



PD/A CRSP NINETEENTH ANNUAL TECHNICAL REPORT

AQUACULTURE TRAINING FOR KENYAN FISHERIES OFFICERS AND UNIVERSITY STUDENTS

*Ninth Work Plan, Adoption/Diffusion Research 3 (9ADR3)
Progress Report*

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ABSTRACT

Lack of technical training has been cited as a major reason for the low output of fish ponds in Kenya. The lack was observed at all levels, from the lowest-level extension agent through university levels. The training program undertaken by the Kenya Project in Kenya seeks to improve training and to provide a cadre of trainers who have extensive practical fish-production experience.

This year the Kenya Project continued scholarship support for two M.S. students, one at Moi University's Chepkoilel Campus, Eldoret, Kenya, and the other at Auburn University, Alabama. Small stipends for student research conducted at Sagana Fish Farm have allowed undergraduate as well as graduate-level university students to remain longer to complete projects and gain valuable field experience.

The series of short courses for personnel of the Kenya Fisheries Department (FD), begun in 1999 and 2000, was concluded this year with the fifth and final course planned under this activity. In this series of courses, more than 80 FD staff received two weeks of training in pond construction methods and pond management techniques, and an additional 26 persons (24 Fisheries Officers and 2 outside-funded participants) received three weeks of advanced training in pond construction, pond management, and business planning. Additional farmer field days for approximately 50 farmers are also planned for later in 2001.

INTRODUCTION

Lack of technical training has been cited as a major reason for the low output of fish ponds in Kenya. The lack has been observed at all levels, from the lowest-level extension agent through university levels. The Kenya Project's training program in Kenya seeks to improve training and to provide a cadre of trainers who have extensive practical fish production experience. This activity was originally planned to include training only for university students and Fisheries Officers at all levels but was expanded to include farmer training as well.

The objectives of this investigation are to:

- 1) Increase the pond management skills of fisheries personnel currently involved in aquaculture extension activities in Kenya.
- 2) Enhance the research and extension capabilities of Kenyan university students likely to be employed in the aquaculture sector.

Activities undertaken during the current reporting year include continuing to sponsor two M.S. students with full scholarships, conducting the final session in our series of short courses in pond construction and management for Kenya

Fisheries Department (FD) extensionists, and continuing to support undergraduate and graduate students conducting research at Sagana Fish Farm by providing guidance and mentorship by the US research coordinator stationed at Sagana as well as stipends for some students.

TRAINING OF UNIVERSITY STUDENTS

Two M.S. students have received full scholarship support from the CRSP Kenya Project for the past two years. Robinson Mugo began receiving CRSP support for his graduate program in the Department of Fisheries at Moi University (MU, Eldoret, Kenya) in October 1999. Mugo has finished his course work, field work, and data analysis and has submitted the first draft of his thesis, entitled "Effects of maize bran, rice bran and wheat bran on the growth of Nile tilapia," to his committee. He is currently working on revisions suggested by his committee and expects to submit the thesis for examination by the end of September 2001. Bethuel Omolo, selected by the Kenya FD in 1999 to receive training for the Department's new Research/Extension Liaison position, began an M.S. program in the Department of Fisheries and Allied Aquacultures at Auburn University, Alabama, in January 2000. Omolo's studies have focused on extension methods and programming and general aquaculture. He also expects to complete and defend his thesis, entitled "Feed conversion efficiency as a function of fish size in channel catfish," by the end of 2001.

This year Patricia Mwau finished her program and was awarded the degree of Master of Science from the University of Nairobi (Department of Zoology) for her work, entitled "Nutrient dynamics, with special reference to nitrogen and phosphorus in tilapia (*Oreochromis niloticus*)/catfish (*Clarias gariepinus*) polyculture ponds at Sagana Fish Farm, central Kenya." Mwau conducted her thesis research at Sagana with on-site supervision by the resident CRSP research coordinator, Karen Veverica.

Earlier this year we received word that Paul Bilal Izaru, a graduate student supported by the Kenya Project, passed away. We have been unable to get official confirmation of this but continue our efforts to do so.

Daniel Oenga Nyanchiri, supported through October 1999, has submitted a draft thesis to Moi University, but some revisions are still needed. He is still employed by the Kenya Marine Fisheries Research Institute (KMFRI), so the going is slow with regard to completion of his thesis.

Last year we reported that Enos Mac'Were and Robert Olendi, both from MU, had begun M.S. research at Sagana Fish Farm. Mac'Were received CRSP stipend assistance and did his thesis research on commercial tilapia and *Clarias* production systems. He has completed his thesis, entitled "Comparison of tilapia and *Clarias* polyculture yields and economic benefits resulting from a locally available animal feed (pig finisher pellet), agricultural by-product (rice bran), and a pelleted test diet in fertilized ponds," and is expected to defend his thesis in September or October of 2001. Mac'Were's work was supervised by Charles Ngugi of MU and Veverica. Olendi, who also received stipend support from the CRSP, did his research on the effects of suspended silt on primary production and fish growth. He finished his thesis research last year and will submit a draft by the end of August 2001. He was already employed as chief technician of the MU Department of Fisheries before entering graduate school and has

returned to that position.

University undergraduates have continued to come to Sagana to do "attachments," in which they learn the practical aspects of fish farm management and often take on a special subject for an Attachment Report. Those who can stay longer often also conduct Senior Project research, for which a report is due at the end of their senior year. Student stipends from the CRSP have made it possible for some students to remain at Sagana for the whole break between their junior and senior years, thus allowing them to complete a senior project.

TRAINING FOR FISHERIES DEPARTMENT PERSONNEL

A series of two-week short courses in pond construction and pond management, begun during the previous reporting year (1999 to 2000), was completed this year. Each course was designed to accommodate 20 participants. These courses were typically a collaborative effort between the Sagana CRSP and FD group and the faculty of the Department of Fisheries of MU. Some courses were held at MUs Chepkoiel Campus in Eldoret (home of the MU Department of Fisheries), whereas others were held at Sagana. Primary MU participants included Ngugi, professor in the Department of Fisheries, Mucai Muchiri, Head of the MU Department of Fisheries, and David Liti, of the MU Department of Zoology. The full MU report on this five-session sequence of short courses is not included in this report because of space constraints but is available upon request to the Program Management Office. That report also includes, as attachments, course evaluations provided by the Training Assessor of the Kenya FD.

The final course in the series, held from 13 November through 3 December 2000, was aimed at senior Fisheries Officers in the Kenya FD (graduate student-level) and was expanded to cover a three-week period rather than the two-week duration of previous courses. As part of a farm planning and management exercise, trainees were given a three-week project assignment on enterprise budget development. This course will become the model for other university aquaculture classes. Twenty places in the course were reserved for Fisheries Officers, but as a result of the high interest in this course and requests to allow other trainees to attend the course, an additional five places were made available for outside-funded trainees (i.e., those under sponsorship from other projects or private entities). One private business and one government department took all the open places. The names, positions, home provinces, and sex of the participants in this course are shown in Table 1.

In addition to the skills gained by the trainees themselves, a further effect of this training has been the creation of a cadre of individuals experienced in the teaching of pond construction and pond management. This team is led by Ngugi of the MU Department of Fisheries. Mac'Were, a graduate student from MU who has assisted with these programs, now has five training programs of experience. Liti (MU Department of Zoology) and Geraldine Matolla (MU Department of Fisheries) have also obtained considerable experience in these programs. Moi University now has eight ponds for use in student research projects and future training programs. The team-teaching technique that combines CRSP researcher Veverica, MU professors, and private pond contractors (African Bulldozers) has resulted in a very strong, field work-oriented training program—the first of its kind for the FD. Professors at MU

Table 1. List of participants in the three-week course on Pond Construction and Commercial Fish Farm Management held for Fisheries Officers of the Kenya Fisheries Department at Sagana Fish Farm, Sagana, Kenya, from 13 November to 3 December 2000.

	Name	Designation	Institution	Province	Sex
1	Agwata Ototo	Lab Tech	KMFRI		M
2	Anne K. Mokoro	Fisheries Officer (FO)	Nyamira	Nyanza	F
3	Bernerd M. Fulanda	FO	Sagana	Central	M
4	George O. Owiti	FO	Sagana	Central	M
5	Isaac W. Wamalwa	FO	Bungoma	Western	M
6	James Mahaja	FO	Meru North	Eastern	M
7	Joab O. Okoto	FO	Teso	Western	M
8	John Oluoch Otiego	FO	Vihiga	Western	M
9	Joseph Kasuti	FO	Trans Nzoia	Rift Valley	M
10	Leornard W. Kundu	FO	Uasin Gishu	Rift Valley	M
11	Mahongah Wala Joseph	FO	Kiganjo	Central	M
12	Mbugua H. Mwangi	FO	Nairobi	Nairobi	M
13	Michael D. Omondi	FO	Kericho	Rift Valley	M
14	Michael M. Mumbi	FO	Kakamega	Western	M
15	Michael Mutuku Silla	FO	Gucha	Nyanza	M
16	Moses Munialo Simiyu	FO	Lugari	Western	M
17	Norman O. Munala	FO	Bomet	Rift Valley	M
18	Othniel Mwabili Mwanjala	FO	Kiambu	Central	M
19	Patricia Nduku Mwau	Graduate Student	Sagana	Central	F
20	Paul Kiprono Maritim	FO	Nandi	Rift Valley	M
21	Peterson Njeru Njue	FO	Sagana	Central	M
22	Philip Ruto	FO	Kisii	Nyanza	M
23	Rodrick Kundu Wakukha	FO	Turkana	Rift Valley	M
24	Simon Wahome Warui	FO	Nyahururu	Central	M
25	Stephen Gichunge	FO	Meru South	Eastern	M
26	Thomas M. Magara	Manager (Fisheries)	Taita D. Centre	Coast	M
	Group Summary	Females	2	7.70%	
		Males	24	92.30%	

and officials of the Kenya FD and KMFRI have all independently reached the conclusion that Sagana is the best place to hold training of this sort.

This year the CRSP continued its support of James Karuri in a three-year diploma program in Applied Biology at the Murang'a College of Technology. He began his first year in January 1999 and will finish by the end of 2001.

FARMER TRAINING

Farmer education days planned for this reporting year have been unavoidably delayed but are expected to be held in September 2001. However, a considerable training effect for farmers and the Fisheries Officers and extension agents who work with them was realized as a result of the on-farm trials that are underway in Central Province. That activity is reported on separately (see "On-farm trials: Evaluation of alternative aquaculture technologies by local farmers in Kenya," 9ATR1; pp. 121–129 of this report).

ANTICIPATED BENEFITS

The Pond Construction and Management Training program has been included in the MU training curriculum and has been

accepted as an official course by the FD. This means that those who have completed the program are eligible for promotion or they have an advantage over their untrained colleagues when it comes time for downsizing of staff. This is why the FD elected to send mostly fishery assistants to the training. The FD is phasing out its use of fish scouts, so both the FD and the CRSP were hesitant to include many of these in the training. In fact, hundreds of fish scouts were retrenched in September 2000. So far, none of the staff who received a certificate has been retrenched.

This activity is providing university students, FD personnel (including those involved in extension efforts), and farmers with knowledge about proper pond construction and skills for improved fish handling and pond management. Senior fisheries officers who participated in the final course from November to December 2000 received more intensive training than previous groups, including experience in enterprise budget development and farm operation planning. Short training courses are improving technical confidence and morale among fisheries personnel involved in extension work. Linkages between research and extension activities in Kenya are being strengthened. Support and hands-on guidance of undergraduate and graduate aquaculture students will strengthen their degree programs and help promote productive and sustainable aquaculture growth in

Kenya and in the region by providing a cadre of trained staff for commercial aquaculture. Ultimately, better pond management by farmers will lead to increased fish production, farm income, amounts of fish available to communities and markets, and employment opportunities.

LITERATURE CITED

- Veverica, K.L., B. Omolo, J. Amadiva, and J.R. Bowman, 2000. Aquaculture training for Kenyan fisheries officers and university students. In: K. McElwee, M. Niles, X. Cummings, and H. Egna (Editors), Seventeenth Annual Technical Report. Pond Dynamics / Aquaculture CRSP, Oregon State University, Corvallis, Oregon, pp. 167–170.
- Veverica, K.L., M. Muchiri, C.C. Ngugi, J.R. Bowman, and J. Amadiva, 2001. Aquaculture training for Kenyan fisheries officers and university students. In: A. Gupta, K. McElwee, D. Burke, J. Burright, X. Cummings, and H. Egna (Editors), Eighteenth Annual Technical Report. Pond Dynamics / Aquaculture CRSP, Oregon State University, Corvallis, Oregon, pp. 135–139.