Development Partnership in Practice: The Sawah Technology

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Abstract: This paper examines the process of technology development and dissemination with respect to sawah rice production. The term sawah refers to man-made environment for rice production that includes levelling and bunding of rice fields with inlet and outlet connecting irrigation and drainage. It has been hypothesized that sawah rice production technology holds the ace to the expected green revolution in West Africa as a yields of 5t/ha have been obtained. The process of sawah rice technology development and dissemination is exploring strategic synergy and partnership among Japanese institutions, research institutes, Ministry of agriculture, extension agencies, farmers groups, Millennium Village and Universities in Nigeria and Ghana which can be described as an emerging innovation system for rice production in West Africa. The partnership was empirically ascertained in terms of involvement, kind of involvement and intensity of involvement of the various stakeholders in the areas of joint problem identification (JPI), joint priority setting and planning (JPSP), collaborative professional activities (CPA), joint On- farm Adaptive Research (OFAR), dissemination of knowledge (DK), joint demonstration trials (JDTR), joint field days (JFD), joint seminar and workshop (JSW), evaluation survey (ES), and evaluation meeting (EM). A structure questionnaire was used to elicit information from a list activities identified among the stakeholders. Data collected were subjected to percentage distribution and one way analysis of variance to determine differences in the involvement of each of the actors. The results show varying degrees of involvement, types of involvement and different levels of intensity. While Japanese institutes are very prominent in funding and training, scientists and farmers are prominent in problem identification and joint demonstration trials. The implications of the results are discussed and pragmatic suggestions made for a proactive revamping of the process of technology development and dissemination for rice production in West Africa.

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1. Introduction

Over decades, rice has occupied a prominent position as a strategic crop for food security and economic development of nations of the world. FAO (2006) classified the crop as the most important food depended upon by over 50 percent of the world population for about 80% of their food need. Due to the growing importance of the crop and the increasing challenges of attainment of food security, it has been estimated that annual rice production needs to increase from 586 million metric tons in 2001 to meet the projected global demand of about 756 million metric tonnes by 2030 (Kueneman 2006). Recent global trend in the rice industry however shows that there is a growing import demand for the commodity in Africa, as evidenced from pressure on world supply and the steady increase in the world price of the commodity in the last five years (FAO, 2006). In the West Africa sub region, Nigeria has witnessed a well established growing demand for rice as propelled by rising per caput consumption and consequently the insufficient domestic production had to be complemented with enormous import both in quantity and value at various times (Erenstein et al., 2004; Daramola, 2005). The enormous importation has however been considered by various regimes as an avoidable drain on the country's foreign exchange earnings in view of the abundant natural endowments for expanded production in Nigeria.

In the past, the growth recorded in domestic rice production was due to area expansion. However, recent strategies through research system sought to increase production through increased productivity through intensification based on the development and dissemination of improved rice varieties and other modern inputs as a composite package to rice farmers. Oyekanmi et al., (2008) and Nwite et al., (2008) reported that from research stations (based on their on-station and on-farm trials showed that the adoption of the technologies and improved management practices lead to substantial yield increases in rice production. This invariably underscores the significant role that technology stands to play in attaining the much needed growth in the rice sub sector.

1.1 Development partnerships

'Partnerships' are of central importance to development practice in the 21st Century. The concept has become generally accepted as being fundamental for the success of poverty 'elimination'. It is used to refer to a wide range of different kinds of relationship, often with insufficiently rigorous assessment being applied either to its meaning or to its substance. Beneficial development practice should involve different groups of people and institutions is (Mercer et al, 2003; Slater and Bell, 2002). Two main ways in which the term 'partnership' is used in development practice are: the relationship between donors and recipient governments (usually global partnerships); and tri-sector initiatives combining the private sector with government and civil society (often partnerships at a national or regional scale). In addition, the term partnership is sometimes used to refer to activity focused projects that draw on the expertise of various stakeholders, invariably at a local or national scale. In some instances, all three usages coalesce, but failing satisfactorily to distinguish between the interests behind each of these approaches to partnership can lead to confusion and can also have damaging effects on the ability of poor people to enhance their lives (UNESCO, 2005).

1.2 Agricultural Technology System

Agricultural technology system (ATS) is defined by Kaimowitz et al (1991) as consisting of all the individuals, groups, organisations and institutions engaged in developing and delivering new or existing technology Ellis, (1992) described ATS as a national agricultural research system (NARS) - this includes many organisations, public and private, that are involved in generating various forms of agricultural technology. Swanson et al (1988) described the following indicators in analysing ATS.

Public policy: This guides the direction of agricultural development by establishing a course of action and goals at national level. Priorities are set; a resource allocated and rules are elaborated which create the environment for technological progress. Under this are the following indicators: - Government financial commitment to agriculture - Investment in research and extension - Availability and utilization of agricultural credit - Pricing policy - Farmers participation in technology system.

Technology development: The indicators under this section measure factors that affect the performance of the research subsystem, these are: - Access to external knowledge and technology - Human resources for agricultural research Resource allocation to research salaries and programme - Resource allocation to commodity focussed research

Technology transfer: This provides information on various resources and activities with knowledge transfer from researchers to farmers through extensionists. This considers the following: - Access to and availability of internal technology - Personnel administration and supervision - Time allotted to technology transfer - Resource allocation between extension salaries and programmes - Technology dissemination - Personnel resources for extension.

Technology utilization: This is concerned with the primary objectives towards which the entire technology system has been aimed. It focuses on: - Availability of technology - Access to technology - Technology adoption Kaimowitz and Merril-Sands (1989), explaining the institutional agricultural technology system posited that links between research and technology transfer have both functional and institutional meaning. Thus, the links between them may be discussed from two points of view, they may be seen as functional links, which relates to the institution and personnel were identified to be influencing research technology transfer namely:

Political factors: consider the historical legacy, current political and social structure and external pressure in terms of national policy, foreign donor and private sectors.

Technical factors: measure the farmer input and targeting; environmental diversity, communication channels and infrastructure, level of pre-existing knowledge about the environment, the dispersion and accessibility of the farming population.

Organisational factors: examine the interdependence between components and compatibility of management style, size consideration, different staff orientation and functional or market based organisations.

1.3 Agricultural Knowledge Information System (AKIS)

Rolings (1991) analyzed Agricultural Knowledge Information System (AKIS) and identified four basic processes in which all participants in an AKIS are engaged. These basic processes are:

Generation - This is often attributed only to research, yet public agricultural research is not more than 100 years old in most countries. Farmers have, however,

managed to develop their agriculture for thousands of years. Knowledge generation appears to be more effective when carried out in-groups than when attempted individually.

Transformation - This is perhaps the most crucial process-taking place in the AKIS. The essence of an AKIS is that knowledge generated in one part of the system is turned into information for use in another part of the system. The following transformations take place: i) From information on local farming systems to research problem; ii) From research findings to tentative solutions to problems technologies; From research problems to research findings; From technologies to prototype recommendations for testing in farmers field. v) From recommendation to observation of farmers' behaviour; From technical recommendation to information affecting service; behaviour; From adapted recommendations to information disseminating by extension; and viii) From extension information to farmer knowledge.

Integration - This is carried out by all participants in an AKIS. The review articles produced by scientific disciplines to pull together research results are obvious examples. Leaders of multi-disciplinary research teams are engaged in a continuous effort to integrate research results produced by different disciplines.

Storage and retrieval - These processes would seem to be typically the taste of specialized libraries but most researchers, extension workers and farmers store and retrieve information.

Rolings (1991), therefore stated that the analysis of AKIS must be examined against the back drop of: 1. Policy environment which formulates the laws, incentives that influence agricultural performance; Structural conditions, such as markets inputs the resource base, infrastructure and the structure of farming; Political and bureaucratic structure through which interest groups influence the system; and 4.

External sector comprising of the donor agencies, international agricultural research centers (IARCs) and/or commercial farms. The analysis could cover the comparison of major components, linkage mechanisms, management decisions, and actual and formal systems. Also identifying institutional and functional gap and investigating how actors see them as playing complementary roles.

1.4 Cycle of Partnership Formation

Various authors studying partnerships in development scenarios have made clear that partnership building occurs in several phases. Partnerships begin when a common interest arises and end when the proposed results are achieved or when the partners decide to terminate the partnership. Nevertheless, the process is iterative: some phases overlap, new problems and ways of operating the partnership arise, and processes that were already completed must be begun again (Hartwich et al 2007).

Phase 1: Identifying the Common Interest: The point of departure is usually a technical problem or a technological or market opportunity that can be resolved or addressed by research. The problem or opportunity may have already been identified by the public and private actors based on previous relationships or through a formal process of identifying a common interest. The common interest changes each time a new member enters the partnership or an old one departs. Therefore, it is often useful to develop a strategic vision that will allow the partnership to orient itself when it must adapt to changes in the socioeconomic context (Bovaird, 2004).

Phase 2: Negotiating the Partnership Contract

In this phase, the potential partners begin to develop the partnership's activities and discuss the expected costs versus the possible benefits. The goals of the partnership are reviewed, as are the interests and capacities of the potential partners. The main subjects of negotiation at this phase are: financing, distribution of benefits and intellectual property, structure or organizational design of the partnership and specific partnership activities (Crawford, 2003)

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Phase 3: Operation

In this phase, the proposed activities of the partnership are put into practice. Some strategies that can improve the operation of partnerships include: confidence building, transparency, understanding different cultures and strategic vision (Hartwich et al 2007).

Phase 4: Monitoring and Evaluation

The evaluation of a partnership can have different purposes, such as justifying the use of funds, understanding whether the expected results have been or are being generated and how efficiently they are being realized, and identifying the strengths and

weaknesses of the partnership in areas related to administration, management, leadership, and the synergetic effect produced (Bovaird, 2004).

Phase 5: Termination or Continuation
After evaluating the partnership and examining whether the expected results have been achieved, the partners must choose whether to continue or terminate the partnership (Hartwich et al 2007).

2. Materials and Methods

A qualitative approach was used in this study and the participant observation and in-depth interviews were conducted to collect data for the study. The study population involves the participating researchers and farmers in Nigeria and Ghana. A purposive sampling technique was used due to the fact that the number of participating scientist is limited and that of farmers has been increasing very season. The checklist for the interviews was based on the list of 21 activities that were developed from literature on partnership and linkages in agricultural technology development. The ranking of the partnership activities were collated and presented in table formats

3. Results

Table 1 presents the results of the ranking of the comparative analysis of partnership activities used among major stakeholders in sawah technology development process, while Table 2 presents the analysis of variance comparing involvement in partnership activities by major stakeholders in sawah technology development

Table 1: Partnership activities among major stakeholders in Sawah rice technology development

Partnership activities	Japanese Institutions and researchers	Scientists in Ghana and Nigeria Institutions	Farmers in Ghana and Nigeria
Joint problem identification	X X X	X X	X
Joint priority setting and planning	X X	X	X
Joint programming	X X X	X X	
Joint technology publication	X X X	X X X	
Collaborative professional activities	X X X	X X	X
Joint research contracts	X X X	X X	
Joint research activities	X X X	X X X	
Exchange of resources	X X X	X	X
Joint facilities	X	X X	X X
Joint financial resources	X X X	X	X
Staff rotation		X X X	X X
Dissemination of knowledge	X X X	X X X	X X X
Joint publication	X X X	X X X	
Joint reports	X X X	X X X	
Joint demonstration trials	X X X	X X X	X X X
Joint field days	X	X X X	X X X
Joint audio-visual materials	X	X X X	X
Joint seminar and workshop	X X X	X X	
Cross training	X X X	X X	X X
Evaluation survey	X X X	X X	X
Evaluation meeting	X X X	X X	X
Evaluation field visits	X X X	X X	
Evaluation reports	X X X	X X	

Table 2: Analysis of variance comparing involvement in partnership activities by major stakeholders in sawah technology development

Partnership activities	Sum of Squares	df	Mean Square	F*	p	Kruskal Wallis Test**	df	p
Between Groups	18.087	2	9.043	16.87	.000	22.846	2	0.00
Within Groups	35.391	66	.536					
Total	53.478	68						

*when scores were at interval level of measurement, **when scores were ranked

4. Discussion

Table 1 covers linkage activities between these three components. Japanese Institutions and researchers were very prominent in 18 out of the 21 listed activities. These are joint problem identification, joint programming, joint technology publication, collaborative professional activities, joint research contracts, joint research activities, exchange of resources, joint financial resources, dissemination of knowledge, joint publication, joint reports, joint demonstration trials, joint seminar and workshop, cross training, evaluation survey, evaluation meeting, evaluation field visits and evaluation reports. This may be because of the high involvement of the Japanese Institutions and researchers in all the stages of the technology development process. It is also noteworthy that the funds for the technology development process were granted by Japanese Institutions and researchers.

Scientists in Ghana and Nigeria Institutions were only prominent in 9 out of the 21 listed activities. These activities are joint technology publication, joint research activities, staff rotation, and dissemination of knowledge, joint publication, joint reports, joint demonstration trials, joint field days and joint audio-visual materials. The institutional mandate of the participating research scientists from in Ghana and Nigeria may be responsible for this trend of involvement in the partnership development activities. The high participation of Scientists in Ghana and Nigeria Institutions in partnership activities implies that when development is the focus and mandate related, resources are likely to be utilized effectively in carrying out these functions.

Farmers in Ghana and Nigeria were only prominent in 3 out of the 21 development activities. These are dissemination of knowledge, joint demonstration trials and joint field days. The acquisition of knowledge associated with these activities could be responsible for their prominence. Their non-involvement in the other activities underscores the lack of complete or partial linkage existing between researchers, extension agents and farmers. While it is a known fact that majority of farmers are illiterate, It has been established that they are sources of vital information (local) that will enhance the development, acceptability and utilization of technologies.

In Table 2, the result showed that there is a significant difference in the involvement of Japanese Institutions and researchers, Scientists in Ghana and Nigeria Institutions and Farmers in Ghana and Nigeria in the partnership activities in the sawah technology development process ($F = 16.87$, $p < 0.05$). The pattern of involvement as revealed by the mean involvement score shows that Japanese Institutions and researchers were more involved than Scientists in Ghana and Nigeria Institutions which also participated more in the partnership activities in the sawah technology development process than Farmers in Ghana and Nigeria. However the degree of involvement has enhanced the successful development and dissemination of sawah technology and there is need for the sustainability of the partnership activities.

The paper has shown clearly that partnership activities were critical in the development and dissemination of the sawah technology in West Africa. It has also highlighted the varying degrees of involvement in partnership activities by the three major stakeholders in the technology development process. The varying degree of involvement in the partnership activities enhanced the successful development and dissemination of sawah technology and there is need for the sustainability of the partnership activities.

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