AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D. C. 20523

BIBLIOGRAPHIC INPUT SHEET

FOR AID USE ONLY
Batch 74

1. SUBJECT CLASSIFICATION

A. PRIMARY: Food production and nutrition — AM00-0000-G116

B. SECONDARY: Fisheries--Central African Rep.

2. TITLE AND SUBTITLE

Review of Peace Corps fisheries program in the Central African Republic

3. AUTHOR(S)

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4. DOCUMENT DATE	5. NUMBER OF PAGES	6. ARC NUMBER
1975	~~19p.~~ 20p.	ARC

7. REFERENCE ORGANIZATION NAME AND ADDRESS

Auburn

8. SUPPLEMENTARY NOTES (Sponsoring Organization, Publishers, Availability)

9. ABSTRACT

Reviews the Peace Corps fisheries assistance program in the Central African Republic (CAR). Peace Corps Volunteers were visited at their project sites in an effort to provide assistance on technical aspects of their work. Five additional sites were visited and evaluated as potential project sites. Fisheries project documents and reports were reviewed. Research projects include raising tilapia in combination with pigs, from which high fish productions are obtained, and production trials utilizing catfish Private fish ponds in the CAR are very small, usually less than one hundred square meters surface area. Tilapia nilotica is the most common pond fish. Pond cultured fish have a definite contribution to make in localized subsistence economies in the CAR as a source of high quality, low cost protein which is well accepted by Central Africans. It is possible that education and experience in fish husbandry may also assist in the development of husbandries utilizing other animals. This report includes the background of the program, a description of the present volunteer sites at Mbaiki, Boda, Bocaranga, Bossembele, and Yaloke, a summary of the proposed sites and recommendations.

10. CONTROL NUMBER	11. PRICE OF DOCUMENT
PN-AAF-065	
12. DESCRIPTORS: Central African Rep.	13. PROJECT NUMBER
	14. CONTRACT NUMBER: AID/ta-BOA-1152 GTS
	15. TYPE OF DOCUMENT

AID 590-1 (4-74)

J Grace
AID/ta-BOA-1152 6-TS
Auburn
PN-AAF-065

REVIEW OF PEACE CORPS FISHERIES PROGRAM IN THE CENTRAL AFRICAN REPUBLIC

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Project: AID/ta-BOA-1152
Task Order 7

Date: September 30, 1975

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INTRODUCTION

Under sponsorship of USAID, at the request of U.S. Peace Corps, a consultant from the International Center for Aquaculture, Auburn University, reviewed the Peace Corps fisheries assistance program in the Central African Republic (CAR), with the purpose of making recommendations for an improved program.

The consultant, during the period July 31 to August 29, 1975, visited Peace Corps Volunteers (PCV's) at their project sites in an effort to provide assistance on technical aspects of their work.

Five additional sites were visited and evaluated for potential as project sites for PCV's. Also, fisheries project documents and reports were reviewed, and numerous discussions were held with officials of the Ministry of Water and Forests, the director of Peace Corps/Central African Republic (PC/CAR), PCV's, and UNDP/FAO personnel.

STATUS OF FISH CULTURE IN THE CAR

History

The French introduced pond fish culture in the CAR in the early 1950's with construction of fish hatcheries for fingerling production. Subsequently, construction of private ponds was strongly encouraged. Fish culture activity peaked in 1959, at which time an estimated 20,000 private ponds were in existence. In 1956, approximately 40 African extension agents were active under French supervision.

Following independence in 1960, the fish hatcheries gradually were abandoned, and increasing numbers of private ponds fell into disuse due to lack of technical assistance and availability of fingerlings.

UNDP/FAO Assisted Projects

In 1967, at the request of the Government of Central African Republic (GOCAR), UNDP/FAO assistance in fish culture development began as a regional research and training project headquartered in the CAR. Under this project, presently scheduled to end in December, 1975, 28 Central Africans have received training in fish culture. Thirteen of these individuals are currently employed at UNDP/FAO-assisted fish culture projects in the CAR. Of these, seven are working in extension from four UNDP/FAO-assisted fishery stations on a full-time basis supervised by one UNDP/FAO expert and two UNDP/FAO volunteers.

Research projects at UNDP/FAO-assisted stations include raising tilapia in combination with pigs, from which very high fish productions are obtained, and production trials utilizing catfish, Clarius lazera. At the present time, however, highly intensive culture is of limited value due to the preponderance of subsistence fish farmers with very small ponds, minimum input capability, and lack of tradition of animal husbandry.

In December, 1975, two new UNDP/FAO-assisted projects are scheduled to begin; a research and training project that is essentially a continuation of the existing project, and a pilot, commercial fish production project.

Characteristics of Fish Ponds

Soils in the CAR generally have a high clay content and good water-retaining characteristics. Topography is of the rolling-hill type, affording many good sites for fish pond construction. Water is provided to ponds by streams, springs, seepage, and digging ponds into the water table. At many sites, adequate water is available year-round, while at the other sites water availability corresponds to the May-to-October rainy season during which approximately 50 inches of rain may fall.

Private fish ponds in the CAR are very small, generally less than 100 m^2 surface area. A person or family usually owns only one pond. Tilapia nilotica is the most common pond fish; however, other species of tilapia are sometimes found in ponds.

Fingerlings are sold to farmers for approximately (U.S.) $0.005 each or $0.50 to $1.00 per kilogram, and stocked at 1 to 2 fingerlings/m^2. Water fertility is usually increased by composting cut vegetation in one or more corners of the pond. Cow manure, rumen contents, cotton seed, and coffee pulp wastes are also utilized when available. Leaves of the ubiquitous manioc plant placed in the ponds as food are readily eaten by tilapia. Termites also are used as food, but to a limited extent.

At the time of the consultant's visit, the first crop of fish stocked in private ponds with Peace Corps assistance had not yet been harvested. The only production data gathered were obtained by interviewing a counterpart of one of the PCV's. From a 185 m^2 private pond, which had been in culture six months and stocked with T. nilotica at 1/m^2, 14.5 kg of fish were harvested, representing a production of 1568 kg/ha/yr. This production is high when one considers the minimum inputs utilized, the presence of predatory fish, and acceptance as food of all fish produced regardless of size. Four of the fish were piscivorous Hemichromis, probably accounting for the absence of small tilapia fingerlings. Specific data on the management practices employed were not available.

Marketing and Acceptibility

Fish are available at times in the markets of the relatively few river towns; however, production from capture fisheries is generally low because of inefficient harvest methods. Fish are rarely found in markets of interior towns; however, when food fish are available at government

fishery station pond drainings, they are eagerly purchased.

Fortunately, Central Africans readily accept any size fish, which means that greater pond productions can be obtained if the fish are harvested at smaller sizes, and all harvested fish have economic value regardless of size. Ironically, the acceptance of small fingerlings as food may create a problem in that fish farmers would rather consume the reproduction from their ponds than use it in restocking ponds for the next production period.

Cattle are herded to the CAR from countries immediately to the north by Muslim traders. Thus, beef is available at most town markets, but in limited quantities and at high prices, (U.S.) $1.75 to $2.75 per kilogram. Fish are sold occasionally at government fishery stations for approximately (U.S.) $0.75 per kilogram.

Goats, chickens, and pigs are present in towns and villages, but are not generally available in the markets. They generally are not well-husbanded, usually running free foraging for themselves, and are apparently underutilized as sources of meat, eggs, and milk.

Pond-cultured fish have a definite contribution to make in localized subsistance economies in the CAR as a source of high quality, low cost protein, eagerly accepted by Central Africans. Successes of the Peace Corps and UNDP/FAO-assisted fish culture extension projects demonstrate that Central Africans can become successful subsistance fish farmers as a result of carefully planned and supervised extension education projects. It is possible that education and experience in fish husbandry may also assist in the development of husbandries utilizing other animals in addition to fish by developing a tradition for animal husbandry.

PEACE CORPS FISHERIES ASSISTANCE PROGRAM

Background

Apart from UNDP/FAO-assisted projects, the GOCAR is presently incapable of supporting a significant fish culture program, as it lacks trained personnel, financial resources, and other essential inputs.

In early 1974, the Ministry of Agriculture requested Peace Corps to provide six fishery extension workers to assist in implementing fish pond culture at six localities.

Five PCV's with B.S. degrees in biology were recruited. They received training in fish culture at the University of Oklahoma under Dr. Howard Clemens. After several months of language and cross-cultural training in the CAR, the PCV's were assigned to five project locations that had been previously evaluated and selected by former PCV's with experiences in other developing countries.

Program Approach

The approach of Peace Corps, in cooperation with GOCAR, is to assign a PCV to a town or village where there is an abandoned fish hatchery and a concentration of abandoned private ponds. The task of the PCV is then to work together with a host-country counterpart to renovate hatchery ponds, produce fingerlings, and to assist farmers with pond construction or renovation, stocking, and management. This is a sound approach providing adequate financial inputs are available.

Program Requirements

Because of the lack of transportation for the fisheries program (even the fisheries director in the Ministry of Water and Forests does not have an official vehicle), PCV's and their counterparts can only be effective in

towns and villages where there is a concentration of private ponds, and where government-operated hatchery ponds are within walking distance of the majority of ponds. In cases in which there is no hatchery, where hatchery ponds at abandoned stations are too large, too badly run-down to be easily renovated, or are not centrally located to private pond concentrations, it might be feasible to construct new hatchery ponds, providing trained personnel are available to operate them effectively. This can be done easily and inexpensively since the size requirements for tilapia hatchery ponds is small and the total surface area of the private ponds being served is also small, though many individual ponds may make up the total. During the early phases of constructing or renovating hatchery ponds, however, transportation definitely will be needed for transport of equipment, supplies, and broodstock. The present scarcity of transportation also requires that only materials available in the immediate vicinity of the ponds be adopted for use as feeds and fertilizers. These materials vary in availability from area to area and include rice hulls, cotton seed, brewery wastes, coffee pulp wastes, cattle manure, rumen contents and blood, palm oil cake, termites, fruits, manioc leaves, cut leaves and grasses.

GOCAR Contributions

While the GOCAR recognizes the importance of pond-raised fish in improving the nutrition, health, and livelihood of the people, it is at present unable to provide necessary inputs for a significant fish culture program. The GOCAR has, however, attempted to provide gasoline for motorcycles, housing, and counterparts for the PCV's. Unfortunately, only one African counterpart has been assigned to the Peace Corps-assisted fisheries program.

To supplement GOCAR contributions, each PCV was provided $1,000

through the Peace Corps "Directors Fund". This money has been used for purchase of small equipment and supplies for routine hatchery operations.

Cooperation with UNDP/FAO

The Peace Corps project document entitled, "CAR Inland Fisheries Extension", states that GOCAR requested Peace Corps extension agents "...to extend and enhance fish farming in coordination with the UNDP/FAO". At the present time, however, there is no official cooperation between Peace Corps and UNDP/FAO, as each agency has extension responsibilities for different areas of the country. UNDP/FAO experts have, however, provided occasional technical advice to the PCV's, and also provided tilapia broodfish to the Peace Corps-assisted hatcheries.

PRESENT VOLUNTEER SITES

PCV's are presently assigned to hatcheries at five different sites. The number of ponds at these hatcheries ranges from four to eleven, and total surface area from 0.06 to 1 ha. All of the hatcheries can be effectively utilized for fingerling production and demonstration purposes, provided necessary financial inputs and trained personnel are available. Since the arrival of PCV's in August, 1974, considerable effort has been expended in renovation of the hatchery ponds.

Mbaiki

This station has 11 ponds with a total surface area of 0.52 ha. Several of the ponds were being renovated. Water is supplied from a stream through a canal that extends about 300 m. The stream flows year-round, but the flow decreases substantially during the five-month dry season. The water is rich in organic materials due to cattle slaughter house wastes discharged

in upstream water. Staff consists of the PCV, a caretaker, and two laborers. No counterpart has been assigned to work with the PCV.

No private ponds were in culture at the time of arrival of the PCV. Approximately 150 ponds have been identified within a ten-kilometer radius of the station. At the present time, 39 ponds, averaging about 100 m^2, have been stocked and 30 additional ponds are ready for stocking, having been prepared according to recommendations of the PCV. There is a great interest among the people in new pond construction, to the point of requiring discouragement by the PCV because he is unable to respond to requests for technical assistance.

The PCV also teaches a course in fish culture at a nearby agricultural college.

Boda

This station has four very small ponds with a total surface area of 0.06 ha. The ponds are newly renovated and have been stocked with broodfish for fingerling production. The station is supplied by a spring, which unfortunately is dry four months out of the year. The staff consists of the PCV, a counterpart, and two laborers paid by the local government.

No ponds were in culture when the volunteer arrived. It is estimated that there are several hundred abandoned ponds in the area ranging from 30 to 400 m^2 and averaging about 100 m^2. To date, 49 private ponds have been stocked by the PCV and his counterpart.

Bocaranga

The hatchery consists of eight ponds with a total surface area of 0.35 ha. The ponds are being renovated, after which they are stocked with broodfish for fingerling production. The hatchery is supplied by a canal

diverted from a stream, with the water being sufficient to fill and maintain all ponds for nine months of the year and several ponds for 12 months of the year. The staff consists of the PCV, a guard, and two laborers. No counterpart has been assigned.

No private ponds were in culture before the arrival of the PCV. There are additional sites in the immediate area that are well-suited for new pond construction.

Bossembele

The hatchery consists of eight ponds with a total area of approximately 1 ha. The ponds are being renovated, with several completed and producing fingerlings for extension purposes. The water is supplied by canal from a small impoundment located about one km from the station. The staff consists of the PCV, a guard, and several workers. No counterpart has been assigned.

Before the volunteer arrived, there were 90 abandoned ponds averaging about 50 m^2. Only 13 ponds have been stocked. There is a relatively low population in the area of the station and a general lack of interest in fish culture, which will impede an effective extension program.

Yaloke

This area is presently served by the PCV assigned to Bossembele. The hatchery is presently being renovated and is not yet in operation. It consists of four ponds of approximately 400 m^2 total surface area, which is adequate for fingerling production. Spring water adequate for station needs is available year-round.

There is very good potential for extension in this area. No ponds were in culture before the arrival of the PCV. To date, 35 ponds have been stocked and 20 more are ready for fingerlings. Numerous favorable sites

exist for the construction of new ponds and local interest in fish culture is great.

Grimari

The hatchery is located on the grounds of a UNDP/FAO-assisted agricultural project and consists of six ponds with a total surface area of 0.21 ha. The ponds are currently being renovated and are producing fingerlings for extension. Spring and run-off water is available year-round in good supply. The staff consists of the PCV, an assistant provided by the agriculture project, and two workers.

There are an estimated 160 ponds in the area, with 80 in Grimari proper. Problems of the area are irregular water supply, a lack of suitable topography for pond construction, and a general lack of enthusiasm for fish culture among the people. At the present time, 21 private ponds have been stocked and five are waiting for fish.

The PCV is teaching a course in aquaculture at the agriculture school adjacent to the agriculture station, using ponds on the station for practical demonstrations.

PROPOSED SITES

Numerous sites exist in the CAR with concentrations of largely abandoned private ponds and abandoned hatcheries. The success of the Peace Corps fisheries assistance program at present project sites strongly encourages expansion of the program to include additional, carefully selected project sites. To this end, five potential project sites were visited by the consultant.

Berberati

This hatchery consists of 20 ponds with a surface area of approximately 0.35 ha. It is very overgrown and would require considerable renovation. The hatchery is poorly accessible, and a large dam which formerly supplied the ponds is partially washed out.

The Water and Forests Inspector of the prefecture has detailed records of 461 private ponds within the town and its districts, including owner's name, size, location, and stocking records for early 1950's. It was estimated by the Inspector that 200 to 300 additional ponds were in outlying areas. Several private ponds in culture were observed. No estimate of the number of abandoned ponds could be obtained. The Inspector expressed definite interest in having a Peace Corps Volunteer assigned to the area, and in fact had previously requested one. He indicated that he had an adequate staff from which he would appoint a counterpart.

Mobaye

This town is on the Oubangui river. Unfortunately, it was visited on a weekend and no officials were available for interview. There were reports of a hatchery here, but we were unable to locate it. We observed several private ponds with tilapia in culture, one of which was newly constructed. There are abundant, stream-fed lowlands with year-round water, which would be good sites for new pond construction. There is a river fisheries at Mobaye, but we were not able to determine the abundance and price of fish in the market.

Bangassou

We conferred with a former fish pond extension agent who had worked under the French who has records of over 200 ponds within a 5-km radius of

the town. He indicated that the interest of the people is high, as they periodically ask him for fingerlings. We observed several extensive areas within town with good topography for ponds and year-round water. There is no hatchery here; thus, several small fingerling production and demonstration ponds would have to be constructed. The French formerly supplied the Bangassou area with fingerlings from a hatchery 80 km away.

We met with the Inspector of Water and Forests for the prefecture, who expressed a strong interest in having a PCV and promised to provide a counterpart.

Bakouma

The Inspector of the prefecture would like to place an extension agent here. The Catholic mission priest, who is very active in agriculture projects, is attempting to interest Peace Corps in involvement in fisheries in the area. There is no history of fish culture here and only four abandoned ponds exist, which belonged to the former French governor. The area in which the ponds are located has considerable potential for the construction of additional ponds. However, a large dam that formerly provided water to the ponds has broken and its repair would be a large undertaking.

Bria

We met with Water and Forests officials who expressed interest in seeing pond culture revived. They reported about 100 ponds within town and an undetermined number of ponds on the routes leading out of town. A large, abandoned hatchery is present about 15 km from the town. We did not see the hatchery, but it is reported to have 17 ponds. The dam which formerly supplied the hatchery is washed out.

A Water and Forests Inspector will soon be stationed in Bria, and

there are presently two former fish pond extension agents stationed there.

RECOMMENDATIONS

1. Measurable progress has been made by the five fishery PCV's in hatchery renovation and fish pond extension work. This is especially encouraging in view of the fact that it is only the end of the first year of the program. Peace Corps should program replacements for the present PCV's when their tours end as there is considerable potential for extension work at each site. The replacements for Mbaiki and Grimari should continue the important job of teaching courses in aquaculture at the agriculture institutes.

2. With regard to prospective new sites for PCV's: at least one, and possibly two, volunteers should be placed at Berberati, and one at Bangassou. Mobaye and especially Bria are potential sites for one PCV each, but these areas should be thoroughly checked out by an experienced PCV for:
   - condition of hatcheries
   - numbers of private ponds and potential for new pond construction
   - interest of local officials and willingness to help support fish culture at their location
   - interest of local people
   - adequate living conditions for volunteers

3. In view of necessary financial inputs, technical expertise and logistical support, and the continued need of the Peace Corps program to bring its objectives into sharp focus, Peace Corps should not be involved at this time in large hatchery renovation for the purpose of food fish production. Hatchery renovation at present should not exceed that which is necessary for fingerling production in support of extension activities. At some sites (e.g. Berberati), it would be less costly to construct a new

smaller hatchery than to renovate a large, abandoned hatchery.

4. In view of the limited ability of the government to assist the private farmer in fish culture development and with the slow pace of improvement, an important objective of the extension program should be to teach farmers to be as independent as possible of outside assistance. They should be taught, for example, to hold back fingerlings and stock their own ponds, and to rely only upon materials in the vicinity of their ponds for pond construction, composting and fertilization, and feeding.

5. Only one of the present PCV's has a counterpart. Peace Corps should press this matter urgently with the GOCAR to provide at least one counterpart for each volunteer.

   Care should be taken in the selection and training of the counterparts. They should be instructed in practical fish culture, and have the opportunity of raising a crop of fish from the pond preparation stage through harvest stage before being given extension responsibilities. The UNDP/FAO staff at Landjia probably would be able to assist in providing on-the-job experience for extension agents.

6. In view of the fact that the GOCAR is able to provide only very limited support for its fishery programs, Peace Corps should assist the GOCAR in seeking outside funding to enable GOCAR to provide two vehicles to the Peace Corps-assisted component of its fishery program, and funds for the equipping, renovation, or construction of small fingerling production hatcheries.

   In as much as Peace Corps no longer has arrangements with the University of Oklahoma for training fishery volunteers, Peace Corps should explore the possibility of having a part of the training in-country at the UNDP/FAO-assisted project at Landjia, which is well staffed and equipped for

this purpose. As part of their in-country training, the trainees should spend at least two weeks with an experienced volunteer to familiarize them with specific problems they will face, and how these problems have been dealt with by the experienced PCV.

8. In order to generate better extension information, accurate data are needed on production obtained in small ponds using compost materials such as cut vegetation, cotton seed, coffee wastes and food such as manioc leaves and termites. Hopefully, the PCV's will be in a position to collect this information on a firsthand basis from farmers cooperating in the project and from station demonstration ponds. Such information will serve as a base for any future fish culture development and extension program implemented in the Central African Republic.

ITINERARY

July	31	Yaoundi, Cameroon; Briefing by RDO at USAID Mission
August	1	Reviewed Peace Corps Fisheries Program documentation; Visited FAO regional station at Landjia.
	2	Saturday
	3	Visited PCV project site at Mbaiki
	4	Visited PCV project site at Boda
	5	Discussions with PCV's
	6	Preparation for trip
	7 & 8	Travel to Berberati; Visited station, private ponds, met with inspector of prefecture.
	9 & 10	Travel to Bocaranga; Visited PCV project site
	11	Travel to Bouar; Visited FAO station
	12	Travel to Yaloke; Visited project site
	13	Rest
	14	Preparation for trip; Meeting with Chargé'd 'affaires of U.S. Embassy
	15 & 16	Travel to Bombari; Visited FAO station
	17	Travel to Mobaye; Visited private ponds; Travel to Bangassou
	18	Bangassou; Met with former extension agent and inspector for prefecture; Travel to Ouango and Babe
	19	Travel to Bakouma; Inspected private ponds
	20 & 21	Bria. Met with Water and Forests officials.
	22	Visited volunteer site at Grimari
	23	Travel to Bangui
	24	Sunday
	25 - 28	Discussions with Peace Corps director, PCV's; Report writing.
	29	Yaoundi, Cameroon; Debriefing at USAID mission.