The State of Irrigation Infrastructure in Ghana: The Way Forward

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ABSTRACT

The Ghana Irrigation Development Authority (GIDA) is a public sector organization established to promote agricultural growth through the provision of irrigation infrastructure and other agricultural water management techniques. Irrigated agriculture in Ghana is categorized into formal, informal or smallholder and large-scale commercial irrigation. Over the years, irrigation development in the country has been faced with a number of challenges, which necessitated the development of the National Irrigation Policy, Strategies and Regulatory Measures and the Ghana Agricultural Water Management Pre-Investment Reform Action Framework. A number of factors affecting irrigation development in the country include lack of capital, commitment by successive governments, cost of energy, access to land and credit, lack of technical know-how and encroachment, among others. Analysis of budget provided by government for public irrigation development was carried out using simple linear regression. Results indicate a bright prospect of irrigation development, with reforms under implementation. A minimum of GHS 633.43 million is required for release into the sub-sector by government together with investments from private sector in the next ten years to shift the balance towards positive growth. To solve the problem of inadequate funding of the sub-sector activities, it is recommended that the GIDA collaborates with Development Partners to fund projects and activities in line with their objectives. GIDA should develop effective programmes for building capacity of contractors involved in development of infrastructure. GIDA should deepen its collaboration with private investors under PPPs and convert electric and diesel/petrol powered irrigation pumps to solar powered ones.

INTRODUCTION

One fundamental challenge that confronts agriculture is inadequate water to carry out all-year-round production and irrigation has been introduced as a strategy to solve this problem to facilitate agricultural intensification. Irrigation development in Ghana officially began in the early 1960s, though informal smallholder irrigation dates back to the late 1890s at Anloga in the Volta Region and Bawku in Upper East Region, which had long histories of indigenous irrigation practice. The Ghana Irrigation Development Authority (GIDA) is a public sector organization established to promote agricultural growth through the provision of irrigation infrastructure and other Agricultural Water Management (AWM) techniques. The present GIDA, evolved from the earlier Land Planning and Soil Conservation Unit of the Ministry of Agriculture in the early 1960s. The Unit went through several cycles of transformation until 1977 when the Supreme Military Council Decree (SMCD) No. 85, establishing GIDA was passed. GIDA at this time was given broad objectives with a multi-disciplinary irrigation development outlook and staff. Besides SMCD 85 of 1977, the activities of the Authority are guided by Legislative Instruments, LI 1350 of 1987 which
provided for the regulation and management of public irrigation schemes, LI 1995 of 2011 and LI 2230 of 2016 have been added to regulate private investment in public irrigation and promote establishment and regulation of Water Users Associations (WUAs) nationwide.

Irrigated agriculture has been carried out in the country for over a century and its benefits are well known. Unfortunately, there is dearth of information on state of irrigation infrastructure in general in Ghana. The knowledge gap presents a difficult task to key stakeholders who are likely to pose the following questions:

1. What is the present state of irrigation infrastructure in the country?
2. What challenges confront the irrigation industry in Ghana?
3. What opportunities are available and how can the private sector utilize the enormous leverage provided by the public sector to invest in the irrigation sub-sector?

The main objective of this paper is to bridge the information gap on the state of irrigation infrastructure in Ghana and propose the way forward. Specifically, the paper: traces a brief history of irrigation development in the country to the present, examines the current state of irrigation infrastructure in the country, investigates challenges confronting the irrigation industry in the country and proposes the way forward for irrigation development in Ghana.

BACKGROUND INFORMATION TO IRRIGATION DEVELOPMENT IN GHANA

Categories of Irrigation

Irrigation is associated with a number of advantages including serving as insurance against total or partial crop failure and serving as pathway for generation of employment for youth in the country. Irrigated agriculture contributes to increased cropping intensification and diversification thus leading to increased production and income. Irrigated agriculture has been used as a key strategy for poverty reduction and a tool to increase farmers’ resilience to risk associated with inadequate water.

Currently, irrigated agriculture in Ghana is categorized into informal or smallholder irrigation, formal irrigation, and large scale commercial irrigation. Smallholder irrigation is practised by an individual who cultivates an area of up to about 0.5 ha or more by using simple infrastructure for water storage, conveyance and distribution. This form of irrigation is characterized by relatively small investment by farmers, dominated by manual fetching of water with buckets or watering cans with few lifting water by pumping. Traditional and community initiated schemes fall under this category which comprise irrigators in the south-eastern coastline of Ghana, groundwater irrigation near Bawku, irrigators in inland valleys and along dams and dugouts in the northern part of the country as well as irrigated urban and peri-urban agriculture. Presently, it is estimated that informal smallholder irrigation covers an area of 189,000 hectares (GIDA, 2016).

Formal irrigation is the type that depends on some form of permanent irrigation infrastructure funded by the state alone or together with development partners and civil society organizations. The development of formal irrigation schemes in Ghana dates back to 1960s. GIDA presently has 56 formal irrigation schemes covering about 11,000 hectares. On many schemes, the rates of utilization are low, due to poor operation and maintenance of infrastructure and high energy tariffs. Specifically, the rate of utilization of pump schemes is 46 %, whiles that of gravity schemes is 134 % both of which fall below 200 % projected mark for irrigation schemes.

Large scale commercial irrigation which falls under either formal or informal irrigation is usually export-driven and involves cultivation of high value fruits and vegetables. Large scale commercial irrigation is formal when government provides infrastructure such as headworks, conveyance and primary water distribution facilities while the private investor provides secondary water distribution and application machinery and equipment. Typical examples include Golden Exotics Limited and VegPro Ghana Limited which partner Government of Ghana under Public-Private Partnership (PPP) arrangement, produce bananas and
baby corn respectively, for export to the European market. On the other hand, informal large scale commercial irrigation is a category in which investment into infrastructure is entirely borne by the private sector. There are an estimated 21,000 hectares of large scale commercial irrigation in Ghana currently.

**Policy and Related Issues in Irrigation Development**

The challenges in the irrigation sub-sector in Ghana over the years have necessitated two initiatives, with the purpose of finding lasting solutions to the challenges. The first initiative was the development of National Irrigation Policy, Strategies and Regulatory Measures which guide irrigation development in the country, approved in 2010 and promulgated in 2011. The second initiative was a diagnostic study of the irrigation sub-sector dubbed “The Ghana Agricultural Water Management Pre-Investment Reform Action Framework,” undertaken in 2012 in line with the Comprehensive African Agricultural Development Programme (CAADP). The Pre-Investment Reform Action Framework of 2012 recommended a shift towards a sub-sector typology based on five business lines as summarized in Table 1.

<table>
<thead>
<tr>
<th>From: Irrigation Types (T)</th>
<th>To: AWM Business Lines (BL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1 Formal irrigation</td>
<td>BL1 Large-scale irrigation system modernization and development</td>
</tr>
<tr>
<td></td>
<td>BL2 Community managed small and medium scale irrigation</td>
</tr>
<tr>
<td>T2 Informal irrigation</td>
<td>BL3 Individual micro and small scale irrigation</td>
</tr>
<tr>
<td></td>
<td>BL4 Enhanced water management in rain-fed agriculture</td>
</tr>
<tr>
<td>T3 Commercial irrigation</td>
<td>BL5 Market-oriented irrigation on a PPP basis</td>
</tr>
</tbody>
</table>

(Source: MoFA and GIDA, 2012)

Among challenges identified by both documents are low irrigation service charge recovery coupled with inadequate attention to operation and maintenance of irrigation infrastructure due to low recovery of irrigation service charges from farmers, inadequate Government budgetary allocation towards filling the operation and maintenance financing gap and high technical staff attrition rate due to poor conditions of service. In addition, GIDA has been identified as having a bloated organizational structure and staff numbers due to public policy on recruitment. These developments have led to poor performance of public irrigation schemes and stifled investments in the sub-sector by individuals and corporate entities. Consequently, the two documents recommended restructuring and modernization of GIDA and irrigation sub-sector.

As part of the recommendation, GIDA developed a vision, mission, objectives and strategies to address the irrigation challenges and shift holistically. The strategy focused on Irrigation Reform which is made up of four pillars:

- **Pillar I is Institutional and Policy Reforms** which involved review of SMCD 85 of 1977 to improve the management and maintenance of the irrigation system to ensure its long term physical and financial sustainability. This pillar also involves revision of the mandate and shifting GIDA’s activities from direct involvement in irrigation implementation and management to the role of sub-sector planner, regulator, advisor, facilitator, supervisor and public service provider. The National Irrigation Policy, Strategies and
Regulatory Measures has been reviewed in view of the change in mandate of the Authority as a result of the modernization and restructuring of the irrigation sub-sector of Ghana and ready for approval by Cabinet.

• Pillar II is Water Resource Management Reforms which emphasizes the critical importance of water entitlements, measurements and transparency. Accordingly, Government has promulgated LI 2230 of 2016 to promote establishment of Water Users Association (WUAs) on public and community-managed irrigation schemes and indeed dams nationwide.

• Pillar III, Irrigation Service Delivery Reforms with the objective to improve the quality, efficiency and accountability of irrigation services, through greater participation of farmers, institutional reforms and the use of contractual arrangements among water supply agencies and users. The result is that some of the schemes will be managed under Public Private Partnership (PPP) arrangements by Scheme Management Entities (SMEs). The SMEs will be in charge of the day-to-day management of the schemes and undertake key functions that will include operation and maintenance of infrastructure and administrative activities including the collection and proper use of Irrigation Service Charges (ISC) which will be paid by farmers. The PPPs will improve external funding and private sector support which are urgently needed to maintain and expand the irrigation sub-sector in the country. This is anticipated to enhance the sustainability of the schemes while freeing public funds for other development projects.

• Pillar IV: Improving Water Use Efficiency and on-farm Productivity through a System of Incentives accomplished by the use, subsidy and other forms of responsible production. This could be achieved by introducing improved water management through continuous contour trenching, rainwater harvesting for homes and gardening, recession water management, developing groundwater and environmental water management framework for sustainability of irrigated agriculture coupled with employment of solar energy to power pump irrigation schemes.

Ultimately, the restructuring and modernization of GIDA will lead to a more substantially decentralized and commercialized sub-sector and place the nation in a better position to overcome the challenges of climate change and its impact on food production and food security across the country. The World Bank, through the Ghana Commercial Agriculture Project (GCAP) is funding the restructuring and modernization of GIDA and Cabinet Memorandum has been approved for the implementation of this turnaround strategy of the irrigation sub-sector. The restructuring and modernization exercise is designed to be exit strategy for GCAP.

To further improve service delivery in the country, GIDA has principal collaboration with national and international research organizations and had successfully completed collaborative researches with International Water Management Institute (IWMI) and International Food Policy Research Institute (IFPRI). Currently, the Authority is developing proposals with IWMI, IFPRI and Technical Centre for Agriculture and Rural Cooperation (CTA). The Authority is also deepening collaboration with academia which led to development of irrigation curriculum for agricultural training institutions for adoption into the certificate and diploma programmes of study in these institutions nationwide. In the near future, GIDA will collaborate with the universities to develop similar curriculum for various levels of programmes in the universities.

Coverage of Irrigation facilities
Ghana has a total land area of about 23.9 million hectares, of which the cultivable land area is estimated to be 13.6 million hectares representing 56.94% (MoFA, 2015). The irrigable potential is 1.9 million hectares but only 221,000 hectares (11.63%) have been developed by public and private sectors, leaving 88.37% of the potential untapped. Presently, only about 11,000 hectares of the irrigable potential is funded by the public sector whiles 210,000 hectares made up of 189,000 hectares of informal or smallholder irrigation and 21,000 hectares is accounted for by commercial development.

Factors Affecting Irrigation Development in Ghana

Capital
The main sources of funds for irrigation development are public and private sectors. The public sector enjoys support from foreign countries, including China, Taiwan, the former Soviet Union, Japan and Republic of Korea and international organizations, such as the Food and Agriculture Organization of UN, German Technical Cooperation (GiZ), United States Agency for International Development (USAID), African Development Bank (AfDB) and the World Bank, among others (Miyoshi and Nagayo, 2006). Irrigation development is capital intensive and not attractive to the private sector. Partnership between public and private sector presents a viable opportunity for rapid development of the sub-sector.

To appreciate investment into public irrigation over the years by Government of Ghana, information on budget was subjected to trends analyses using simple linear regression. Trends in total budget and the component spent on actual irrigation infrastructure (assets or investment), past and future for the sub-sector were analyzed. Forecast of total budget to be released for public irrigation as well as the component to be spent on actual irrigation infrastructure development in the future were defined by:

\[ Y_t = a + bx_t \]  

(1)

Where \( Y \) is total budget or investment into irrigation infrastructure for a particular year by government, \( a \) is y-intercept parameter, \( b \) is slope of the parameter and \( x_t \) time in years. Information on total budget requested, approved and released for public irrigation and the corresponding components of the total budget spent on actual irrigation infrastructure (assets or investment) over a thirteen year period, from 2004 to 2016 were used for analyses. Total budget comprises compensation of employees, goods and services, and asset or investment.
Figure 1: Graph of Budget Requested, Approved and Released by Government for Actual Irrigation Infrastructure (Assets) Development (2004-2016) x GHS 100,000


The analysis indicates that budget released for actual irrigation infrastructure (assets) development was persistently less than budget requested and budget approved over the period except for the 2012 (Figure 1), when budget released exceeded both budget request and budget approved. This was due to release of funds for payment of arrears for previous years. Besides, budget approved was always more than budget released within the period apart from 2009 and 2016 when budget released exceeded budget approved for assets. A general sharp increase in all budget figures for assets is observed from 2013 to 2016 in the sub-sector. The reason is that Government decided to pay more attention to irrigation development in the bid to increase farmers’ resilience to climate change.

The pattern exhibited by total budget request, approved and released is similar to those of assets. Total budget released by Government within the period was lower than total budget requested and approved from 2004 to 2008 (Figure 2).
In 2013 and 2016 total budget released exceeded total budget approved but not total budget requested. The analysis further shows only one instance in 2012 when total budget released exceeded both total budget requested and total budget approved. A sharp increase is observed in total budget requested, approved and released from 2013 to 2016, an indication of increased government commitment to the irrigation sub-sector. To sustain investment into the irrigation sub-sector beyond the current level, a minimum of GHS 560.17 million investment into actual irrigation infrastructure (assets) and GHS 633.43 million total budget are required for release into the irrigation sub-sector over the next ten years from 2017 – 2026 (Table 2). This is expected to be used to implement agriculture development agenda, such as ‘One Village, One Dam’ Programme. Investment coupled with deepening of partnership with private sector through PPPs is expected to produce the desired results in the irrigation sub-sector and help solve identified challenges in the sub-sector.

Table 2: Annual Assets and Total Budget Projections (GHS) from 2017 – 2026

<table>
<thead>
<tr>
<th>Year</th>
<th>Assets (Investment)</th>
<th>Total Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>39,007,000.00</td>
<td>44,614,000.00</td>
</tr>
<tr>
<td>2018</td>
<td>42,787,000.00</td>
<td>48,776,000.00</td>
</tr>
<tr>
<td>2019</td>
<td>46,567,000.00</td>
<td>52,938,000.00</td>
</tr>
<tr>
<td>2020</td>
<td>50,347,000.00</td>
<td>57,100,000.00</td>
</tr>
</tbody>
</table>
The formal, informal and commercial irrigators recognize the role irrigation plays in agricultural development of the country amidst climate change. Irrigation has the potential to solve the huge unemployment challenge facing the country because thousands of jobs are generated in the irrigation value chain. However, irrigators are of the view that development of irrigation infrastructure is capital intensive and difficult to carry out entirely by either private or public sector alone.

**Commitment by Successive Governments**
The irrigation sub-sector in the country has not enjoyed much needed support from central Governments over the years. It is obvious that after the exit of National Redemption Council Government under Col. I. K. Acheampong, no major public irrigation projects have been implemented. Moreover, the sub-sector received insufficient and often delayed government budgetary allocation towards filling the financing gap occasioned by low ISC recovery from farmers over the years. Additionally, the sub-sector has experienced exodus of a lot of competent professionals because of inadequate remuneration and other poor conditions of service. Most young professionals enter the sub-sector with a lot of zeal and enthusiasm but in no time their enthusiasm begins to wane, due to poor working conditions.

**Cost of Energy**
One major factor affecting irrigation development in Ghana is cost of energy. The existing electricity tariff system in Ghana makes pump irrigation expensive and economically non-viable. All forms of irrigation comprising formal, informal and commercial irrigators are really finding it difficult to operate with some of the public and private schemes out of production as electricity supply to these schemes has been disconnected due to high tariff. This problem is caused by the maximum demand levy charged by the Electricity Company of Ghana on pump equipment in addition to actual power consumed. The levy is sometimes three or four times the cost of actual power consumed. A discouraging feature of the maximum demand levy is that farmers are billed whether pump is used or not which means that even when cropping is not taking place, farmers have to pay electricity bill. Farmers find it difficult to afford this tariff. Consequently, power supply to such schemes is cut off sometimes in the middle of a cropping season when crops are growing on the field.
This results in loss of crops, revenue, livelihoods and reduction in food self-sufficiency. Furthermore, the option to use petrol/diesel pumps is expensive and laden with other challenges. These include the relatively high price of fuel, the complex nature of the internal combustion engines and the consequent frequent need for repairs and replacement of parts.

A comparison of tariffs paid by irrigators indicates that irrigation farmers in the West African sub-region and elsewhere enjoy concessionary tariff regimes while Ghanaian irrigators pay more, as shown in Figure 3. The Ghanaian irrigator pays US$ 0.17 per kilowatt/hour of electricity consumed as against US$ 0.03 of Egypt, for example.

**Access to Land**
Irrigation development is constrained by land tenure system due to weak legal framework, institutional structure and the policy environment within which the land administration takes place. Customary tenure displays indeterminate boundaries of land, due to unreliable and inaccurate maps. In Ghana, about 80% of lands are owned by stools, families and traditional authorities and 20% by the state. Within the 80%, the boundaries are not well known. Additionally, there is conflict of interests among land owning groups, due to inadequate security of tenure making it difficult to use land as economic asset in the country.

There are instances where Government compulsorily acquired large tracts of land for agricultural and other development purposes without paying compensation to the landowners and this has created much tension in the communities. In the instances of vested lands, the state takes over the legal interest of traditional authorities of such lands and allocates them without adequate consultation thus creating further problems in the communities. There are issues of poor record keeping both at the state and customary levels, but more widespread at the customary level, where a chief sells land to an individual and because records are not kept/improperly kept, same parcel of land is sold to another person. All these issues summed to create insecurity, tension and difficulty in accessing land by investors.

Both customary laws and state laws operate at the same time. This leads to legal pluralism. There are issues of institutional pluralism, where several institutions are
found dealing with at the same time. For instance, Town and Country Planning Department, Land Valuation Board and Lands Commission are all dealing with land.

**Encroachment of Irrigation Lands**

Regardless of all measures put in place to secure irrigation lands by payment of compensation for most of the land acquired from Chief and other landowners, there is increasing incidence of encroachment by especially real estate developers with impunity on a number of public irrigation schemes including Ashaiman, Weija, Dawhenya, Akurobi, Adiembra and Asantekwaa. Moreover, Land Commission’s inability to grant lease to land acquired with compensation paid leaves these lands unprotected and easily encroached. This has led to demolition of structures on Ashaiman and Weija Schemes. Economic trees planted along the borders of acquired lands to ward off intruders have been cut down and periodic patrols by military personnel were found to be expensive and unsustainable.

**Illegal Mining Activities**

Illegal mining activity poses a major threat to irrigation development in Ghana. Uncontrolled mining activities impact negatively on irrigation lands, irrigation infrastructure is destroyed and water resources for irrigation are highly polluted. In many instances, Metropolitan, Municipal and District Assemblies and Lands Commission in these areas issue permits to people who prospect for gold on irrigation schemes. It is hoped that national action against illegal mining spearheaded by Ministry of Lands and Forestry and supported by the security agencies will make a lasting headway in the fight against this threat.

**Rate of Technological Adoption**

With advancement in technology, new and more efficient systems of irrigation such as drip and centre pivot irrigation systems are being developed. Good agronomic practices in addition, have been developed to improve production of crops under irrigation. However, the rate of adoption of these technologies is slow, making it difficult to achieve the desired results in the sub-sector. Moreover, despite tax exemption, cost of some technology is beyond the reach of average farmers and consequently leads to low adoption rate.

**Access to Credit**

Though access to credit for agriculture in general is difficult to come by, due to the high risk involved in agriculture, the risk level associated with irrigated agriculture is minimal, compared with rainfed agriculture. However, failure of most irrigators to appreciate the business-oriented nature of irrigated agriculture and consequent reluctance in paying loans and bills advanced to them by service providers for production is a major setback for the sub-sector. Despite the fact that irrigated agriculture presents the prospect of higher yield and lower possibility of crop failure due to water unavailability, irrigation farmers are unable to access adequate loans for production activities. Irrigators are thus, left with the choice of borrowing from either the open market with high interest rates which in the end affects their profit margins adversely or aggregators to whom their produce is then mortgaged. These lenders then dictate the prices of the produce on harvest.

**Technological know-how**

Development of irrigation infrastructure is a specialized area and requires specific knowledge to accomplish. However, majority of local contractors lack knowledge in this field of endeavour. This makes it difficult for local contractors to develop infrastructure to meet international standards. To avert this, foreign contractors of international expertise are brought in to develop irrigation infrastructure leading to higher cost of developing infrastructure for the sub-sector.

**Environmental and Social Issues**

There is abundant evidence of the impact and far reaching effects of irrigated agriculture on the environment and society. Though this is recognized and addressed by the sub-sector policy, production is currently carried out without recourse to the health of the environment. Additionally, reservoirs, irrigation water and drains serve as media for breeding of mosquitoes that transmit malaria parasite and this may affect health of farm family and the surrounding area.
communities. Flood waters from irrigation schemes can be a major source of problem for communities close to schemes. It is therefore important to ensure that while irrigated agriculture is carried out to reap economic advantages of water resources, individuals and surrounding communities are not disadvantaged as a result.

Other factors
A major factor affecting formal irrigation development is the existence of a core of multi-disciplinary professional staff made up of civil engineers, agricultural engineers, geodetic engineers, quantity surveyors, agronomists, agricultural economists and sociologists who are involved in design and construction of dams, tube wells and fish pond and project management. However, these professionals do not enjoy adequate representation on all the schemes and the regions throughout the country.

CONCLUSIONS
It can be inferred from the above discussion that irrigation is critical for attainment of food security and other national agricultural development objectives as well as Sustainable Development Goals (SDGs). Boosting production in agriculture, which directly and indirectly employs about 60% of Ghanaians, is key to achieving the first three SDGs which are water-related, namely no poverty, zero hunger and good health and well-being. Fortunately, irrigated agriculture in the country has good prospects to facilitate achievement of these goals.

The restructuring and modernization programme of GIDA and the irrigation sub-sector which is currently under implementation has led to training of employees to equip them with new set of skills mix to match up with additional responsibilities due to expansion of the mandate of the Authority. Accordingly, conditions of service including staff emoluments have been reviewed and new salary structure is being negotiated to attract, retain and maintain staff with these complex competencies. Additionally, the Authority is presently being re-equipped, retooled and supplied with other logistics required to deliver on the new mandate including computers and office equipment. It is abundantly clear that the future of agriculture is irrigation due to increasing impact of climate change. Though irrigation development is plagued with the financing challenges, PPPs are being implemented to offer a viable opportunity to private sector to take advantage of leverage provided by government to invest in the sub-sector as part of the restructuring exercise. Ring-fenced finances are being explored as additional strategies for diversified and improved financial sustainability of GIDA. All these reforms have been made possible by approval of Cabinet Memorandum on the Restructuring and Modernization of GIDA and the irrigation sub-sector in 2015. Moreover, reviewed National Irrigation Policy, Strategies and Regulatory Measures which takes into account institutional, legal and policy framework of the reform programme will be approved by Cabinet soon. It is therefore, recommended that government continues to fully support the restructuring and modernization of GIDA to ensure full realization of the objectives of the programme.

The following additional recommendations are made:
1. To improve financial sustainability of the Authority, it is recommended that the Authority collaborates with Development Partners to fund projects and activities in line with their objectives.
2. Government should expedite action on amendment of Irrigation Development Authority Act which will empower GIDA to among others, enable the Authority exercise absolute control over public irrigation lands. This will empower the Authority to take assertive and decisive action against encroachers of irrigation lands and help tackle the threat of encroachment of irrigation lands.
3. While actions are being taken to transform all electric or diesel/petrol powered irrigation pumps to solar powered ones in the long term, Government is requested to consider legislation that will exempt Maximum Demand Levy to irrigation schemes by Electricity Company of Ghana (ECG) and allow pump irrigation farmers to enjoy normal social tariff system in the short to medium-term.
4. To solve the problem of inadequate supply of credit to the irrigation sub-sector, setting up of pilot farmers’ bank on selected schemes is recommended where seed capital could be advanced to members of Water Users Associations (WUAs) just as it was successfully established on Ashaiman Irrigation Scheme with the support of Japan International Cooperation Agency (JICA). Capacity of WUAs should be built to enable them recognize the business dimensions of irrigated agriculture, make judicious use of any loans acquired and repay such loans advanced to them. This will open the door for out-scaling to other schemes nation-wide after successful implementation on pilot basis.

5. All schemes have well-organized Irrigation Farmers Associations (IFAs), currently under transformation to Water Users Associations (WUAs). This facilitates training, cropping, marketing of farm produce and other collective actions. One important advantage of the organization of farmers into WUAs is the ease with which private entities such as WIENCO-COPPA CONNECT and GADCO were able to partner with farmers on Kpong, Weta and Aveyime Irrigation Schemes. Though this kind of partnership could not cover all farmers on the schemes they operate on, both parties and the government derive immense benefit from it. Through this, private entities support farmers with input credit facility and receive payback in kind after harvesting. The private entities add value to farmers’ produce through processing and packaging which is useful in promoting marketing of local rice. Irrigation Service Charge (ISC) is paid for farmers to the respective Scheme Management Units (SMU) to improve revenue mobilization of the schemes by the private entities. Generation of employment opportunities for youth in communities in which large scale commercial farms are located is characterized by improved standards of living: block houses replaced mud houses, switch from the use of bicycle to motor bikes and cars. There is increased school enrolment and increased access to improved health care and sanitation. Besides, commercial farms have been particularly supportive by rendering corporate social responsibility to the communities and districts in which these farms are located through provision of potable water, roads, schools, clinics and electricity to identified communities. This kind of partnership between farmers and the private sector can be explored to solve perennial loan access problems confronting irrigators.

6. Since PPP has been identified as the way forward for irrigation investment in the country and the National Irrigation Policy, Strategies and Regulatory Measures was reviewed to take into account the concept, we recommend its approval by Cabinet and subsequent full implementation by the relevant stakeholder to realize this reality. The PPP Unit of the Authority should be fully developed to facilitate preparation and operationalization of sub-sector framework on PPPs. This will enable the Authority to be on top of issues in scouting for, engagement and recruitment of viable private entities to partner government in the eventual development of the sub-sector.

7. To improve the technological know-how of local contractors, it is recommended that the GIDA develops effective programmes for building capacity of contractors involved in development of infrastructure.

8. To deal decisively with the issue of illegal mining which threatens existence of irrigation schemes nationwide, Ministry of Lands and Forestry should be supported in their action against illegal mining by the security agencies and civil society organizations individuals in the fight against the threat.

9. To forestall negative consequences of irrigation projects, it is recommended that Environmental and Social Impact Assessments are carried out and adequate mitigation measures developed to lessen impact of such projects on individuals, communities and the environment.
The Ghana Agricultural Water Management Pre-Investment Reform Action Framework of 2012 recommended a shift towards a sub-sector typology based on five business lines. The way forward is to develop irrigation along these lines to bring area developed for irrigation in the country to 500,000 ha as summarized on Table 3. It is expected that if developments are done along these lines, it will put the sub-sector on a sound footing to drive agricultural development to the next level.

Table 3: Proposed Distribution of Medium-Term Additional Area to be brought under Irrigation

<table>
<thead>
<tr>
<th>BL</th>
<th>Agriculture Water Management (AWM) Business Lines (BL)</th>
<th>%</th>
<th>Projected Area to be brought under irrigation (2018 – 2022)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Large-scale irrigation system modernization and development</td>
<td>5</td>
<td>14,000 ha (GoG, GCAP &amp; GASIP)</td>
</tr>
<tr>
<td>2</td>
<td>Community managed small and medium scale irrigation</td>
<td>5</td>
<td>14,000 ha (GoG, GASIP)</td>
</tr>
<tr>
<td>3</td>
<td>Individual micro and small scale irrigation</td>
<td>30</td>
<td>84,000 ha (GoG, GCAP &amp; GASIP)</td>
</tr>
<tr>
<td>4</td>
<td>Enhanced water management in rain-fed agriculture</td>
<td>10</td>
<td>28,000 ha (GoG, GCAP &amp; GASIP)</td>
</tr>
<tr>
<td>5</td>
<td>Market-oriented irrigation on a PPP basis</td>
<td>50</td>
<td>140,000 ha (GoG, WB)</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>100</td>
<td>280,000 ha</td>
</tr>
</tbody>
</table>

(Source: GIDA, 2015)

Based on the five business lines, GIDA drew a plan to develop additional areas ranging from 14,000 ha for large-scale irrigation and community managed small and medium scale irrigation to 140,000 ha for market-oriented irrigation on a PPP basis which sum up to 280,000 ha within the next five years.

REFERENCES


met out of Moneys Granted and Drawn from the Consolidated Fund, Central Government.