

SITUATIONAL ANALYSIS REPORT

FIELD DATA COLLECTION EXERCISE UNDER NATURE-BASED SOLUTIONS

RAINWATER HARVESTING, DAMS, CANALS AND IRRIGATION TECHNIQUES FOR FARMING ACTIVITIES IN THE TECHIMAN NORTH DISTRICT



SUBMITTED TO THE MANAGEMENT OF NATURE BASED SOLUTIONS

BY

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**RAINWATER HARVESTING, DAMS, CANALS AND IRRIGATION TECHNIQUES
FOR FARMING ACTIVITIES IN THE TECHIMAN NORTH DISTRICT**

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TABLE OF CONTENT

Table of Content	3
List of Figures	4
1.0 Background	5
2.0 Demographic Issues in Irrigation.....	5
3.0 General and Irrigated Crops in the District.....	7
4.0 Irrigation Techniques Used in the District.....	8
5.0 Factors Influencing Investment in Irrigation	12
6.0 Impact of Irrigation on Crop Productivity	13
6.0 Challenges with Irrigation in the District.....	15
7.0 Measures Taken to Address Irrigation Challenges.	16

LIST OF FIGURES

Figure 1: Section of the male population involved in irrigation farming	6
Figure 2: Section of youth population involved in irrigation farming.....	6
Figure 3: Cabbage farm	7
Figure 4: Tomatoes farm.....	8
Figure 5: A farmer fetching water from a nearby river for irrigation.....	9
Figure 6: Gallons of water transported to farm for irrigation purposes	9
Figure 7: Water is drawn from a dugout near a river for irrigation purpose	10
Figure 8: A river obstructed to collect water for irrigation purposes	10
Figure 9: A river dammed for irrigation purposes	11
Figure 10: Storage tank for underground water storage for irrigation.....	11
Figure 11: Concrete storage tank for underground water storage for irrigation.....	12
Figure 12: River Agyina in Ofuman	13
Figure 13: River Mprisi in Bonya.....	13
Figure 14: Harvested garden eggs being prepared for marketing.....	14
Figure 15: Tomatoes being prepared transported to the market	14
Figure 16: Wilting of crop due to water stress in the dry season.....	15
Figure 17: A farmer drinking water from a nearby river	16
Figure 18: An interview with extension officers in Tanoboase	17

1.0 Introduction and Approaches

The three (3) days field exercise was conducted to collect situational data on rainwater harvesting, dams, canals and irrigation techniques for farming activities in the Techiman North District from the 17th - 19th December 2020. A Senior Technician from the Department of Environmental Management led the Team with two national service persons in the School of Natural Resources and a driver. The first day of the field exercise was dedicated to familiarising the study communities and interaction with key stakeholders in the study area such as the District Director of Agriculture, extension officers, heads of farmers associations and community leaders. The interactions with these stakeholders revealed that rainwater harvesting is not a common phenomenon in the District. However, being a vegetable growing district, farmers were involved in different forms of irrigation. Therefore, data collection instruments were modified to reflect the field's conditions and the data collection exercise conducted in the second and third day in communities such as Aduwie, Kyiridiagya, Ofuman, Bonya and Tanoboase. Also, extension officers in some of the study communities were interviewed to obtain experts perspectives on irrigation issues in the District. Data collected in the exercise centred on demographic issues in irrigation, general and irrigated crops in the District, irrigation techniques used in the District, factors influencing investment in irrigation and impact of irrigation on crop productivity. Additional data were collected on challenges with irrigation in the District and measures taken to address such challenges. The critical issues identified in the field exercise expatriate in the sections below.

2.0 Demographic Issues in Irrigation

The field exercise revealed that it was mostly male-dominated due to the capital-intensive nature of investment in irrigation. Where females were involved in irrigation, they mostly did so in partnership with male counterparts. In households where men are involved in irrigation, they receive support from their wives. Furthermore, though irrigation in the District was not restricted by age limit, observations on the field revealed that the youth form a more significant percentage of farmers involved in irrigation due to its lucrative nature in the dry season. In an interview with extension officers in Tanoboase, they reported that irrigation and vegetable farming had contributed significantly to reducing youth emigration from the community. The business provides them with enough funds to live comfortable lives in the community. Though the conflict was not the main focus of the study, interaction with some of the respondents revealed conflicts between

educated government workers who engage in part-time farming and the local uneducated population engaged in farming as their main livelihood activity.



Figure 1: Section of the male population involved in irrigation farming



Figure 2: Section of youth population involved in irrigation farming

3.0 General and Irrigated Crops in the District

Farmers in the District have relatively small farm sizes particularly 1-5 acres. However, they are involved in producing a wide variety of crops including cassava, yam, maize, plantain, cocoa, cashew, pepper, watermelon, garden eggs, tomatoes, carrots, cucumber, cabbage, okra and green pepper. However, with the rise in cashew products' prices in recent years, many of the District farmers have converted significant portions of their farms into cashew plantations. The remaining portions of land have been used for the cultivation arable crops. Farmlands near water bodies in the District are primarily reserved for producing vegetables such as garden eggs, tomatoes, carrots, cucumber, cabbage, okra and green pepper using irrigation. While these crops are used for domestic and commercial purposes, farmers cultivate these crops, especially vegetables for commercial purposes with cabbage, tomatoes and garden eggs being the dominant vegetables produced in the District using irrigation.



Figure 3: Cabbage farm



Figure 4: Tomatoes farm

4.0 Irrigation Techniques Used in the District

The interaction with respondents in the various study communities revealed that irrigation in the District had experienced an evolutionary trend over the years. The initial stage of irrigation in the District involved hiring labourers to fetch water from nearby water sources for irrigation. At later stages in the District where most water bodies started drying due to climate change, farmers who had their farms close to their settlement resorted to labourers to convey water from boreholes in communities to their farms. However, the limited availability of labour in the District in recent years has compelled high-income farmers whose farms are not near water sources to transport water to their farms using tricycles and Kia trucks. Other farmers who had their farms close to water bodies such as rivers and streams have also primarily resorted to water tapping from nearby rivers and streams, damming rivers and streams, and constructing wells. Only a few farmers in the District have adopted boreholes to storage tanks for precision irrigation. Water from these water sources is pumped to the farms using pumping machines. Where farms are relatively distant from water sources, multiple pumps are used to transport the water. Despite the variation in irrigation techniques in the study communities, the damming of rivers and streams is a widely practised phenomenon due to ease of construction.



Figure 5: A farmer fetching water from a nearby river for irrigation



Figure 6: Gallons of water transported to farm for irrigation purposes



Figure 7: Water is drawn from a dugout near a river for irrigation purpose using a pumping machine



Figure 8: A river obstructed to collect water for irrigation purposes



Figure 9: A river dammed for irrigation purposes



Figure 10: Storage tank for underground water storage for irrigation



Figure 11: Concrete storage tank for underground water storage for irrigation

5.0 Factors Influencing Investment in Irrigation

According to the respondents interacted with, the phenomenon of irrigation is a recent happening that started around 2010. According to the respondents, the phenomenon has mostly been influenced by many dominant factors in the study communities. Notable among these factors include i) the less-profitable nature of formerly grown crops in the District, such as maize, cassava, yam; ii) erratic rainfall patterns; iii) profitable nature of vegetable farming in the dry season and iv) market availability for vegetable products. Also, the large number of water bodies surrounding the study communities and the availability of technologies such as tricycles and pumping machines were cited as a critical factor influencing farmers' investment in irrigation in the District. However, these technologies' high investment cost serves as demotivation to low-income farmers interested in this technology and farming system.



Figure 12: River Agyina in Ofuman



Figure 13: River Mprisi in Bonya

6.0 Impact of Irrigation on Crop Productivity

Our interaction with respondents in the study area revealed that irrigation had contributed substantially to arable crops productivity in the District. Most respondents estimated the percentage rise in productivity due to irrigation between 30 to 60 per cent. In an interview with the extension officer on Ofuman, he reported that most of the vegetable grown in the community

during the dry season would not have survived without irrigation. The officer also emphasized that the recent vegetable growing status of the District communities is mainly due to irrigation farming widely adopted by many farmers in the District. Aside from the increase in productivity, the respondents also widely reported improved quality of crops due to irrigation.



Figure 14: Harvested garden eggs being prepared for marketing using irrigation



Figure 15: Tomatoes being prepared transported to the market using irrigation

6.0 Challenges with Irrigation in the District

Despite the positive impacts of irrigation on quantity and quality of vegetables grown in the District as widely reported by the respondents, it was reported to have also contributed to many challenges in the District. Irrigation challenges reported among the respondents include i) the drying up of some rivers and streams in the dry season; ii) pest and disease infestation; iii) abuse of agrochemicals by vegetable farmers; iv) pollution of water bodies with chemicals used in farming; and v) pressure on water bodies due to increase in the population of farmers involved in dry season farming. Farmers who depended on chlorinated water from homes for irrigation also reported the crops' reaction to the chemicals. The over-reliance on rivers and streams for irrigation during the dry season was reported to contribute to water shortage in downstream communities dependent on these water sources for their domestic activities. Furthermore, muddy water during water shortages at the dry season peak results in the transfer of dirt to the crops.



Figure 16: Wilting of crop due to water stress in the dry season



Figure 17: A farmer drinking water from a nearby river

7.0 Measures Taken to Address Irrigation Challenges.

Consequent to the study areas challenges, extension officers, unit committee members and traditional authorities have taken various steps to address the challenges. This includes banning irrigation using river and stream water at the dry season's peak, and farmers' training on the appropriate agrochemicals. In collaboration with security agencies, community leaders enforce these rules by confiscating pumping machines and arresting recalcitrant farmers'. Also, extension officers in the various communities have made several recommendations to the government to construct large community dams to serve farmers in the community. However, farmers' unwillingness to congregate in particular areas due to privacy issues in farming and land tenure issues in the communities undermine some of these recommendations.



Figure 18: An interview with extension officers in Tanoboase

Annexe: Pictorial Gallery of Data Collection Exercise















List of Interviewees

No	Name	Community	Phone number	Stakeholder Group
1	Amofah foster	Tanoboase	0246166023	Farmer
2	Emmanuel	Kyiridiagya		Farmer
3	Alfred	Ofuman		Farmer
4	Keaku	Ofuman		Farmer
5	Isaac	Bonya		Farmer
6	Kumah	Bonya		Farmer
7	James	Bonya		Farmer
8	Attah	Bonya		Farmer
9	Fuseni	Bonya		Farmer
10	Anane	Bonya		Farmer
11	Appiah	Bonya	0543753830	Farmer
12	Francis	Ofuman	0553626540	Farmer
13	Saeed	Tuobodom		Farmer
14	Aboagyewaa	Tuobodom		Farmer
15	Seth Boakye	Kyiridiagya		Farmer
16	Francis	Kyiridiagya		Farmer
17	Kwadjo Stephen	Kyiridiagya		Farmer
18	Akudugu Ayeba	Bonya	0559284178	Farmer
19	Sarah	Ofuman		Farmer
20	Boateng Kwadwo	Tanoboase	0552598470	Farmer

21	Adjoa	Adutwie		Farmer
22	Owusu Francis Junior	Tanoboase	0556449976	Farmer
23	Ano Stephen	Bonya	0542685820	Farmer
24	Emmanuel Kwaku Efa	Tanoboase	0596726483	Farmer
25	Isaac	Bonyam		Farmer
26	Atta	Dampah		Farmer
27	Emmanuel	Ofuman		Farmer
28	Kwaku owusu	Ofuman		Farmer
29	Augustine	Ofuman		Farmer
30	Gympah	Ofuman		Farmer
31	Gideon	Bonya		Farmer
32	Sabasko	Bonya		Farmer
33	Frank	Bonya		Farmer
34	Mr Hema	Ofuman		Farmer
35	Mavis Anum	Tanoboase	0548227603	Extension Officer
36	Zakaria Nmukan	Tanoboase	0541703444	Extension Officer
37	Cosmos	Ofuman	0551446941	Extension Officer
38	Enock	Kyiridiagya	0243767177	Extension Officer
39	Evans	Tuobodom	0242108979	Extension Officer
40	Becky	Tuobodom	0249661935	Deputy Director of Agric