Field testing of Agency-Farmer Joint Irrigation Management Concept and its Institutional Impacts in HVIP, Nigeria[1]

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Abstract

An integrated approach was used to introduce the Agency-Farmer Joint Irrigation Management (AFJM) Concept in Hadejia Valley Irrigation Project (HVIP) located in the semi arid region of northwestern Nigeria. The intervention was undertaken between 1996 to 2001covering a period of 5 wet and 4 dry cropping seasons. Specific modules in the areas of system operation, network maintenace, agricultural production and marketing were designed and used to address the critical issues facing the major actors in a typical irrigation scheme. For each of these areas, an application process developed for the purpose of promoting the concept was observed in two stages. First stage involve preparation of farmers seasonal plans based on their wishes and expectations, while the second stage involve joint revision of the seasonal plans and adaptation to realities by the scheme managers and farmers.

Results of this effort revealed that both the irrigation agency (IA) and water users associations (WUAs) adopted the AFJM concept at varying degrees. The IA was reorganised resulting to the creation of a WUA unit where activities relating to farmers associations are organised and co-ordinated. This organizational reform enabled the IA to improve its manpower quality ratio (MPQR), financial autonomy factor (FAF) as well as financial-self-sufficiency-factor (FSSF) from means of 20.0, 0.0, and 14.7% to means of 24.0, 14.0 and 26% respectively. The IA also witnessed increase in cost recovery ratio (CRR) from a mean of 47.0 to 72.0%. Farmers were similarly organised into eight functional WUAs registered with Auyo Local and Jigawa State Governments, respectively. The WUAs grew in membership from a mean of 82 to 146 per association. This allow the WUAs to achieve an internal revenue generation (IRG) of 58%. A mean financial viability index (FVI) of 40% per WUA was also attained.

Assessment of the impact of applying the AFJM concept showed that the approach necessitated improvement in the quality of irrigation services provided by the irigation agency. This also provided the needed incentive for the effective user participation leading to joint sharing of O and M costs and responsibilities.

Keywords : AFJM, WUAs, manpower quality ratio (MPQR), financial autonomy factor (FAF), financial-self-sufficiency-factor (FSSF), cost recovery ratio (CRR), internal revenue generation (IRG), financial viability index 1.

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Introduction

The justification for the promotion of joint irrigation management concept between the Government agency and users was since recognized as a condition for the development and sustenance of irrigated agriculture in a developing economies like Nigeria (Pradhan 1993b, FAO, 1991a and 1991b; Vermillion, 1999 ; and World Bank 1995). The various stakeholders (policy makers, farmers, field staff, researchers, etc ;) having apppreciated the relevance and potentiality of the concept became anxious to contribute their quota and facilitate the successful execution of this task in Nigeria (Prahdan 1993a; Ijir 1994 ; and Ijir et al 1998) . With the development of a package on the concept, the need for an integrated approach for its application as a pilot case became imperative. It was recogized that the development of the concept does not necessarily means its successful testing. This can easily retard the manifestation of the potentials or otherwise of the concept for better direction and guidence.

In another development, Gerards (1995) reported that the institutional development or reforms that took place in the irrigation agency in order to accommodate the new roles it is expected to play under PIM in Indonesia were considered very central. Level of re-orientation, capacity building for both management and field staff were used to quantify these indicators. Other indices used to establish these by Pradhan and Babura (1993) and Ijir *et al*. (1998) include: number of WUA facilitation visits by agency staff, collection efficiency of membership fees or annual dues by the WUAs, and others.

It became clear that the first challenge for a successful promotion of the AFJM concept in the country was to design and carry out a scientific pilot trial using a process-based apporach with clear procedure (Pradhan, 1994). The approach must also have the flexibility for adaptation in different socio-technical and political environments (Musa, 1994 and Lauraya, 1996). The collaborative programme between CIRAD, NAERLS and HJRBDA took up the challenge and designed an integrated approach for trying the concept in HVIP . The intervention, was to apply the AFJM concept involving all key stakeholders as specified in the components of the concept. It used a process that evolve from the existing practices of the farmers as well as the government agency (Abubakar,1999). The process demands for the minimum changes in the practices and life styles of the actors that is not beyond their resources and capabilities.
The article present the process employed to apply the AFJM concept in HVIP at the diffèrent levels of interactions by the primary stakeholders. The evolution of the process over time reflecting the needs and priorities of the two principal parties (farmers associations and agency mangers) involved in the pilot trial was also highlighted. The institutional impacts of applying the concept recorded by either of the two parties were summarized while lessons learned and conlusion on how to improve the experience gained and scale from piloting to real field application were suggested.

2. 0 Materials and Methods

2.1 Location of the intervention

The HVIP lies within Auyo, Kaugama and Miga Local Government Areas of Jigawa State. It is located at latitude 12^{o}-13^{o}N and longitude 10^{o}-11^{o}E between the Hadejia River and its tributary the Kaffin Hausa River around Auyo town. The town of Auyo is situated near the center of the project area (Fig.1). The project involves land, water resources and irrigation development to enhance agricultural production in the predominantly farming communities within *Hadejia Emirate* (Hollis et. al.1993).

The climate around HVIP consists of a warm (28°C) rainy season from June to September, a cool dry (17°C) season from October to February, and a hot dry (31°C) season from March to May. The warm rainy season is traditionally the farming period. Rainfall is highest in July and August during which precipitation exceeds potential evaporation. During the rainy season the cloudiness and the prevailing cool southwesterly wind have a moderating effect on daily temperatures. The average annual rainfall in the area is 550mm (Hollis *et al.* 1993).

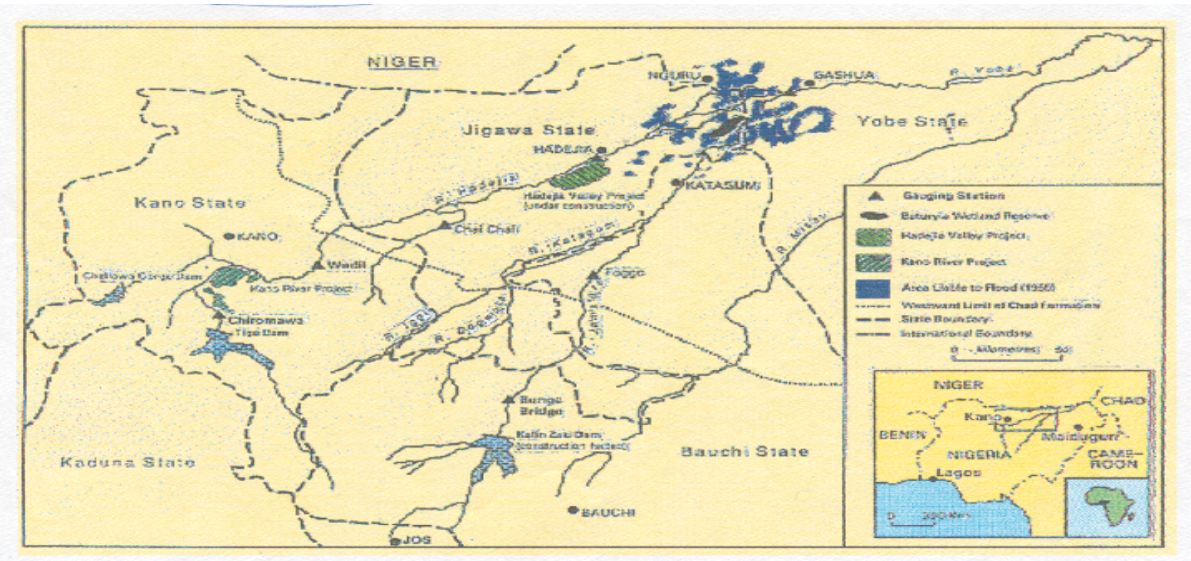

Figure 1 Location of the study area

2.2 Institutionalizition of the famers associations and the irrigation agency

The field testing of the concept requires that the two primary actors (WUAs and IA) must be on the ground as separate institutions that can understand the rational of the concept and are willing and ready to play the roles and responsibilities prescribed in the process. It therefore became imperative that institutionalization of the two parties in HVIP is a neccesity for the concept to be tested. The followings were therefore undertaken : a) Formation & strengthening of WUAs and WUA members and b) Organizational reforms of Agency and Capacity building of Agency staff.

Combinations of various strategies were used to achieve the set objectives. The following were among others:-

i. Consultations, meetings, discussions were used during program formulation, situation analysis, training needs analysis, negotiations e.g. to enhance organizational skills of WUAs and their members.

ii. Community workshops were held either in classrooms or on the farm to exchange ideas on specific organizational and or technical problems.

iii. Facilitated the formal registration of the farmers associations with HVIP, Auyo LGA, and Jigawa State Governments following all the protocol required.

iv. Introduced additional units that would be in charge of co-ordinating WUAs activities,

v Technical training focusing on four broad themes was vigorously implemented. The themes were as follows:- i) Irrigated crop production and management, ii) Operation and maintenance of irrigation systems, iii) Organizational development of WUA's,

vi Interactive study tours to irrigation schemes with similar or dissimilar settings were organized and conducted to enable the WUAs acquire new experiences on both organizational and technical skills. Specifically Kano River project, Wateri irrigation project and Gatafa fadama was visited in Nigeria, while Galmi, Konni and Djirawa irrigation projects were visited in Niger Republic.

vii Participatory Rapid appraisal technique (PRAT) was used to establish institutional linkages between the WUAs with major stakeholders who supply input and services to the farmers for on the spot appraisal of field problems, and proffering of appropriate solutions to identified problems.

2.3 The process of testing the concept

Specific modules of activities or roles/responsibilities that would allow the individual farmers to interact amongst themselves as a group as well as with agency field staff right from the tertiary up to the primary/scheme levels towards the preparation of seasonal plan of their farming activities (e.g. types of crop, planting dates, harvesting period, etc) were designed. Similar modules were also designed for the agency field staff to interact with the physical system and with their managers to prepare seasonal targets (e.g. date of water release, date of water closure, maintenance interval etc) that would facilitate a smooth farming season. A framework that allows the two efforts to be negotiated upon and harmonized was establishd and recognized by all (see Fig. 2). The period required for the process to be commence and be completed at both ends for all the identified levels were further set. The categories of the different actors from amongst the farmers (WUA members, leaders, block representatives etc) as well as from amongst the agency staff (WUA facilitators, gate operators, advisory extension officers, etc) were also specified. The sum total of all these was packaged and introduced to the target beneficiaries using the following strategies (Abubakar, 2002):

- Adult education through extension campaign adopting Havelock (1970) and Morgan et al (1978) approahces ;
- Capacity building of the direct actors using Adhikarya (1978) technique ;
- Experintal learning and continuous training as practiced by Rolling (1982) and Laird (1972)

The following steps were put into use to test the process on the ground between the period of 1996/97 to 2000/2001 dry seasons. Basically the process comprises of five steps as follows (Abubakar, 2002):

i. Preparation of seasonal plans on farming activities by farmers ;
ii. Setting up of seasonal targets by the agency ;
iii. Joint review of seasonal plans and targets through negotiation ;
iv. Feedback to grassroot (in case of WUAs to farmers and in case of agency to management) for adjustment to reflect actual realities ;
v. Implementation of agreed plans and targets through :

- ✔ Timely allocation of materials, funds, and labour
- ✔ On the spot supervision (where the job is handle by WUA members)

Vi. Monitoring and evaluation of implementation through :

- ✓ Weekly revisions of implementation at sector level led by farmers
- ✓ Weekly review of implementation at main system level led by agency
- ✓ Assessment of effectiveness (cost, time or labourwise) in executing the task
- ✓ Feedback to grassroot (in case of WUAs to farmers and in case of agency to management) on the level of performance of the party responsible.

Overlaping exist between these steps when executing the process in reality. The process commences early enough to allow for adequate interaction between the farmers, on one hand, to arrive at decisions for their blocks and sector, and between the farmers associations and the agency managers to arrive at decisions for the entire irrigation scheme.

2.3. Data collection tools

The instrument used to collect data checklist, (to guide discussion and obtain qualitative data) questionnaire (to obtain quantitative data), and field notebook for recording of observations. Others include seasonal reports, annual reports, and progress reports of the collaborative program.

2.4 Data analytical tools

The following expressions were used to analyze the data obtain:

Manpower Service Ratio (MPSR), $MPSR = M/A_{dcv}$ ……1

where:

M = Total manpower numbers for O& M of the system

A_{dcv} = Total developed irrigable area, (ha)

Similarly

Manpower Quality Ratio (MPQR), $MPQR = (Mp/M_t)\ 100\%$ …….2

Where :

Mp = No of professional and middle cadre personnel employed in the scheme

M_t = Total manpower numbers for O & M activities of the scheme.

Financial Autonomy Factor (FAF), which is given as (as (Ijir *et al.,*1998; Plusquellec,1990; Peter *et al.,*1999):

$FAF = (Fs/Fg) \times 100\%$……. …….. …….3

where:

F_s = Amount of scheme income retained by the managing agency

F_g = Amount passed to central or regional Authority

Similarly,
Financial self-sufficiency Factor (FSSF).This can be given by (Ijir *et al.,*1998; Plusquellec,1990; Peter *et al.,*1999):

$FSSF = (I_w/C) \times 100\%$…….. ……..4

where:
I_w = Total annual scheme income from water charges and diverse other revenue sources
C = Total annual O & M costs

3. 0 Results and Discussion

3.1 Organizational reforms and financial capability of the irrigation agency

a) organizational reforms and re-orientation (tables ?)

The agency was confronted with the option of either undegoing institutional reform to enable it interact with the obvious partners or to drop the idea of promoting participatory irrigation management. This was viewed from two perspectives viz : rationalization of redundant staff or expansion of area under irrigation, to increase the manpower service ratio of the agency (Abubakar, 2002). Neither of these strategies were implemented mainly because the agency was fully dependent on government, thus could not improve its manpower service ratio above 15.2. The agency however was able to increase its manpower quality ratio from a mean of 20 to 24% through the emloyment of eleven professional cadre staff.

b) level of autonomy and financial capability (tables ?)

The organizational reform undertaken by the agency allowed it to increase its financial-self-sufficiency where up to 26% of the O and M costs were internally generated as against only 15% prior to the application of AFJM concept (Abubakar,2002). The agency was also able to improve its financial-autonomy from 0 to 14% indicating that the scheme managers have started gaining some latitude on the use of internally generated revenue. This enhenced their ability to facilitate timely execution of maintenance work agreed with the users.

3.2 Institutional development of the farmers' associations

The 8 users associations operating in the scheme grew in membership sizes from a total of 656 with a mean of 82 members/association in 1997 to a total of 1169 with a mean of 150 members/association in 2000 giving a corresponding mean membership growth of 78% within 3 years.

a) WUA formation and legal recognition (tables)

The collaborative programme empowerment activities catalyzed the formation of Marina and Auyo Sector WUA's in 1997 and 1998 respectively. Between 1966 to 2002 WUA membership quadrupled in the entire eight sector WUAs. Formal recognition by HVIP and attaining legal status at both local government and state levels was further facilitated by the collaborative programme for all the WUAs, by the year 2000 all the 8 WUAs were registered at all levels of registration (table I) . This enabled the WUAs to enter into formal agreements with both its own members and other stakeholders. As an example in1999/2000 dry season, the WUAs signed an agreement with HJRBDA to collect water fee from farmers

on their behalf and on turn, the WUA's would be paid 20% of the amounts they collected. Similarly, tractor lease agreement was signed between the WUA's and local governments of Auyo and Kaffin- Hausa during the same season to enabled them prepare irrigation fields on time.

b) Resource mobilization and utilization (tables)

As a strategy for self-sustenance and effective support to planned activities, the WUA's through the integrated empowerment programme, learned how to look inwards and mobilize their hitherto dormant human and material resources into useable state. Sources identified and exploited by WUAs include the following among others.

- Membership registration fee,
- Annual membership fee,
- Fines for violating WUA rules and regulations egg breaking channel embankments for irrigation or catching of stray animals in irrigated fields etc
- Special levies/donations from members for executing social or technical activities of the WUA
- Communal work by WAU members to assist collogues or to generate revenue for the WUA
- Commissions from services rendered by the WUA e.g. water charges collection for HIVP, sales of agro-inputs to farming communities, group marketing of farm produce etc.
- Sourcing of credit on behalf of members from commercial/development banks for financing farm activities. Table 2 summarizes WUA efforts in revenue generation for supporting planned activities. The table indicates that between 1997 –2003 over one and half million naira was collected from various sources and used to support both administrative functions such as attending meetings at HIVP office or technical activities such as mending of cracks on irrigation structures.

This led to the initiation of generating internal revenues from membership registration fees and annual dues to improve the financial viability. In all the 8 associations the least percentage of members that contributed to resource mobilization through these two sources was 40%. Two associations (Zumoni and Gamsarka) benefited from loan facility provided by financial institutions between 1998 and 1999 and won merit awards from Central Bank of Nigeria for repaying the laon within the repayment period (Programme annual reports of 1999 and 2000) .

This performance encouraged the French Embassy in Nigeria to provide a revolving credit loan scheme for all the 8 associations to the tune of 1.7million naira (14,166 .77₦). At the end of the first farming season all the associations repaid the first installment provided despite the flood disaster that biseiged them during the season (Ilu,et al 2001).

4. Lessons learned

The pilot case provided opportunity for the followings lessons:

- Evolution of the two actors from individual farmers and government controlled agency to organized groups and autonomous agency ;
- Evolution of the interests and needs of the two actors that must be satisfied for them to have the legal ground to carry on with the initial goal of PIM ;
- Without a clear policy direction it is extremely very difficult for the two actors to proceed despite any facilitation provided ;.
- There must be a simple, iterative and participatory process through which the concept is being promoted and adapted to the socio-cultural and technical behavoirs of both the actors and the environment in which the intervention is carried out ;
- The various actors need a clear indications and incentives to motivate them to effectively participate not only in the process but also in sustaining the gains recorded
- Above all very well motivated social organisers and technicians are a necessity for the sensitization and mobilization of the two actors towards the PIM concept.

5. Conclusion

The testing of the AFJM concept using a six-step participatory process was involving the users and the agency as equal partners led to the : a) institutionalized farmers' associations and re-organized irrigation agency ; b) sensitization and mobilization of the users and reoriented agency staff for effective participation ; and c) capacity building of both parties on how to proceed with the implementation and sustenance of the concept for improved irrigation management. These achievements necessitated the strenthening and empowerment of the users which is a basic necessity for them to achieve higher agricultural productivity and incomes. Higher cost recovery, financial self sufficiency and financial autonomy by the agency were the results that allow farmers' interests to be addressed. It also provided the opportunity for the evolution and strenghening of farmers' associations which serve as the platforms and as incentive for effective participation by the users.

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Table 1: Legal status of WUAs, membership strength, growth rate and level of participation of landowners in HVIP (1993-2002)

Sector	No. of land owners	Year of HVIP Reg.	Year LGA Reg.	Year State Govt. Reg.	Member-ship strength in 1st year of Reg.	Member-ship strength 2002	Annual member-ship growth rate	Level of participation in WUA activities by landowners in (%)	
								First year of Reg.	2002
Garmsarka	238	1993	1995	1996	62	178	13	26	75
Ayama	263	1994	1996	1998	48	144	11	18	56
Zumoni	505	1995	1997	1998	71	276	23	14	55
Adaha	550	1996	1997	1999	92	302	23	17	55
Yamidi	290	1996	1998	1999	70	175	12	24	60
G/Kuka	394	1996	1998	1999	81	224	16	20	57
Marina	980	1997	1999	2000	42	265	25	04	27
Anyo	594	1998	1999	2000	75	235	18	12	40
Totals	3814				541	1799			
Means	272				68	225	15	17	53
St. Dv.	269					55			

Table 2: internal revenue generations by WUAs to support its activities 1997-2002

Year	*No. of land owners*	*No. of Reg. Members*	*No. of Reg. fee collect (₦)*	*Annual dues collected*	*Fines donation etc collected*	Total (₦)
1997	3220	656	32,880.00	65,600.00	24,000.00	122,480.00
1998	3768	868	1,060.00	86,800.00	55,000.00	142,860.00
1999	3768	1019	755.00	101,900.00	88,000.00	190,655.00
2000	3768	1169	750.00	116,900.00	128,000.00	245,650.00
2001	3768	1955	3,990.00	195,500.00	166,000.00	365,450.00
2002	3768	2690	36,750.00	269,000.00	202,000.00	507,750.00
Total			**76,125.00**	**835,700.00**	**663,000.00**	**1,574,825.00**