WATER TRANSFER METHODS IN RESPONSE TO WATER DEMAND FOR AGRICULTURAL PRACTICE AT CHANCHAGA RIVER AND TAGWAI DAM IN NIGER STATE, NIGERIA

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ABSTRACT

Water remains the determinate factor in intensifying agricultural and non agricultural activities. Considerable investment in water transfer will improve availability of water for irrigation. Random selection method was used to administer questionnaires to the farmers on the irrigation scheme of Chanchaga River and other activities carried out in the area. Some of these questionnaires were also distributed to the farmers along the major course of the Tagwai dam. Farmers who have their farmlands upstream the Tagwai dam were observed as 77.05%, the midstream had a population 6.89% farmers while at the downstream, was 16.06%. A total of 315 copies of structured questionnaire were distributed to the respondents. It was observed that the water transfer for Agricultural (irrigation) purposes is relatively not enough. Consequently, it is recommended that government should make water available for farmers to have access at all time when needed for bountiful crop yield.

Keywords: *Abattoir, water, irrigation, transfer, regression*

INTRODUCTION

Water is life in its common state. About 1,460 tetratonnes (Tt) of water covers about 71% of the earth surface some of which is contained in the man made, natural dams, lakes e.t.c. (Dooge, 2001). Water is central to photosynthesis and precipitation. Photosynthetic cells use sun energy to split off water hydrogen from oxygen. Hydrogen which combined with Co_2 (absorbed from air to water) forms glucose with plants in-turn releasing oxygen to the surrounding environment (Ayers and Westcost, 1985). Water fit for human consumption is called portable water which is mostly applied where there is a low threshold of chlorine which is one of the major constituents. This forms a skin mucous membrane when used for bathing or drinking. The use of chlorine is highly technical and is usually monitored by various monitoring agencies.

Water as a natural resource is becoming scarce in certain places and its availability is a major socio-economic concern. Currently, about one billion people around the world routinely drink unhealthy water thus causing the death of over five million people in a year (Jansen, et al, 1979). In developing countries, 90% of all wastewater still goes untreated into local rivers, streams and other major water bodies around which are further extracted annually either for human consumption or agricultural activities. This strain not only affects surface fresh water bodies but it

also degrades groundwater resources (Pescod, 1992). One of the most important uses of water is for irrigation which is the key component to increasing food production. Irrigation takes up to 100% of water drawn from the various sources in some developing countries (Dooge, 2001). Water transfer is the process of moving or conveying water from reservoirs, streams, rivers, lakes and dams for agricultural, industrial and human uses. There are two major ways of diverting water, the first of which is surface and groundwater gravity diversions and the second is the pumping plants (FRN, 2001). When water surface elevations or heads at the water source are sufficient, gravity diversions are used, else pump plants are installed to lift water to the various irrigation sites (ICID, 1985).

The purpose of water transfer practice is to satisfy the rate of water demand by crops at the time of need. This rate depends on the balance between the natural rainfall, evapotranspiration, terrain and soil properties which affect the drainage system, retention and consumptive use of water by plants. For an efficient irrigation process, a certain soil moisture level must be maintained at all times which should be above the wilting point of the crops planted (ICID, 1985). However, it is of utmost importance to note that if too much water is applied to farmlands aside being wasteful, it may cause an irreversible loss of soil fertility. However, the objectives of this study were to identify the need for water transfer as well as the various water transfer methods employed in response to increase in water demand for agricultural practices and to examine public policies at changing the water use transferred for agricultural purposes.

METHODOLOGY

This study was conducted on the Chanchaga irrigation scheme which has its source from Tagwai dam in Niger State. The irrigation scheme is located along the Minna-Abuja express road on longitudes 7°N and latitude 8°N while the dam is located 20km away from the irrigation scheme. The dam has a capacity of 84 X 106m^3 when it was constructed. Its annual inflow is 25 X 106m^3 while the daily outflow of the dam is between 334m^3 and 660m^3. At the downstream of the dam is the water board treatment plant and the Chanchaga irrigation scheme with a total land mass of 360 hectares. A total of three hundred and fifteen (315) copies of questionnaire were distributed to the people living around the Tagwai dam, only three hundred and five (305) copies of these were returned. This showing that a total of 96.83% of the questionnaires were fully filled and returned for analysis. The farmers plant mainly vegetable crops such as okra, tomatoes, amaranths spinach, pepper, onions and maize. Close to the irrigation scheme is the abattoir where a total of 10-12 animals are slaughtered per day. Also close by are three mechanic workshops. Random selection method was used to administer the questionnaire to the farmers, people working within the abattoirs, the mechanics and the people living along the river bank. Data obtained were statistically analyzed using pie charts and simple percentage.

RESULTS AND DISCUSSION

Farmers who have their farmlands upstream the Tagwai dam were 77.05%, those who have theirs at the midstream had a population of 6.89% while at the downstream, 16.06% farmers operated. Figure 1 below shows the percentile representation of the farmers in the study area. As observed, there is a higher concentration of farmers along the upstream area of the dam when compared with the other two points which may be the non involvement of the Local Government Council and State Government in the activities of the farmers in area. This may also be the availability of the land mass in the area which is mainly in the hands of the local farmers. Most of the farmers along the dam area are known to practice either mixed or single type of cropping system. From the interview conducted, 77.05% of the farmers were know to practise mixed type of cropping system while 22.95% practised single cropping system. This may account for low production rates of food crops in the area. The major crops planted by the farmers include grain crops such as rice, and maize; tuber crops such as yam and cassava; sugar cane and vegetable crops. Table 1 shows the distribution of crops planted in the area.

Due to the short term growth period of grains and its source as a staple food in Nigeria, most of the farmers are actually involved in the planting of grain crops. This is closely followed by the vegetable farmers. Though the vegetables planted vary and when the farmers were asked the type of vegetables planted, it was discovered that pepper had 26.55% out of the farmers that were involved in the planting of vegetable. This may be as a result of the high rate of economic return of the crops and this further shows the extent of usage of this crop by the people of Nigeria. Others include tomato with 23.89%, spinach with 19.47%, onions with 18.58% while carrot and lettuce received the least attention from the farmers with 7.08% and 4.42% respectively. The other crops planted by the farmers within the Tagwai dam include sugar cane and tuber crops which represented 13.77% and 9.84% of the farmers respectively in the area.

The farmers were also asked about the rate at which they apply water to their various farms and when they apply water. It was discovered that 48% of the farmers supplied water to their farmlands everyday while 28% of the farmers supplied there farmlands with water once in two days, once in three days 13% and once in four days, 10%. It was discovered that the areas that received water from the stream on the third and fourth day of the pumping where mainly wetland areas which do not require much water to be pumped to it. These areas are mainly used for the production of rice. The processes for water transfer to the farms were also put into consideration and it was discovered that most of the farmers practiced different methods which include channeling, pumping, piping and the shaduff. 52% of the farmers within the area were observed to use pumping method to apply water to the farms which they claim that it was a more effective way to water the crops, 32% of the farmers used the piping method to irrigate the farmlands. Though they complained that they have transfar the pipes from one role to the other creating time difference at the rate at

which water is delievered to the various crops thus affecting the growth rate. 14% of the farmers were involved in using the traditional method of shaduff to irrigate the farmlands while only 2% of the farmers used the channeling method to provide water for the crops.

Table 1: Distribution of crops planted by the farmers

S/No	Name of Crop	Population of Farmers	Percentage (%)
1	Grains	120	39.34
2	Tuber	30	9.84
3	Sugar cane	42	13.77
4	Vegetable	113	37.05

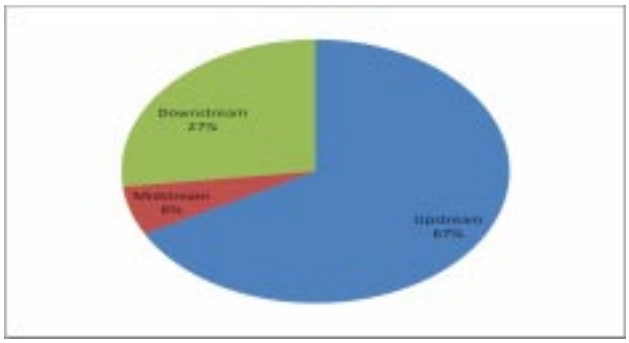

Figure 1: Distribution of farmers along the Tagawi dam Channel.

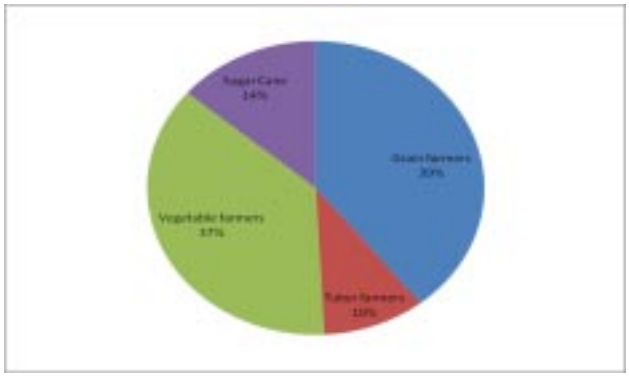

Figure 2: Distribution of the farmers that plant various crops within irrigatable area of Tagwai dam.

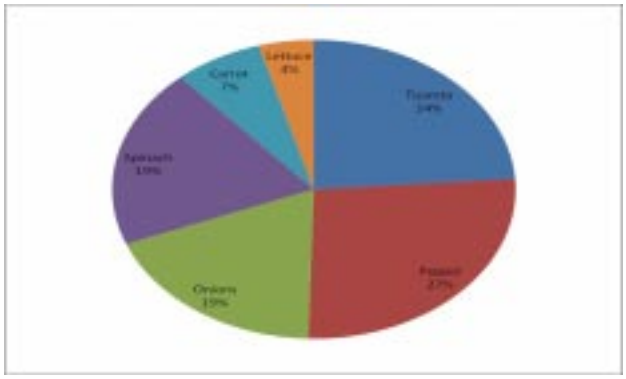

Figure 3: Distribution of the vegetable farmers within the irrigatable area of Tagwai dam.

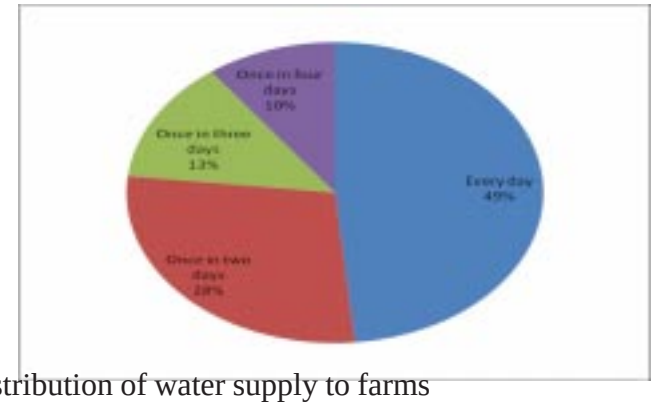

Figure 4: Distribution of water supply to farms

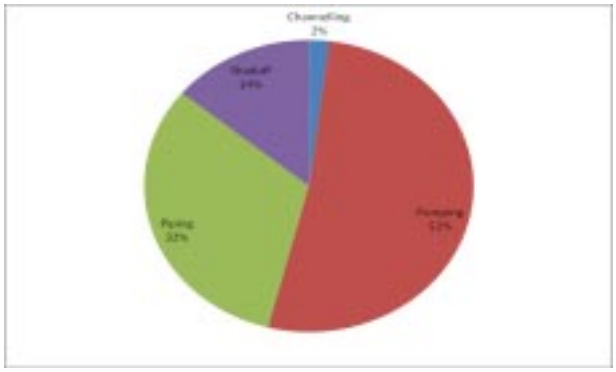

Figure 5: Methods of water transfer to the farms.

CONCLUSION

During the cause of this study, it was observed that the water transfer for Agricultural (irrigation) purposes is relatively not enough. This is based on the result of the analysis conducted using the Multiple Regression analysis method for the information obtained from the field. The values were used within the permissible limits in terms of water used by the crops, planting period, size of the plots, Distance of the river, waste water flow the abattoir, number of the animals slaughtered at the abattoir, water supply to the abattoir. In view of the water transfer problem in the study area, the result is not quite encouraging. However, the water transfer study also highlighted areas of concern for which if adequately addressed will improve the farming activities thus increasing farm produce and other socio-economic activities. In all, proper right should be given to the farmers concerning water transfer by the government for them to have access to water at all time for bountiful crop yield as well as empowering the farmers financially in terms of soft loans.

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