IOSR Journal of Agriculture and Veterinary Science (IOSR-JAVS)
e-ISSN: 2319-2380, p-ISSN: 2319-2372. Volume 11, Issue 3 Ver. III (March 2018), PP 75-78
www.iosrjournals.org

Influence of Fish Farmingenterprise Productivitytraining Program on Adoption Of inland-Based PondfishFarming inMeru South Sub-County, Kenya

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Abstract: *Inland-based fish farming in Kenya continues to draw enormous financial support by the government. Fish farmers in MeruSouth Sub-County have been slow in adopting inland-based pond fish farming despite Governments efforts to promote the same farming through training. This study investigated the influence of fish farming enterprise productivity training program on adoption of inland-based pond fish farming in Meru South Sub-County, Kenya. The study adopted a causal comparative research design. Four hundred farmers who had undergone Fish Farming Enterprise Productiontraining Program excluding those that abandoned their ponds, 22 extension officers and three divisional fisheries officers formedthe study population. Purposive and stratified random samplings were used to select the respondents. The sample comprised 212 farmers, 22 extension officers and three divisional officers. Data was collected using questionnaire for farmers, and interview schedule for fisheries and extension officers. Piloting of the research instruments was done in Maara Sub County on a sample of 21 farmers, two Extension Officers and one Sub County Fisheries Officer. A reliability coefficient of 0.72 and 0.70 for questionnaire and interview schedule were obtained. Impact of FFEP training Program training on adoption of pond fish farming was assessed using difference-indifference methodology. The findings show that there was an increase in adoption rate of pond construction of 63.66percentafter training. This implies that FFEPTP had a positive impact on pond fish farming as evidenced by the significant number of ponds constructed after training. Based on the results of this study, it was concluded that FFEPTP had positively influenced farmers' pond construction, fish production, harvesting and marketing practices. Ministry of Livestock and Fisheries Development should include provision for credit to purchase pond liners and screen nets to control predation in future funding programs in order to scale up the adoption of pond fish farming.*

Key Words: *Inland-based fish farming, Adoption*

Date of Submission: 20-03-2018 Date of acceptance: 03-04-2018

I. Introduction

In 2009, the Kenyan Government initiated efforts to provide stimulus to the country's economy key of which were major agriculture sector improvement programs through the Economic Stimulus Program(GOK, 2009).As a part the effort, the Ministry of Fisheries Development established the Fish Farming Enterprise Productivity Program(FFEPP)in a bid to intensify efforts to equip fish farmers with knowledge and skills on modern fish farming technologies(MoFD, 2010).The FFEPP under the Economic Stimulus Program (ESP) wasan initiative by the Government of Kenya to expand economic opportunities in rural areas for employment creation(MoFD, 2010). The intervention aimed at creating120, 000 jobs that would benefit more than 290,000 youth, as well as women, farmers and fishers in the selected pilot constituencies.

The Fish Farming Enterprise Productivity Training Program funded by the Government of Kenyawas implemented in two phases. Phase one was funded under the Economic Stimulus Program, while the second phase was funded under the Economic Recovery, Poverty Alleviation and Regional Development Program (ERPARDP) (MoFD,2010).In first phase of the project,Kes1.12 billion were allocated for the construction of 28,000 fish ponds in 140 constituencies(GOK,2009). In the second phase, Kes 2.72billion were allocated for the construction of additional 200 fishponds in 20 other constituencies, purchase of pond liners, fingerlings and fish feeds. Further support was provided for the construction of 80mini fish processing and storage facilities(Republic of Kenya, 2010).A total of Kes1.2 million was allocated to MeruSouth Sub-County that led to the establishment of 450 ponds(GOK,2009). Two hundred farmers in Meru South Sub-Countywere selected and trained under the FFEPP in 2010. However, farmers who were not trained went ahead to construct ponds

using poor quality liners and started fish farming without adequate knowledge on fish production. Out of the 450 ponds that were established in Meru South Sub-County, 270 have since been abandoned leaving only 180 (MoFD, 2010).A baseline survey conducted to establish the extent of adoption of pond fish farming by farmers in Meru South Sub County after the FFEP training programby United Nations Development Program (UNDP) and Food Agricultural Organization (FAO) (2012) revealed a low pace of adoption. This implied that despite undergoing training, farmers in Meru South Sub County had not yet fully embraced the practice. According to UNDP/FAO (2012) thelow rate of adoptionwascharacterized by low pond productivity and abandonment of fish ponds. It was therefore imperative to institute a study to investigate the impactthatFish Farming Enterprise Productivity Training Program had on farmers 'adoption of inland-based pond fish farming in Meru South Sub County Kenya. The findings thus generated would be useful to the Ministry of Agriculture, Livestock and Fisheries Development in re-designing farmers' education curriculum for training pond fish farmers to increase adoption rate and fish production.

II. Methodology

The study employed an Ex-Post-Facto research design utilizing causal comparative study. Using the causal comparative research design, the researcher determined the effect of training on adoption of pond fish farming. The design was appropriate in gathering information from fish farmers in MeruSouth Sub- County because they underwent training through the FFEP training programand were expected to have adopted the practices taught. The study was carried out in Meru South Sub-County in Tharaka-Nithi County.Meru South Sub County was chosen because for two reasons; first, the Sub County was one of the beneficiaries of the Government of Kenya fish farming ESP; and historically people in Meru South Sub County have not been known to engage in fish farming until the introduction of the ESP. Pond fish farmers in Meru South Sub County have also reported lack of adequate support to fish farming development resulting in bad site selection, pond construction and management that have led to farmers realizing reduced fish yields (FAO, 2012). Furthermore, it is not clear whether farmers in Meru South Sub County were adequately trained to adopt inland-based pond fish farming.

The study population comprised 400 pond fish farmers that benefited from the initial ESP Program excluding those that abandoned their, 22extensionofficers and three WardFisheriesOfficers. With the help of Sub-County and Ward Fisheries Officers, 212 farmers were randomly sampled. Data for this study was collected by interviewing farmers and observing their fish ponds in addition to administering a questionnaire to the Extension Agents. A pilot study was carried out in Maara Sub-County involving 21farmers, two Extension Officers and one Ward Fisheries Officer. Maara Sub County was chosen for the pilot study because some farmers in the Sub County underwent FFEP training. Cronbach Alpha Coefficient method was used to estimate the reliability of the instruments. A reliability coefficient of 0.72 for farmers' interview schedule and 0.70 for questionnaires were computed. The study employed descriptive and inferential statistics to analyze the data. Hypothesis was tested using chi square. The impact of training on adoption of pond fish farming was also assessed using difference-in-difference (DID) methodology.

III. Results And Discussions

The researcher visited and observed ponds in the study area. The data presented in Table 1 indicates the number of ponds that the researcher was able to observe during the study.

Table 1: Number of Ponds Targeted and Observed

Division	Number of ponds targeted	Number of ponds observed
Chukka	270	240
Magumoni	220	170
IgambaNg'ombe	140	112

The objective of this study was to determine if there was a significant difference in the number of ponds constructed by farmers before and after training in MeruSouth Sub-County, Kenya. To establish this, farmers were asked to indicate the number of ponds they had before training and how many additional ones had they constructed after training. The results obtained are presented in Table 2.

Table 2: Number of Ponds Before and After Training

Number of ponds	Before training		After training	
	Frequency	Percentage	Frequency	Percentage
0	85	47.2		
1-2	70	38.9	81	45.0
3-4	25	13.9	77	43.0
5-6	0	0	22	12.0
Total	**180**	**100.0**	**180**	**100.0**

The results in Table 2 indicate that majority (47.2%) of the farmers had not constructed any pond before FFEPTP as compared to 38.9% who had 1-2 ponds and 13.9% who had 3-4 ponds. The results further show an increase in the number of ponds constructed by farmers after training. In Nigeria Onuegbu (2010) found that majority of farmers who attended a fish farming training programs had no ponds but adopted the practice after training.Wetengere (2010) concurs that despite high potentials that pond fish farming possesses, the adoption of the technology in Kenya leaves much to be desired. This result indicates that farmers who have acquired knowledge on fish farming are more likely to adopt it than those who have not acquired the knowledge. To determine if there was a significant difference in pond construction before and after undergoing training, a difference-in-difference (DID) statistical technique was used to study the differential effect of a treatment. That is DID = Post Treatment Mean − Pre-Treatment Mean. The results are shown in Table 3.

Table 3: Difference-In-Difference Estimation of Adoption Rate Using PondsConstructed Before and After Training

Divisions in Meru South Sub County	Pre-Testing	Post Testing	Change
	Variables		
	Ponds constructed before training	Ponds constructed after training	Difference
Chuka	23	130	107
Magumoni	9	70	61
IgambaNg'ombe	2	25	23
Total	34	225	191
DID (Mean) change	11.33	75	63.66

The results in Table 3 show that there was an adoption rate of 63.66% after FFEPTP training. This implies that FFEPTP had a positive impact on pond fish farming as evidenced by the significant number of ponds constructed after training. DID is a quasi-experimental design that makes use of cross-sectional or longitudinal data from post and pre-treatment to obtain an appropriate counterfactual to estimate a causal effect. DID is typically used to estimate the effect of a specific intervention or treatment (such as training) by comparing the changes in outcomes over time between a population.Chi Square was used to test the hypothesis that there was no significant difference in the number of ponds constructed by farmers before and after training in Meru South Sub-County, Kenya and the results obtained are shown in Table 4.

Table 4: Chi Square Statistics on Number of Ponds Constructed Before andAfter Training

Variable	N	X^2 calculated	df	X^2 tabulated
Number of ponds constructed before training	180	5.71	1	3.84
Number of ponds constructed after training	180	6.71	1	3.84

The Chi square calculated values for number of ponds constructed before training (X^2 cal = 5.71), and number of ponds constructed after training (X^2 cal = 6.71) are greater than the tabulated value of 3.84 at df = 1 and 0.05 level of significance. The null hypothesis is therefore rejected. There is significant relationship between training and the number of ponds constructed after training. This therefore implies that FFEPTP had a positive impact on adoption of pond fish farming in Meru South Sub County.

IV. Conclusions

The results of this study showed that there was an increase in adoption rate of pond construction of 63.66% after training. This implies that FFEPTP had a positive impact on pond fish farming.

Recommendations

i) Ministry of Livestock and Fisheries Development Government should intensify training of therural folk on pond fish farming and help them with supplies and technical support services to enhance adoption.

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*Mbiuki William Njeru1. "Influence of Fish Farming enterpriseProductivity trainingProgram on Adoption ofinland-Based Pondfish Farmingin Meru South Sub-County, Kenya ." IOSR Journal of Agriculture and Veterinary Science (IOSR-JAVS) 11.3 (2018): 75-78.