (BADEA)***, which is funding the ongoing Small Farms Irrigation Project – Phase II (SFIP II), aimed at putting a total of 820 ha under irrigation in eleven schemes by 2007.

- The ***Agence Française de Développement (AFD)***, which has supported a US$2.25m Lowland Rice Development Initiative in the Northern Region. The project includes construction of water retaining bunds for rainy season rice cultivation.

- The ***Japan International Cooperation Agency (JICA)***. The Japanese Government has been supporting irrigation development in Ghana since 1996. After studying several existing small–scale, public sector irrigation schemes, JICA funded the rehabilitation of two, the Ashaiman and Okyereko schemes, in the period 1998–2000 both were intended for farmer–based management. As part of the US$7.0m rehabilitation, JICA is supporting the strengthening of sustainable farmer management of the two schemes.

- The ***Canadian International Development Agency (CIDA),*** which since 2002, has been supporting the rehabilitation of sections of deteriorated irrigation infrastructure on the Tano and Vea irrigation projects in the Upper East Region. Currently, CIDA has committed funding towards the rehabilitation of the 90 ha Anum Valley and 26 ha Mankessim irrigation schemes in the Ashanti and Central Regions.

- The ***Department For International Development (DFID)***, UK, which is or has been supporting a number of irrigation–related programmes in Ghana. These include US$9.0m support for the Land Administration Project for the period 2004–2008. Others include policy support of the AgSSIP between 1999–2004 (along with DANIDA/IDA/EU/ ADB/GEF and the Netherlands) and US$9.3m for a National Resource Management Project between June 1999 and September 2004.

(iv) Private Sector and Non–Governmental Organizations

I.29. A large number of NGOs are involved in the promotion of improved agricultural practices and rural development in Ghana. Approaches include farmer education and training in land and water management, land preparation, farm maintenance, post harvest activities, processing, marketing and provision of financial service assistance. NGOs involved include Technoserve, Action Aid, World

Vision, Care International, Sasakawa–Global 2000 Agriculture and Rural Development Foundation Africa, Anointed Mission Organisation, Self–Help Initiative Support Services and Poverty Reduction and Ecological Protection in Rural Areas (PREP). At the district level, NGOs take part in the consultative process to draw district agricultural development plans.

II. PROJECT AREA

A. Justification and Location

II.1. The proposed project can be thought of as national in scope since it has schemes distributed throughout eight of Ghana's ten regions. The proximity of human settlement to suitable land and adequate land and water resources comprised the principle scheme selection criteria, although specific considerations vary from area to area. Table 3 summarizes for each region the project area, water body, beneficiary communities, as well as expected number of persons and households benefiting from the project.

- ***Upper East Region*:** The specific locations in the Upper East Region run along the White Volta and form a border with the Northern Region. Though the beneficiary farmers mostly come from Bolgatanga and Pwalugu in the Upper East, some communities such as Kpasenkpe, Yapala and Buliba are actually in the Northern Region. Poverty and food insecurity are endemic among the people. Frequent crop failure followed by long dry season, typically in excess of six months all but makes these communities permanent food deficit areas. The food deficit situation moreover, is not limited to these communities alone; it is regional and especially acute in the Bawku East District in the north eastern corner of the region. Communities in the project area however, have adequate water resources and suitable flood plains for irrigated dry season production of tomato, onion and other vegetables. Project implementation prospects are improved by the fact that a few private individuals from Bolgatanga and Pwalugu are already successful dry season pump irrigators of vegetables along reaches of the White Volta in the project area. A total of 2,200 ha would be irrigated.

- ***Upper West Region:*** The Upper West Region with its similar agro–ecology as the Upper East Region grows millet and sorghum as the main staples of the people. However, other crops are grown including groundnuts and cowpeas. Like the Upper East Region, it is also a food deficit area and for the same reasons. The Black Volta, which runs along the border with Côte d'Ivoire, nonetheless has water and land resources adequate for communities to use for pump irrigation along long reaches of the river. At least 13 communities including Saru, Sambayiri, Dekpee and Dochire would benefit from project development. Motorized and treadle pumps would be required for individual farmers or small groups of farmers to practice small–scale/micro–scale irrigation of vegetables. Access roads would also be required in these communities to linking them up with Lawra and other major towns as far away as Wa for ease of produce marketing. Eventually storage facilities may also be necessary when the anticipated full 1,600 ha is brought under irrigation, which would benefit 900 households[3].

[3] See second BIPP *"Post–Harvest Systems and Agro–processing Project"* in Volume III, which addresses the need for storage facilities. A third BIPP *"Rural Roads Development Project"* has been drafted and still needs to be discussed by MOFA and MRT before finalization by government.

- ***Northern Region:*** The Northern Region project area would cover 2,800 ha of White Volta flood plain to serve communities at Daboya, Adaayili, Lingbuisa as well Kukuo and Dalun (an estimated 1,430 households). Other areas would be Teplinayili, Nawuni and a scatter of smaller settlements. The food and poverty scenarios of the two Upper Regions also pertain here. Donor food support has been provided for a long time, usually from around the middle of the dry season in January/February. A project along the lines proposed herein would greatly reduce the number of people usually dependent on seasonal food aid. Access roads and market facilities would nonetheless need to be improved in order to mobilise the full potential of the project. This is because the dry season vegetable crop that would be cultivated would have to be sold in Tamale and other nearby towns. Encouragingly, a few individuals at Dalun already cultivate dry season vegetables using their own portable pumps. Nearby at Sogo and Duiga also along the White Volta, the SSIDP is implementing two pump schemes to irrigate a total of 130 ha of dry season vegetables. Lessons learned from these schemes would be applied to this project for improved performance.

- ***Brong Ahafo Region:*** The project area here would be located by three rivers: the Tano, Pru and Kwasu in areas ranging from degraded forest vegetation to transitional vegetation. A total area of 3,300 ha on the three river flood plains can be developed to the benefit of at least four communities in each selected river plain, with a total of 1,850 households. The climate here and the general welfare of people are somewhat better than in the north. Poverty is nonetheless prevalent and increased sustainable agricultural production and improved marketing would contribute greatly to its reduction. The SSIDP is constructing a pump scheme at Asantekwaa and a flow diversion scheme at new Longoro in the region. Both would provide management lessons to the beneficiaries of this project.

- ***Ashanti, Central Regions:*** The Ashanti and Central Regions have similar conditions to the Brong Ahafo Region. In the Ashanti Region 1,800 ha of River Oda plains would be developed to benefit some 1,000 farm households. Already on the Oda River at Besease the SPFS pilot phase has developed 20 ha for micro–scale irrigation of high value vegetables using treadle pumps. This project would benefit from the lessons learnt especially as regards to marketing because of the close proximity of Besease to Kumasi. In the Central Region, Nsuayem is a major market centre. Project beneficiaries would therefore find produce marketing structures already in place.

- ***The Greater Accra Region:*** the reach of the River Volta just before it enters the estuary region in the Greater Accra Region, comprises a prime farming area. Crops such as maize, cassava and assorted vegetables do well when there is adequate rainfall in quantity and distribution. But this rarely happens and the farmers continue to live precariously. Project intervention with motorized or treadle pumps would halt this. In fact, nearby at Anyakpor and Adonorkope, there are already vibrant SPFS treadle and motorized pump schemes on 10 ha areas. This project would learn production and marketing lessons from them. On the Nsaki and Densu Rivers, also in the Greater Accra Region, provision of motorized or treadle pumps would allow the farmers to produce prime vegetables for the Accra market on a regular basis from over 200 ha area. Beneficiaries would comprise around 835 farm households who would be assisted to carry out direct pump irrigation on a total 1 500 ha of land in and around settlements.

- ***Volta Region:*** The small–scale/micro–scale irrigation and drainage project area in the Volta Region lies along the Volta River just before it enters the estuary area from

Adidome through Sogakope to Nutekpor and Agotaga. The area lies opposite to a similar area in the Greater Accra Region. About 3,500 ha of potential flood plain would be developed with 3.5–5 hp motorized or treadle pumps irrigation for some 5,500 farm families. In the Avu Totoe and Aglaw Lagoon areas, together with the Kpli Inland Valley near Afefe 3,890 ha of small–scale projects with flood control dykes would be developed for other communities.

Table 3: Small–scale/Micro–scale Irrigation and Drainage Project Area

Region	Community	Water body	Project area (ha)	Type of Irrigation	Beneficiaries	
					Persons	H/holds
Upper East	Pwalugu 1, Bolgatanga, Kpaswenkpe, Yapala, Dibisi, Bulibla	White Volta	2,200	Pump Irrigation Schemes	1,400	500
Upper West	Saru, Sambayir, Dekpee, Bundi, Kpali, Pala, Chiatanga, Tomaasaru, Sambayiri, Tuole, Talawona, Dodobi, Dochire,	Black Volta	1,600	Pump Irrigation Schemes	2,670	900
Northern	Daboya, Adaayili, Lingbinsi, Teplinayili, Nawuni, Kukuo, Dalun	White Volta	2,800	Pump Irrigation Schemes	5,000	1,430
Brong Ahafo	Ntotroso, Nobeko, Kwakunuma, Sienkyem, Dantano, Kinkuom, Tanoso, Pruso I,II & III. Dduduso, Prang, Nagya	Tano, Pru, Kwasu	3,300	Pump Irrigation Schemes	5,500	1,850
Ashanti	Apromase, Akyenakurom, Denuaso, Dedesua, Esipon, Perabon, Adagya, Dedesua, Kyiransa, Adumasa, Brusanke	Oda	1,800	Pump Irrigation Schemes	3,000	1,000
Central	Nsuayem, Gomoa Mampon, Atekyedo, Gomoa Brofo, Etwa, Gomoa Sampa, Esakyer	Ayensu,				
Okyi (Nakwa)	2,000	Pump Irrigation Schemes	3,300	1,100		
Greater Accra	Papase, Domfaase, Fankyeneko, Dzamai, Nsakyina, Oduman, Dordoekope, Angosekope, Dzetekwe, Kokope, Kponekope	Nsakyir, Volta Estuary, Densu	1,500	Pump Irrigation Schemes	2,500	835
Volta – 1	Adidome, Todzanu, New Bakpa, Angbleta, Adidokpui, Fiave	Volta River	1,000	Pump Irrigation Schemes	8,147	1,050
Volta– 2	Sogakope, Gbonakope, Detorwume, Wlotor, Agrodome, Agodomekpotami, Yorve, Adidokpe, Vetorkor, Todzikpota, Dalive, Tolesem, Totsoamyi, Nutekpor, Agotaga	Volta River	2,500	Pump Irrigation Schemes	10,341	3,450
Volta – 3	Dabala, Adutor, Avuta, Bludo, Tosukpo, Agugbla, Deme	Avu Lagoon	1,825	Flood Control and Drainage Improvement	6,008	2,000
Volta – 4	Belekpo, Tekukope, Amekpokope	Totoe Lagoon	175		502	140
Volta – 5	Lave	Aglaw Lagoon	115		198	90
Volta – 6	Galotse, Totsoanyi, Tolesem	Aglaw Lagoon	175		310	105
Volta – 7	Agorbledokui, Wenu, Sakome, Hatorgodo	Avu Lagoon	1,000		1,100	367
Volta – 8	Agorve I,II & III Agbledome I & II, Afefe	Kpli Inland Valley, R. Anotoe	600	Flood Protection and Shallow Wells	4,688	1,563
	Total		22,590		54,664	16,380

B. Agro–ecological Conditions

II.2. All the development would be in the immediate environs of the various target rivers. In the Black Volta area, there has been minimal farming or other activity along the entire reach intended for development. Despite occasional scattered bush fires, much of the thicket and grass vegetation would continue to provide watershed protection and adequate soil cover against erosion.

II.3. The White Volta areas in the Upper East and Northern Regions have areas that are not so well protected. Such areas have been cleared and cultivated over time, though they are eventually allowed to return to grass cover. They include areas in the Pwalugu reach of the river where active dry

season vegetable irrigation and wet season millet/sorghum cultivation are practiced. The Tano, Oda, Pru and other rivers in the transitional and forest belt in Brong Ahafo, Ashanti and Central regions project areas have maintained substantial vegetation cover within 20 m or more of the river banks. Cultivation in such areas has comprised food crops such as plantain, vegetables and also rice in the case on the SPFS Ejisu–Besease project on the Oda river. In the coastal area of the Volta River section of the project, the watershed environment has maintained its grass and thicket vegetation. The Densu and Nsakyir rivers however, have sections with farming almost to the river banks.

II.4. Even though food security and poverty alleviation goals call for project development along the rivers, watershed protection would nonetheless remain crucial for sustainable exploitation of the rivers for agriculture, other uses and the maintenance of essential environmental services. The project would therefore include the following measures to ensure a safe watershed environment:

- ***Maintenance of restoration of tree cover within 25 m of the river banks:*** tree planting and nurturing would accordingly be promoted as a project component. NGOs with appropriate experience would be contracted to assist communities to nurse seedlings and carry out the planting exercise and after–planting care.
- ***Contour bunding and ploughing*** would be practiced routinely as part of project land development such that the entire project would minimise soil erosion and maximise its protection.

II.5. An SPFS expansion phase is already planned. It would have a component intended to support community land use planning in the Upper West Region as well as mechanised conservation agriculture. This project would link up with the SPFS initiative once it gets under way thereby preserving beneficial agro–ecological conditions in the watersheds.

C. Climate

II.6. Weather conditions in Ghana are unfavourable for dependable all year crop production. In the northern project areas just as elsewhere in the north, there is a marked distinction between the rainy seasons. The rainy season extends from April to October and exhibits a mono–modal pattern with a gradual build up at the beginning. It peaks in August/September with the end of October signalling the beginning of the dry season.

II.7. The rainy season is associated with moist monsoon winds which blow from a south–westerly direction off the Gulf of Guinea onto the West African main land. These winds predominate throughout the rainy season.

II.8. The months of November to February comprise the *harmattan* period which is characterised by north–easterly trade winds. The *harmattan* is a very dry wind and often brings a fine dust from the Sahara desert with it. The nights and mornings are usually colder than average with temperatures in the range 18˚C–23˚C. Day time temperatures are higher and may range between 28˚C and 32˚C. High value irrigated vegetables with irrigation are most appropriate for this period.

II.9. Average relative humidity varies from 29 percent in January to 84 percent in August. This is generally higher during the night and early morning, but decreases during the day to a minimum in the afternoon. Periods of lowest relative humidity occur during the months of December, January and February.

II.10. Climate in the southern project areas is characterised by a bi–modal pattern. A short dry begins in July, ends in September and is followed by a minor rainy season covering the latter half of September to the end of October or early November. A second dry season then sets in lasting till March the following year. During August, the lowest temperatures are recorded in the range 22˚C–23˚C. Day time temperatures may range between 28˚C and 33˚C. The dry *harmattan* conditions also persists in the south, affecting relative humidity in much the same way as the north.

D. Soils and Topography

II.11. Schemes intended for the Black and White Volta rivers would be situated on an extensive block of alluvial soils of the Dagare–Siare–Pani association which characterise most of the Volta Basin. The Dagare soils occur irregularly on the high banks or levees. They are formed when the rivers overflow their banks and are suitable for the irrigated production of a wide variety of crops and vegetables. The Siare soils occur on almost level land. Below 50 mm of a dark greyish brown slightly humous clay, the profile consists of about 500–1,000 mm of olive brown silty clay overlying brown, yellow and grey mottled silty clay to 2 m or more. Pani series are very poorly drained alluvia which occur patchily within Siare areas.

II.12. Schemes intended along the Tano, Pru, Kwasu, Oda and Ochi Rivers would be situated on the Chichiwere–Kakum–Oda alluvia association. The most inferior of these soils is the Oda series which is located in flood plain depressions. The Kakum is the most important series and is situated on the lower terrace of the flood plain and poorly drained. It is deep, with clay/light grey mottled clay loams topsoil 30–50 cm deep and is used extensively for the cultivation of rice.

E. Land Use in Targeted Areas

II.13. Original vegetative cover in the ***Forest Zone*** largely comprised semi–deciduous trees. However, due to the continuous usage — slash and burn, felling, etc. — much of this has degenerated into:

- Unfarmed land comprising broken forest, fallow farmland made up of secondary forest and thicket;
- Swamp and re–growth occurring extensively on the lower and middle sections; and
- Unutilised depressions, where swamp vegetation is encountered.

II.14. Perennial crops are cultivated on the middle and lower slopes of the forested regions and include oil palm, coconut and cocoa. Mixed crop farming of vegetables, cassava and other staples also occurs on the drier uplands.

II.15. The three vegetation types encountered in the ***Interior Savannah Zone*** include savannah woodland, transitional forest and solid forest which have sparse distribution and usually fringe the rivers. The entire area is burned annually to clear the land for cultivation and only fire tolerant species survive. Crops grown on the well drained bottom and lower levee soils include oil palm, plantain and vegetables and these are intensively cultivated. In depressions, well developed rice cultivation is prevalent while on the bottom and lower and middle sections of the catena and part of the upper on some of the project sites, yam comprises the dominant crop.

II.16. The project sites in the ***Coastal Savannah Zone*** exhibit three main land use types: riverine forest, tall and short grassland savannah and coastal thickets. Riverine vegetation developed along the

main rivers consists of light forests and thickets. Thicket vegetation and tall grassland with isolated trees predominate in the depressions while most existing projects are planted to paddy or sugar cane. On the relatively dry land however, short grassland savannah occurs which in places is used for livestock farming. Well drained areas are usually under intensively cultivated with vegetables, cassava and other staples.

F. Land Tenure Arrangements in Targeted Areas

II.17. Land ownership in the three northern regions is vested in either the *Tindana* or the Chief, and he allots it to any villager who wishes to farm. The *Tindana* is the chief fetish priest and conducts all religious ceremonies, especially those relating to land. Land for farming is held loosely within the family by the whole family. Acquisition of land for farming from the *Tindana* or the chief first requires introduction to the latter. This means sending a gift normally referred to as *kola* to the *Tindana* who then confers with his elders. If the village farmer is considered trustworthy, he is allowed an usufructory right to the land, in other words a right to use the land for productive purposes without actually owning it. By his means a farmer can farm any acreage he wants provided it is not already owned or is not taboo land.

II.18. As for the South, most agricultural land in the Brong Ahafo, Ashanti, Central and Greater Accra Regions is under stool ownership. Stool land is controlled and allocated by the traditional authorities, i.e. chiefs, to interested parties again through usufructory leasing modalities which provide title deeds for a renewal periods of up to 99 years.

II.19. In general, land tenure is becoming problematic. In order to provide secure tenure for the farmers, allocation and usage terms for the development blocks must be agreed with the landowners. This will normally include preparation of lease agreement on an indenture form between the land owners and the farmers. The District Chief Executive in whose district the project falls would coordinate the process and witness the signature of the parties to the document. He would also see to it that a fair ground rent whether in cash or produce is agreed between the two parties. This approach to tenancy has already been used on some of the SSIDP schemes currently being implemented.

II.20. Men and women have equal right to land. But to ensure that woman do benefit fully, ongoing projects such as the SSIDP and the SPFS pilot phase demand the full participation of women and the disadvantaged in the community as a necessary condition for sitting a project in a particular community. This has had 100 percent acceptance at all projects sites. It is therefore intended that the Small–scale/Micro–scale irrigation and Drainage Project is equally favourable to all segments of the communities in question.

III. PROJECT RATIONALE

III.1. The promotion of irrigation farming is strategically important for Ghana if it is to satisfy the increase in food demand and alleviate the poverty which otherwise could become very serious in the future due to the rapid population growth of about three percent. If this rate continues, Ghana's population will more than double within 25 years from its current 20 million to almost 42 million. It is obvious that rainfed farming only, with its vulnerability to various risks such as unpredictable rainfall, sustained drought and bush fires, cannot produce sufficient food to meet the demands of the future population. At the moment, favourable international terms of trade allow production shortfalls to be met by imports. However, advantageous trade arrangements may not last forever and every country, including Ghana, will have to think carefully about how best to achieve food security. Where

economies and livelihoods are predominated by small scale, rain fed and insecure agriculture, a combination of irrigation development, improved agricultural water management and sustainable operation and maintenance represents an obvious response. Private smallholder schemes with strong user groups could in fact be expected to become a driving force for sustainable development. However for this to happen in Ghana, funding will have to be complemented by an improvement in support services including research, extension and credit as well as enhanced downstream activities including post harvest systems, agro–processing, as well as rural roads and marketing structures.

III.2. Viable agricultural water control systems would facilitate agricultural growth and poverty alleviation. They could also increase the productivity of land, reduce the pressure for extending cultivation area into marginal lands, and facilitate protection of soils and the environment. The water control systems intended for the project area would be complemented by land development appropriate for pumped irrigation from the river systems. In the Avu–Keta lowlands, drainage improvement and flood protection would also be involved.

III.3. In order to fully benefit form these developments, farmers must be organised into viable groups, trained and provided with appropriate and reliable extension and credit services as well as other institutional support. These services are detailed in Chapter IV, *Project Objectives*.

III.4. In the past, projects were often selected only on the basis of technical feasibility with little or no consultation with the target communities. The communities just looked on and saw projects constructed, after which they were "invited" in as beneficiaries. Not only was this supply driven, it was also constrained by a lack of binding commitment on the beneficiaries with respect to their participation throughout the project cycle. As perceived by them, it was government who "built" the facility and as such it was government's responsibility to keep the facility operational. Even when beneficiaries earned an income from utilizing the facilities, they usually contributed minimally to the cost of operation and maintenance. However, there are encouraging examples of well sensitised farmer groups in Ghana that have overcome such constraints. Lessons learned from these would be applied at this project's component schemes.

III.5. Increased productivity and production through irrigated agriculture will only result in increased farm incomes if they are linked to corresponding investments in rural infrastructure. For instance, it will be necessary to improve or construct roads linking the producing areas to the large towns representing markets for the increased or diversified production. In some locations the potential volumes and nature of the produce will also necessitate the construction of markets and market chain infrastructure such storage and cold rooms, and agro–processing facilities to reduce post–harvest losses, add value and generate collateral benefits in the form of additional employment and income opportunities. In that regard, it would be crucial to establish linkages with the proposed "Post–Harvest Systems and Agro–processing Project" and the "Rural Roads Development Project" (see footnote 3).

IV. PROJECT OBJECTIVES

IV.1. The project would contribute to the ***overall development objective*** of:

National food security and poverty alleviation.

IV.2. Its ***immediate objective*** is:

A sustainable increase in production and/or productivity by small farmers at selected scheme locations as a result of appropriate investments in agricultural water control technology, participatory scheme management and enhanced service delivery.

IV.3. Achievement of this objective would require four ***outputs***, each corresponding to one of the project's four ***components***:

- ***Output 1:*** Economically viable smallholder irrigation or agricultural water management schemes at up to 22 590 ha, distributed between almost 120 communities situated in 8 out of 10 of Ghana's regions.
- ***Output 2:*** Strengthened institutional capacity for sustainable water resources management and demand–driven service delivery.
- ***Output 3:*** Cost–effective support services contributing to sustainable agricultural water control and successful, profitable operation of the Output 1 schemes.
- ***Output 4:*** Effective and replicable Project Management, Coordination and Monitoring and Evaluation skills.

V. PROJECT DESCRIPTION

V.1. The project would be implemented over a five–year period and would have four components as follows:

Component 1: Agricultural Water Management Schemes

V.2. Working in full consultation with the communities, the project would introduce economically viable smallholder irrigation or agricultural water control schemes to a total of around 22.590 ha, distributed between almost 120 communities located in 8 out of 10 of Ghana's regions. The schemes would be sited where the demand of well sensitised beneficiaries is matched by an adequacy of soil and water resources. Most of the schemes would involve water lifting technology in the form of either mechanical or treadle pumps supplying some 18,700 ha from the nearby rivers, with the remainder of the total benefited area comprising flood control and drainage improvement (3,290 ha) and flood protection and irrigation from shallow wells (600 ha). Depending on the nature of a particular scheme, farmers would be worked with either on an individual basis or in groups of between 10 and 15.

V.3. With respect to irrigation, average irrigated farm plots per farmer would be in the range 0.5 ha–0.8 ha.

V.4. Where possible, up to five farmers may have a common mainline with extension pipes. Farmers would however have their own field pipe system according to farm configuration. In order to reduce the cost of land levelling, pipe systems would be used to manage the water either by surface application or by sprinklers. The main activities here would be to:

- Identify and select willing farmers and sites in the various river flood plains for small–scale/micro–scale irrigation;
- Train beneficiary farmers in the installation, operation and maintenance of the recommended irrigation technologies;
- Facilitate procurement and delivery of the equipment through selected suppliers who have at least a regional or district coverage and who can support the farmer with technical backstopping with respect to the equipment supplied. Any otherwise suitable suppliers

selected that do not have district outlets in project areas would be assisted by MOFA/GIDA and the District Assembly to open an outlet to serve the farmers; and

- Facilitate installation and establishment of pump irrigation systems.

V.5. A revolving short and medium–term credit facility would be established under Component 3 from which farmers can access funds for on–farm needs. The procurement of pumps, pipes and necessary accessories would be from the medium–term credit while production inputs would be from the short–term credit. Project credit would be channelled through acceptable financial institutions, which would be close enough to the particular project site. Initially, the project would have to procure the pumps and accessories through pre–qualified agents. The credit service providers would then pay the full cost for the equipment on behalf of the farmer.

V.6. Project implementation would be phased. There would be an average yearly increment of around 4,500 ha, although the pace of development on the three types of intervention (straight irrigation, flood control and drainage improvement, and flood protection of shallow well irrigation) would differ. Consequently the procurement of mechanical equipment would be phased accordingly, with the caveat that each of the river systems involved would be developed simultaneously.

<u>Component 2:</u> Strengthening Institutional Capacity in Water Resource Management

V.7. Institutional capacity building would largely comprise training along with limited payroll support to GIDA. Beginning with the latter it is noted that he AgSSIP small–scale irrigation preparation document Report No. 00/028 CP–GHA of April 2000 highlights GIDA's institutional challenges and notes that due persistent staffing and financial problems the organisation is finding it increasingly difficult to function. The project would therefore support the recruitment of three senior level engineers and four senior level irrigation agronomists to complement its implementation team.

V.8. GIDA would also be the focus of the training proposed under the project as would the farmers themselves, the extension services, credit service providers and irrigation equipment suppliers, thus:

- ***GIDA*** would receive training *inter alia* to enhance skills for consultative participatory project identification, planning, implementation, monitoring and evaluation. Also important would be the matter of establishing and working with farmer groups. Although these are at present established under cooperative law, this law's aptness for farmer groups is currently being questioned by those responsible for drafting the new Irrigation Policy and Strategy. This is because the matter of share issues and accounting requirements usually necessary for cooperatives are unnecessarily onerous for the purpose of what would effectively be little more than water user associations in the first instance. Furthermore, the principles of mutual exclusion justify forced membership for potential users of common resources and infrastructure; but to force membership of an organisation that can sue and be sued is not particularly ideal. Thus another key capacity building challenge with respect to GIDA would concern its ability not only to establish and work with farmer groups but perhaps also to be the umbrella institution under which they are established, as the Department of Cooperatives is now[4]. With this in mind it is

[4] This does not mean that a water user association should never be a cooperative. On the contrary in fact, that would be an obvious and desirable evolution, but it should be done according to democratic processes permitted under a more appropriate legal framework, after prior establishment of the group.

noted that the NGO community has demonstrable skills in group dynamics. A significant role is therefore foreseen for them during project implementation.

- ***Farmers*** would require sensitising as to the benefits of improved agricultural water management and their obligations as beneficiaries. In addition they would require training in group operations, new crops and farming techniques, farms as small business, the proper use of inputs and credit; and how to market effectively and avoid the boom and bust production which seems to result from prevailing farm decision making skills. In addition, they would need to be organised into the intended groups and registered with the appropriate institution at each location. As indicated above, this would be the Department of Cooperatives, at least in the short–term. Registration would be important not only because of the legal status that it affords; but also in order to access credit more easily – perhaps secured on the basis of group collateral. Group sensitisation and establishment would be carried out by both GIDA and the NGO community.

- The ***Extension Services*** would need training that enables them i) to teach farmers how to be good water managers and ii) to respond to farmers' demand for advice rather than a continuation of the prevailing package–based approach. This would involve not only the transfer of the necessary technical knowledge, but also the techniques for its dissemination. A particular priority would therefore be to train the extension workers in how to conduct and evaluate Farmer Field Schools and the mobilisation of contact farmers. Furthermore, just as with the farmers, *inter alia* the extension workers would also need a greater understanding of how markets work.

- Capacity building for ***Credit Service Providers*** would include but go beyond simple training in the administration of group loans. It would also have to include a broad awareness raising exercise concerning alternative credit modalities to those with which they are familiar, and seemingly locked–in. These could involve mobile banking, group collateral models as well as options for reducing transaction costs and hence increasing the profitability of multiple small portfolios. Also, of crucial importance would be loan officer risk assessment skills with respect to non–traditional crops.

- Finally, with the intention of establishing a mutually profitable and symbiotic relationship between the ***Equipment Suppliers*** and the farmers, awareness raising and training would be necessary for selected suppliers, especially with the intention of enhancing spares inventory management skills and achieving a vigorous after–sales service ethos.

V.9. In addition to these obvious targets of the project's training strategy, it may also be necessary to provide training to other relevant agencies. These include the Water Resources Commission, the Water Research Institute and the Environmental Protection Agency which also play important roles at the resource management level. Of particular interest here would be their skills and commitment with respect to the regulatory framework necessary to maintain equitable and sustainable access to the natural resources.

V.10. Enhanced service capacities of course are meaningless in the absence of the means by which to pay for the services. The next component is therefore to provide the resources necessary to mobilise the new found capacities and make them available to the farmers as consumers.

Component 3: Support to Irrigated Agriculture and Support Services

V.11. The principle objective of this component would be to ensure that the enhanced skills and capacities imparted during and as a result of Component 2 are mobilised to the benefit of the beneficiaries. This largely means logistics support.

V.12. Extension workers must be better able to respond to farmers' demand for new farming systems, in order to supply new markets. To this end their capacity building needs would be addressed in Component 2; but in order that their own information sources approximate to the state of the art, it would also be necessary to catalyse and support appropriate programmes of adaptive research.

V.13. Credit service providers may need help in establishing mobile banks or similar as well as the cash needed for a revolving fund which would be set up under the auspices of the project and used to provide for seasonal production credits. The revolving fund is based on a figure of US$1,000 per ha per season. With a total target benefited area of 22,590 ha, this means that by the end of the project the fund would total US$22,59m; but this total it would be built up in annual increments of 20 percent of the total.

V.14. Although equipment suppliers would be targeted under Component 2, it would not be necessary to support them under Component 3 since they are presumably "for–profit" organisations that should bear their own risks, thereby allowing the market to favour those that deserve an enduring place in it while ejecting by attrition, those that do not. Similarly, the supply of agricultural inputs is a private sector activity; however, in order that farmers learn to avail themselves of this service in the most advantageous fashion, the AEAs at the project sites would assist their farmer groups to do bulk procurement. Purchases made in this way would nonetheless normally be financed as part of the production credit facilities provided by the strengthened credit service providers.

V.15. It is crucial to note however, that project funding of service provision should only be seen as a transitional strategy, one that allows full advantage to be taken of the capacity building initiatives in the short–term. For the medium and long–term, service delivery should be financed on a cost recovery basis. Accordingly, efforts would be made to render service providers more accountable, demand–driven and cost–effective, while beneficiaries would be sensitised as to user–pays principles and gradually made to adopt them. To this end it is encouraging to note that when adequately sensitised, Ghanaian smallholder reportedly do understand their responsibilities in this regard.

V.16. It is also crucial to note that poor transport infrastructure and market access and inadequate storage facilities remain a significant constraint on catalysed agricultural production. This however is the subject of the other BIPPs referred to earlier (see footnote 3, page 7). It is essential nonetheless that close coordination is maintained between the projects in order to maximise and maintain complementarity between them thereby maximising their benefits.

Component 4: Project Management Coordination and Monitoring and Evaluation

V.17. As described in Chapter IX, a Project Management Unit would be established in Accra and supported by GIDA sub–offices that are relevant to scheme locations. This would necessitate the provision of two four–wheel drive (4WD) station wagons, an estimated fourteen 4WD twin–cab pickups, 25 motorcycles and 40 bicycles for project use. Office equipment including desk top computers would also be procured.

V.18. Additionally, in consideration of GIDA's limited capacity to carry out its functions due to a serious lack of operational funds and notwithstanding the financial support implicit in Component 2, funding would also cover allocations for travel and night allowances, project related incremental activities, participation in the technical meetings and conferences, vehicle and office operation and maintenance expenses as well as project staff monthly performance allowances.

V.19. A Monitoring and Evaluation system would also be established and include strengthened data collection and analysis as part of its management and planning toolkit. At the local level this would be the responsibility of:

- the farmers themselves through their groups/associations;
- the District Directorate of MOFA based at the District Assembly;
- the District Assembly through the deliberations of its agricultural and development sub–committee; and
- the Regional GIDA office.

V.20. A complementary feedback reporting loop would also be established linking district agricultural offices up to GIDA PMU office in Accra in order to address possible problems and constraints at an early stage and accordingly develop appropriate mitigating measures.

V.21. It is important to note that this component, which is largely process–oriented also provides a hands–on capacity building opportunity to strengthen GIDA for the longer term.

VI. INDICATIVE COSTS

VI.1. Estimated costs for the project are presented in the following table**:**

Table 4: Indicative Project Cost by Component and Year

Component		Project year					Total (US$)
		1	2	3	4	5	
1	Promotion of Small/Micro Scale Irrigation Technology	4,896,547	4,896,547	4,896,547	4,896,547	4,896,547	24,482,735
2	Strengthening Institutional Capacity in Agricultural Water Control	207,014	207,014	207,014	207,014	207,014	1,035,070
3	Support to Irrigated Agriculture	4,721,280	4,721,280	4,721,280	4,721,280	4,721,280	23,606,400
4	Project Management – Establishment	789,750	0	0	0	0	789,750
	Project Management – Operations	564,400	564,400	564,400	564,400	564,400	2,822,000
Contingencies							
Physical (15%)		1,676,849	1,558,386	1,558,386	1,558,386	1,558,386	7,910,393
Price (5%)		558,950	519,462	519,462	519,462	519,462	2,636,798
Total Project Cost		13,414,789	12,467,089	12,467,089	12,467,089	12,467,089	63,283,146

VI.2. The split between local and foreign exchange is illustrated in Table 5. The indicative cost build up by component is presented in Annex 1.

Table 5: Indicative Project Cost by Component and Local/Foreign Cost

Component		Local costs		Foreign costs	
		%	US$	%	US$
1	Promotion of Small/Micro Scale Irrigation Technology	43%	10,467,710	57%	14,015,025
2	Strengthening Institutional Capacity in Agricultural Water Control	47%	481,432	53%	553,638
3	Support to Irrigated Agriculture	1%	191,568	99%	23,414,832
4	Project Management – Establishment	10%	78,975	90%	710,775
	Project Management – Operations	40%	1,129,200	60%	1,692,800
Contingencies					
	Physical (15%)		1,852,333		6,058,060
	Price (5%)		617,444		2,019,353
Total Project Cost		23%	14,818,662	77%	48,464,484

VII. PROPOSED SOURCES OF FINANCING

VII.1. In recent years beneficiary contribution to project costs has been a precondition for public project funding. This has been achieved by sensitisation of beneficiaries from the earliest stages of projects conception and involving them through the preparation process. Local NGOs are usually contracted to undertake project formulation in this participatory fashion. Examples of agricultural sector projects which have met with various levels of success of community participation in project funding include the WB/GoG funded ASIP and VIP projects, the ongoing ADB/GoG funded SSIDP as well as the GPRP/SIF community–based projects. In all of these the community contributions have comprised labour, materials or cash. Often in fact, the contributions have been made using all three means.

VII.2. It can be seen from Tables A4.1.1 to A4.1.iii (Annex 4) that the expected value of farmer's contributions (whether by cash or labour equivalent) would total some US$4.6m, i.e. almost 7 percent of the total project cost.

VII.3. Based on this and recent trends in government–led project financing, project costs would be allocated tentatively as follows:

- Government (Central and Local) 16%
- Development Partners[5] 77%
- Beneficiaries 7%

[5] For simplicity at this stage, it has been assumed that all foreign exchange costs would be picked up by the Development Partners and all local costs by the combination of government and Beneficiaries.

VIII. PROJECT BENEFITS

VIII.1. The principle benefits of the project would be noticed in terms of improving socio–economic conditions in the rural areas as a result of reduced climatic risks, increased farm labour productivity, and enhanced livelihood opportunities. These would be achieved by a combination of investment and institutional strategies, so benefits would also be noted in terms of improved institutional capacity and sustainable, cost effective service delivery.

VIII.2. In particular the expected benefits, several of which are linked or overlap, would include:

VIII.3. ***Increased agricultural outputs:*** at full development, when permanent irrigation schemes are in place, it is anticipated that the incremental crop production on the 22 590 hectares would be some 302 320 tons of vegetables and 44 340 tons of paddy rice annually.

VIII.4. ***Poverty alleviation and food security:*** poverty among rural smallholder farmers worsens during the dry season when food supplies dwindle, cash income falls and cropping activities grind to a halt. The irrigation schemes would result in all year round cropping and thus employment and cash income during the dry season. Furthermore, this benefit is additionally enhanced by the fact that the proposed crops are all of high value in comparison to the prevailing farming systems.

VIII.5. ***Risk reduction to farmers:*** risks to farming families can be considerably reduced by means of irrigation and higher cropping intensities. These protect farmers against shortfalls in food production while reliable water supplies in the longer term encourages them to diversify and take advantage of market conditions thereby hedging their risks further.

VIII.6. ***Nutrition and welfare:*** the increased cash income from irrigated crops and higher family consumption of a greater variety of foods would result in improved diets and nutritional levels in the poor rural farm households.

VIII.7. ***Increased employment opportunities:*** these would be generated by the incremental cropped area resulting from the project. At full development, it is expected that about 37.5 million person–days of unskilled labour would arise from increased agricultural activities. In addition, civil works construction and the operation and maintenance activities on the projects as well as marketing and processing of farm produce would contribute to employment generation. An estimated total of about 16,400 households would benefit directly from the incremental income and employment opportunities generated by the project.

VIII.8. ***Technology transfer:*** farmers at the schemes would receive intensive support services which, apart from benefiting farmers directly, would also serve as demonstration to others engaged in rainfed farming. These farmers would also benefit from the use of improved varieties, application of fertilizers, plant protection measures and reduction in post–harvest losses.

VIII.9. ***Improved access to credit:*** from financial institutions such as the rural banks through properly registered farmer groups.

VIII.10. In addition, there would be indirect downstream benefits in terms of additional employment arising from the need for more transportation, storage and marketing services as well as added value opportunities such as grading, packaging and processing.

IX. IMPLEMENTATION ARRANGEMENTS

A. Implementing Agencies

IX.1. As suggested under Component 4, operational responsibility would be vested in a Project Management Unit (PMU) based at GIDA headquarters and lead by National Project Manager who would be a suitably qualified senior engineer. He/she would be assisted by a team of engineers and agronomists and a Financial Controller who would be a professionally qualified accountant to be in charge of the finances. Because GIDA does not have any suitable spare capacity, The Financial Controller would be recruited from outside. Provision for his/her remuneration has been made in the budget. In addition, GIDA would provide two junior level accounts personnel to assist the Financial Controller. At project level in the Regions, the Financial Controller would work through the GIDA regional accounts personnel. The National Project Manager would report immediately to the GIDA Chief Executive.

IX.2. The PMU would be supported by the monitoring and evaluation system to be established as part of project Component 4.

IX.3. Despite the progress made on decentralisation, GIDA is not yet represented at the District level while technical capacities for scheme studies, designs and supervision are still limited at that level. Accordingly, overall management responsibility would remain at the central level, where MOFA would establish the Project Management Unit to direct project implementation and where a National Steering Committee would be formed and chaired by the Minister of Food and Agriculture and convened quarterly. This committee would provide policy guidelines for the implementation of the project. However, it is intended that a National Technical Committee would also be formed, chaired by the Chief Executive of GIDA, to deal with the technical issues.

IX.4. Membership of each of these committees would not be more than seven, and would comprise representatives from relevant ministries or agencies in the case of the Steering Committee or individuals with relevant expertise, in the case of the technical committee. District Assembly level implementation committees would also be formed.

IX.5. District Assemblies would be fully represented during implementation. The initial activities involving beneficiary awareness visits, sensitization and selection of the community's scheme locations would be led by personnel from the districts. Equally, the arrangement of legally binding leases with landlords with respect to allocation of their lands for schemes would also be a typical early activity involving the Districts. In fact, in order to ensure that implementation is as smooth as possible, it would be necessary to ensure that meetings and negotiations arranged between beneficiaries and landlords benefit from the full participation of the District Chief Executive or his designated District Coordinator. When the terms of lease, including the amount of ground rent payable has been agreed, the District Chief Executive would then be a signatory, witnessing the transaction between the parties. In addition, site progress meetings would as far as possible be chaired by the District Chief Executive or his designated representative.

IX.6. Activities such as agricultural extension services, including Farmer Field Schools (FFS) and group formation would also be delegated to the district level along with NGOs where available and adequately qualified. This approach replicates that adopted so far successfully on the SPFS pilot phase project, the ongoing SSIDP and the SFIP.

IX.7. A need for Technical Assistance is foreseen, which is discussed in Chapter X below.

B. Role of Other Government Institutions

IX.8. The Ministry of Finance and Economic Planning (MFEP) would be responsible for mobilizing the necessary financial resources needed to carry out the project.

IX.9. District Assemblies fall under the Ministry of Local Government and Rural Development (MLGRD). Current GoG policy is that at the District level, in addition to reporting to the parent ministries at the Regional and National level, Ministries and Departments in the District answer to the District Coordinating Director of the District Assembly where they operate. In this way they are expected to serve effectively the communities in the Districts. MOFA, as a decentralized Ministry, is affected by this policy.

IX.10. The responsibilities at district level would be distributed as follows:

- Besides project support to District MOFA to carry out FFS, extension and other activities at the numerous sites in a District, the annual budget of the District MOFA would begin to recognize the project so that long after completion of procurement activities, there would be normal logistics provision to allow District MOFA personnel to continue working in the project area. This need would be raised by the District Project Committees.

- Roads into some project locations are poor and would need improvement if the project produce are to be marketed to the benefit of the farmer. In the same manner as the district MOFA, the Department of Feeder Roads (a decentralized department under MRT) personnel would need to plan for construction or rehabilitation of such roads. Therefore the District head together with the District MOFA Director would be members of the District Project Committee.

- The District Engineer has responsibility to monitor all development works in the district and the small–scale/micro–scale works as well. As such he/she would be a member of the District Project Committee.

- The District Department of Cooperatives officer as already mentioned, would be involved in project development from the outset. He/she would continue to visit and work on the farmer groups in his area on a continuous basis, several years after project development. His/her presence on the District Committee would be necessary. He/she also must budget for the necessary logistics to keep visiting the project.

- With all these decentralized Ministries and Departments in a District being coordinated by the District Assemblies, it can be inferred that the MLGRD is perhaps the one most important arm of government that would influence the project positively, when these officials with the oversight of the District Coordinating Director, support project implementation.

- Besides the above government organizations, there is the Assemblyman of the area, whose personal contact on the ground would also support project implementation and could help solving teething problems.

C. Role of the Private Sector and NGOs

IX.11. The successful involvement of NGOs and the private sector would be essential for project success and sustainability. For instance, significant roles for the private sector would be input supply

and the procurement, supply, installation and after sales service of mechanical equipment, including pumps. Suitable companies, especially those with Regional/District coverage would be registered by MOFA/GIDA as pre–qualified suppliers for the project. As indicated in Annex 4, a modest budget has been allowed for building the capacity of these local suppliers as regards their ability to work with groups, especially as regards hands–on training for operation and maintenance of the equipment and the management of spare parts inventories. In the specific instances where treadle pumps are required, it is noted that the manufacturing technology is already in place in country as a result of the pilot phase of the SPFS. There are groups of artisans in Accra, Kumasi, and Tamale who have been manufacturing the pumps for the SPFS project. These groups would be used, and if need be, new groups would be formed who would be attached to the existing groups to learn the manufacturing technology.

IX.12. A key role for the NGOs would be group formation. The capacity of MOFA/GIDA to organize farmer groups in general and to assist them in accessing appropriate credit services in particular is limited. Local NGOs with relevant expertise would be needed to carry out this important function, working with MOFA/GIDA personnel to the greatest extent possible. Selected NGOs would also be represented on District Project Committees. To these ends it is intended that a selection of suitable NGOs would have been pre–qualified as a priority soon after project start–up.

X. TECHNICAL ASSISTANCE ARRANGEMENTS

X.1. Technical assistance would be required at two levels and would comprise a combination of international and domestic expertise. A small team of internationally and locally recruited advisors would be based in Accra where it would assist GIDA to coordinate the project while providing overall technical backstopping. However, because of the spatial distribution of the project in eight Regions and also because of its size in these regions, the technical assistance would also include regional sub–teams of domestic experts based in GIDA regional offices and allocated as follows:

- Team No 1 – Upper East and Upper West Regions
- Team No 2 – Northern and Brong Ahafo Regions
- Team No 3 – Ashanti, Central and Greater Accra Regions
- Team No 4 – Volta Region

X.2. Precise arrangements and modalities for the Technical Assistance have not as yet been suggested in order to avoid an overly prescriptive approach. This is a matter that is better addressed during detailed project design when the specific conditions or preferences of all parties, including GIDA and the funding agency, can be mutually discussed and resolved.

X.3. Nonetheless, it is possible to suggest what the principle responsibilities of the technical assistance would have to include, thus:

- The adaptation and/or development of a participatory scheme planning, implementation and management system that would involve direct contact between the advisers and the groups for a minimum of 2–3 years;
- Assistance with the detailed studies and designs for each scheme;
- Assistance in the specification of mechanical equipment;

- The supervision of procurement, delivery of pumps and installation/commissioning of the equipment;
- The design and establishment of suitable credit models and capacity building from the credit service suppliers; and
- The preparation of farmer and counterpart personnel training modules.

XI. SPECIFIC ISSUES AND PROPOSED ACTIONS

XI.1. ***Sustainability through ownership:*** International conventional wisdom along with Ghana's own problems with respect to project sustainability and funding gaps has resulted in the need for development beneficiaries to contribute to project costs. In fact, this is now current government policy. Besides beneficiary contribution, project schemes would also be demand–driven. After due sensitization communities would be assisted to work on their land issues and group formation. Beneficiaries who satisfy group formation requirements, commit to participate and sign their land lease agreements, would apply to the PMU for physical implementation of their scheme to be started in earnest. Beneficiary groups in areas requiring pumps and piping would have been registered with the appropriate credit service provider. When the supply of their equipment has been certified by project personnel, the bank would then pay the supplier directly and debit the beneficiary account. Then, according to whatever amortisation arrangements have been agreed, the group or individual would repay the loan from the improved cash flows resulting from the project.

XI.2. This policy would encourage a commitment from the beneficiaries to take an everyday interest in the operation and maintenance of the schemes and encourage them to shoulder the maintenance costs.

XI.3. ***Role of groups to ensure sustainability:*** From the time groups take delivery of their equipment, they would know that the equipment belongs to them. Because they would also have to make regular payment to the bank for the equipment, they would learn to use the machines carefully according to the instruction manual. Also, since groups would want to produce and sell bountiful harvests they pay better attention to extension personnel on proper crop husbandry.

XI.4. ***Roles of District Assemblies:*** As already explained, the District Assemblies would be involved in the development process from planning, study preparation, design through construction to extension and farmer training through its departments such as district MOFA, Feeder Roads and Department of Cooperatives. This would pave the way for the Assemblies' financial obligation during project implementation to form part of their annual budget.

XI.5. ***Project management:*** As described in the previous chapter, the proposed project implementation arrangements provide for technical assistance to GIDA at the national and regional levels. It would be essential that the advisers adopt a reactive rather than proactive relationship with GIDA, thereby enhancing the project's capacity building agenda.

XI.6. Early during project start–up, GIDA would need to begin to establish subproject technical teams within the head office structure to ensure necessary data are compiled and made available on request. GIDA would also have to ensure throughout project implementation, that such technical teams are be familiar with the status of subprojects on the ground.

XII. POSSIBLE RISKS

XII.1. The main risks identified at this stage are:

- ***Inadequate farmers' capacity to participate in the project:*** The expected beneficiaries sensitization and group formation, if poorly carried out or not given adequate resources, may lead to limited farmers participation. In the event that group formation is not adequately carried out, farmers' ability to access credit for pumps and inputs can be weakened with fewer farmers receiving the inputs. This situation would reduce the size of the area intended to be brought under cultivation. It would therefore be necessary to give this activity a high priority. The project therefore provides a budget for group formation on a continuous basis and beyond the scheme development phase through district level NGOs and cooperative and MOFA structures.

- ***Poor credit recovery:*** Unless sensitisation campaigns regarding the project's credit oriented activities become effective, there would a residual risk that farmers fail to repay loans for on–farm equipment, construction of wells and for pumps as well as inputs etc. This risk would be greatly reduced by ensuring that adequate and well understood measures for orderly debt servicing are put in place. These would include: (i) the pledging of farm equipment and pumps to the lending bank until full loan repayment; (ii) establishment of group responsibility for loan repayment and the use of the water users associations to monitor debt servicing; and (iii) the involvement of the District Assemblies in the group formation process.

- ***Poor after–sales services:*** In particular the smooth functioning of the small irrigation pumps is crucial for the success at individual farm level and of the small–scale/micro–scale irrigation development wherever it takes place. The present pump dealer/service network is not dense enough and stocks of spare parts are insufficient to provide adequate coverage. As has been described, however, the project, by pre–qualifying suppliers and appropriately training them anticipates this and would result in strengthened local capacity for after sales service and the like.

- ***Central Government and District Assemblies' capacity to implement the project:*** GIDA head office would set up a project implementation structure that would be supported by technical assistance at both the national and local levels where its role would be to help GIDA to implement the project, not implement the project on GIDA's behalf.

- ***Impact of increased production on markets:*** Structures have been put in place to minimize any adverse effect brought about by glut harvests. These include market surveys beyond the local markets to link up farmers with interested buyers. Nevertheless, it is important that the project does not go against market forces, which, if properly understood, would allow farmers' wealth to grow and their production to diversify. Accordingly therefore, the anticipated capacity building agenda would assist farmers to this end.

- ***Potential environmental risks:*** The main environmental risks would be, in the health sector as the snails carrying the bilharzias worm tend to breed in canals. Malaria is the other major problem, especially in paddy rice fields. The effect of development along the lakeshores and river banks would be another concern, as soil erosion into the water bodies can be increased. The design engineers and the staff of the Environmental Protection Agency (EPA), who would be represented on the Steering Committee, would work together to comply with necessary guidelines. One measure already mentioned in the

project document is a minimum distance of the cropped area of 25 m from the river bank. Besides this, agro–forestry and household/community woodlots would be part of watershed protection measures to be undertaken. In addition, beneficiaries would be helped to include tree seedlings nurseries for vegetative cover in the project areas. Since almost all irrigation water would be pumped through pipes distribution systems at direct cost to the farmer, farmers would tend not to over irrigate and promote erosion or water logging. Equally, the project would ensure that all scheme proposals are based inter–alia on affordable water budgets that account for the need to maintain adequate environmental stream flows and services.

- There is also the risk of ***pollution of soils and water bodies through high dosage of agro–chemicals*** or misuse of these as farmers seek to increase yields. However, the risk would be reduced through better enforcement of environmental regulations for which farmer awareness would have to be raised by extension services which have themselves been strengthened by the project. In addition, a continuous and participatory environmental impact assessment (EIA) would be put in place especially where flood irrigation would be practiced, in order to contain soil and water pollution at tolerable levels.