

TAKING WATER TO WETLANDS: AN EXPERIMENT WITH SMALL IRRIGATION FOR RESOURCE POOR FARMERS



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Outline of Presentation



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Definitions



❑ Wetlands:

“Areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is flowing or static, fresh, brackish or salty, including areas of water the depth of which at low tide does not exceed six meters”

(Ramser Convention, 1971).

❑ Types:

- (i) Inland Valleys
- (ii) River floodplains
- (iii) Mangrove swamps.

Wetlands in Nigeria



- ❑ 7.2% of Nigeria's total land area is major wetlands (Ojanuga, Lekwa and Okusami, 2003);
- ❑ NEST (1991), Umoh (2008) put total wetlands area in Nigeria at 2,889,000 hectares.
- ❑ Water management is the foremost technology the wetlands farmers need to improve their productivity, expand incomes from farming activities.
- ❑ Water management technologies that can be extended to wetland farmers on agro-ecological basis are yet to evolve (Ojanuga, 2006).

Wetlands in Nigeria



- ❑ Efforts in extending water management technologies to wetlands farmers in Nigeria:
 - (i) River basin and Rural Development (RBRDA) (1973);
 - (ii) National Fadama Development Project phase I (1992-1995):- farmers were taught to irrigate their crops in the dry season using water from tubewells installed with pumps).

- ❑ Outside of the two projects, there has not been any form of water management in wetlands/fadama farming anywhere in Nigeria (Ojanuga, 2006).

- ❑ Wetlands/fadama farmers resort to manual watering using plastic containers , earthen wares or any available container.

- ❑ Manual watering is full of tedium and would hardly increase on-farm productivity in the face of climate variability and long term change.



During the short dry season, the wetland soil could become so dry leading wilting of crops due to extreme low moisture level in the soil.

In such circumstances, farmers need irrigation to rescue the crops and remain in business.

Farmers resort to hand watering using plastic containers, earthen wares or any container at their disposal.

The tedium of carrying water manually during the dry season saps the energy of the poor farmers and further reduces their below-average output.



Hand watering of crops by wetland farmer

A Typical wetlands soil in the dry season



Experiment with Farmer-managed Small Irrigation



- ❑ An intervention by EU- Micro-projects in six states of the Niger Delta region (Abia, Akwa Ibom, Cross River, Edo, Imo & Ondo States).
- ❑ One project was located in each of the six states.
- ❑ Aims:
 - (i) To encourage resource poor farmers exploit the dry five months of idle time to grow vegetables on the banks of ponds, rivers and small lakes;
 - (ii) To improve yields and income.

Project Design/Technology



Requirements for Siting Project:

- ❑ Availability of perennial water source;
- ❑ Evidence of farming activities near the water body in the dry season;
- ❑ Availability of local materials for irrigation facilities-pipes, tanks, hoses, etc.

Irrigation Facilities Supplied



- ❑ Motorized pump
- ❑ Reservoir tanks (water storage tanks)
- ❑ Watering hoses
- ❑ Pressure pipes
- ❑ Tank stands
- ❑ Power generating set.

Operational Inputs/equipment Supplied



- ❑ Training;
- ❑ Seeds;
- ❑ Fertilizers;
- ❑ Agro-chemicals;
- ❑ Wheel barrows & machetes, etc.

Water management practice



- ❑ Water was pumped from the river to the tanks as the need arose,
- ❑ Reticulation: Water was piped to locations in the farm. Water channeled from taps through hoses for watering of crops
- ❑ Watering was done twice in a day: morning & evening by farmers.

The Impact Study



- ❑ Two of the six projects were selected for impact evaluation:
 - (i) Akai Effiwat Small Irrigation project, Cross River state
 - (ii) Ata Abio Akpa Small Irrigation project, Akwa Ibom State.
- ❑ Objective: To assess impacts small irrigation on Crop outputs, income, productivity & farmers' welfare.

Research Methodology



□ Data Collection methods:

- (i) Administration of structured questionnaire
- (ii) Focus Group Discussion

□ Data Analysis

- (i) Descriptive Statistics:
- (ii) Regression Analysis

$$Q = f(X_1, X_2, X_3, X_4, X_5, X_6)$$

$$\text{Ln}Q = b_0 + b_1 \text{Ln}X_1 + b_2 \text{Ln}X_2 + b_3 \text{Ln}X_3 + b_4 \text{Ln}X_4 + b_5 \text{Ln}X_5 + b_6 \text{Ln}X_6 + \mu_i;$$

Ln = natural log, b_0 = intercept, $b_1 - b_6$ are the coefficients of the respective production input and μ = stochastic error term to be estimated.

Results

Impacts on Crop Outputs & Income

FGD discussants reported of increase outputs

- (i) Leading to more farmers joining the groups: Number of farmers increased from 25 to 50;
- (ii) Cultivated land area increased from 3 to 5 hectares;
- (iii) 450% rise in income

According to Emmanuel Johnny, Chairman, PMC, Ata Obio Akpa:

Farming is good. We harvest a lot from the farm. People now know this place as vegetables centre. People come from the cities and neighbouring communities to buy from us here in this farm. With the training I received, I am also cultivating vegetables in my compound and my number one customers are the university students who reside in our community. I added fish farm to the farm, but had to stop because of too much pilfering. Proceeds from the farm are enough for my family needs. I don't regret doing farm business and I will keep expanding it.



Healthy crops and bumper harvest at Ata Obio Akpa

Current Situation in Ata Obio Akpa Farm



Emmanuel in the vegetable section of his farm at Ata Obio Akpa

Cassava Section of the farm in Ata Obio Akpa Farm



Regression Result (Cobb-Douglas Function)

Variables	Project participants/Irrigators	Non-Project participants/Non-irrigators	All farmers(pooled data)
Constant	-4.646 (-1.869)	3.369 (1.308)	-1.125 (-0.541)
Planting materials	0.473 (4.859)***	-0.89 (-1.095)	0.50 (0.736)
Fertilizer	0.665 (3.027)***	1.006 (6.135)***	0.093 (0.309)
Labour	0.866 (2.116)*	-0.536 (-1.697)	0.559 (4.057)***
Irrigation water	0.336 (1.928)*	-0.080 (-0.579)	0.745 (4.649)***
Land	-0.419 (-1.849)*	0.62 (0.229)	0.008 (0.036)
Agrochemical	0.089 (0.912)	-0.48 (-0.410)	0.001 (0.100)
Dummy			-.051 (-0.261)
	Adjusted R ² = .655 Standard Error =.21398 F-ratio =13.001	Adjusted R ² =.667 Standard Error =0.25674 F-ratio = 14.010	Adjusted R ² = .566 Standard Error =0.31217 F-ratio = 15.548
*** =sig. @ 1% level	** = Sig. @5% level	* = Sig. @ 10% level	

Impacts on Crop productivity: Productivity Parameters



Farm Input	Marginal Physical Product (MPP)	Marginal Value Product (MVP: MPP x Py) (N)	MVP-MFC	Conclusion
(A) Project Participants(Irrigators)				
Planting materials	0.473	331.1	31.1	Productive
Fertilizer	0.665	465.5	431.5	Productive
Labour	0.866	606.2	-143.8	Not productive
Irrigation	0.336	235.2	231.2	Productive
Land	-0.419	-293.3	-5293.3	Not Productive
(A) Non-Project participants(Non-Irrigators)				
Fertilizer	1.006	704.2	670.2	Productive
(A) All Farmers				
Irrigation	0.559	391.3	387.3	Productive
Labour	0.745	521.5	-228.5	Not Productive

Marginal Factor Cost:(i) Labour = ₦750; (ii) Irrigation Water = ₦4(₦100/25litres);
 (iii) Fertilizer = ₦34/kg(₦850/25kgbag); (iv) Land = ₦5000/plot; Planting materials = ₦300

Unit Output Price (Py): ₦700/kg (in grain equivalent)

Impacts on farmers' welfare: Household monthly food expenditure

- ❑ Per caput monthly expenditure of project participant was ₦5165.40 (equivalent of \$1.1 dollar per day).
- ❑ Per caput food expenditure of non project participant was ₦154.30/day (\$0.96/day).
- ❑ Going by the assumption that an individual who spends less than a dollar a day lives below the poverty line, it can be inferred that on account of food consumption, irrigation has enhanced the welfare of farmers.

Respondents	Average Expenditure(N)	Expenditure per caput (N)
Irrigators/Project Participants	27,520	5,165.40
Non-Irrigators/Non-project participants	22,494	4,629.10
\$1.00 = ₦160		

Lesson Learned & Conclusions



- ❑ Outputs from wetland agriculture can be enhanced through irrigation.
- ❑ Improved outputs, income and welfare of farmers arising from irrigation justify the need to take water to wetland.
- ❑ Effective water management in wetlands agriculture can provide a win-win solution to the provision opportunities to secure crop production.

Lesson Learned & Conclusions



- ❑ Farmers could not sustain irrigation facilities on their own.
 - (i) Tank stands had broken down with no replacement at Akai Effiwat;
 - (ii) Farmers could not replace malfunctioning generating set after 2 attempts.

- ❑ Technology should be adapted to specific wetland environment.

- ❑ Farmers require continuous mentoring and training on group management, and maintenance of the facilities.

- ❑ Farmers need support to the point where they are economically stable and can run the small irrigation scheme on their own.

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