Gender Differences in Small-Scale Rice Farmers' Access to Technological Inputs in Enugu State, Nigeria

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Chapter One

Background and Problems of the Study

The importance of rice as a major staple food in Nigeria has been observed (Osifo and Anthonco, 1970; Nweke 1980.a). Apart from maize, rice ranks second in energy content out of the four most common staple foods in Nigeria, with the energy potential of 334-390 calories per 100g (Olagoke, 1990). Hence the high rate of average per capita annual rice consumption in Nigeria, which according to Nweke (1990.b) has been increasing by about 17 percent since 1970. Yet local production is evidently low relative to demand. The low production of rice forced the Federal Government to embark on massive importation of rice. This exercise was short-lived as it was later banned because it resulted in massive depletion of the country's foreign exchange reserves. A blueprint for promotion of local production of certain food crops, including rice, was then formulated by the government in form of the Agriculture National Policy (FMA, 1989) in which the attainment of self-sufficiency in the production of certain foods was considered one of the primary objectives of the nation's agricultural programme. In policy specifications, it was noted that because of the supply-demand gap and the relative difficulty in accelerating local production of rice, attainment of self-sufficiency in rice would largely depend on the quality and quantity of agricultural technological inputs accessible to the small-scale farmers. In accordance with the policy, every state's ADP was given the responsibility of procuring and disseminating agro-technological inputs to the farmers in the respective state.

In Enugu State, procurement and distribution of fertilizers was, however, removed from the ADP to a few government-appointed individuals or politicians and later to members of Better Life for Rural Women Programme/Family Support Programme, a government-initiated women's co-operative, headed by the wives of the chief executive in each state in Nigeria through the ministry of agriculture. Perhaps the policy of disseminating agro-technological inputs in a number of states in Nigeria may have been informed by the need to enhance food production by ensuring gender equity in access to the inputs in view of the observation that policies in agro-input distribution in Third World countries discriminate against women farmers who take the lead in food farming activities (Saito and Spurling, 1989).

However, since the adoption of a national agro-policy and the subsequent changes in

dissemination of technological farming, there is no report of their effect on rice output in the state on the basis of which the achievement of the policy objectives on the rice production could be assessed apart from recent reports by Nwafor (1993) and APMEU (1995) which appears contradictory. Nwafor (1993) reports that in Enugu State, male rice farmers have smaller rice farms ranging from 1 to 1.90 hectares and that their female counterparts have parcels ranging from 2 to 2.90 hectares. APMEU (1995) reports that the output per hectare in the state in 1994 was 2.19 tonnes. Out of this, male farmers produce 1.15 tonnes of rice per hectare, which is higher than the 1.04 tonnes produced by their female counterparts. These findings indicate gender differences in rice farm size in favour of the female farmers and output per hectare of rice farm in favour of the male farmers. Although this gender difference in rice output is not directly attributable to such resources as farm practice system, land, time or technological inputs, the recognition (FMA, 1989; Olayide and Eweka, 1993), of the crucial role of the inputs in enhancing the effectiveness of other resources suggests that gender differences in access to technological farming inputs are responsible for the differences in rice output in the state. Is it possible therefore that the low output of rice in Enugu State could be attributed to gender differences in access to, and use of, technological inputs in favour of male rice farmers who are less involved in rice farm activities. On the basis of the foregoing, it is unlikely that any programme designed to enhance rice production in the state, and indeed any part of Nigeria, will be successful without providing valid answers to such questions as: What is the extent of difference in access to technological farming inputs by male and by female farmers? What factors account for the differences? What are the implications of the gender differences in access to technological farming inputs on rice output? Can policy guidelines be suggested that will enhance gender equity in access to the inputs?

These, among other questions, are addressed in this study.

Chapter Two

Literature Review

The literature examines factors of rice production, policy on technological inputs procurement and dissemination, and farmers' access to rice farming technological inputs.

Factors in Rice Production

Rice production factors have broadly been classified into five categories: Production of horticultural systems, seed variety, land, labour, and water.

According to the West Africa Rice Development Association (WARDA) there are five types of rice production systems. The upland or rain-fed, mangrove swamp, deep water floating, fallowed or swamp rice without water control, and irrigated rice production.

The upland or rain-fed production system is largest in Nigeria. It is practised in well-drained land that is not subject to floating and where rain is the only source of water for rice farming. According to EDA (1978), this system accounts for approximately 55 percent of the total area under rice cultivation and for 43 percent of Nigeria's total rice output. It is practised mostly in southern Nigeria.

The mangrove swamp rice production system is practised in mangrove swamps along the southern coastline where ocean tidal action cause inundation at high tide and drainage at low tide. This system is practised along the deltas of rivers Niger and Benue and accounts for about 1.5 percent of total area under rice cultivation in Nigeria (FDA 1981).

The deep water floating rice system has no water control and is widely practised in the Fadamas, where water is about 1.5m (Oni and Ikpi, 1981). Fadamas rice or inland swamps rice is the second most important rice production system in Nigeria. In 1995, the system accounted for about 30.5 percent of total area under rice cultivation in the country (FDA, 1978). It is practised along such flooded river valleys as Niger, Kaduna, Benue, Anambra, Imo, Abakaliki and Uzo-Uwani. In these basins the banks of the Fadamas are usually flooded during rainy seasons, a situation that lasts four to six months. In irrigation rice production, water is almost entirely supplied artificially from dams, rivers and streams through pipes, ditches or other methods. Oni and Ikpi (1981) Adeleke and Mabowonke (1985) and Nwulia (1985) have

reported 11 dam-based irrigation locations of the federal government-sponsored River Basin Authorities, including the Anambra-Enugu-Imo River Basin Authority, where this system accounts for eight percent of the total area under rice cultivation in Nigeria (Oni and Ikpi, 1981). IRRI (1979) reports that yields of rice per hectare under this systems are higher than those under the rainfed systems. The upland or rainfed and irrigation systems will be the focus of this study.

The second important factor in rice production is the variety of rice seed produced technologically. The yields of different rice varieties have been-shown to depend on the cultivation systems prevalent in given locations. Thus, the IR14/16 and Mass 2401 varieties thrive better under upland or rainfed production system (FDA, 1978). FARO-6 and FARO-7 do better under deep water floating systems, while B79, IR 14/16 and Mass 2401 perform better under Fadama or inland swamp system. IR 20, IR 14/16, FARO-15, FARO-16, FARO-22 and ITA 222 are best suited to the irrigation system (Oni and Ikpi, 1981, IRRI, 1979).

Land is the third factor in rice production. Land is a field resource whose area can be expanded only at high cost through drainage of swamps or reclamation from water (Olayide and Heady, 1982). The influence of land on output has not given constant results. It has been shown that sometimes there are greater yields from smaller farms than from larger farms (Anil, 1981). It also has been reported that greater production efficiency is associated more with larger farms that with smaller farms (Khan and Maki, 1979). Ahmed (1980), however, observes that what is more important in determining output per unit of land is its fertility. Access to fertile land, which can be enhanced by the application of technological inputs increased output. Technological inputs refers to skills, processes, procedures and methods, equipment and machines applied by man to reduce risks and maximize output (World Bank, 1991, Ayichi, 1995).

Labour is the fourth factor in rice production. It could be a major limitation to output (Olayide and Heady, 1982). Oni and Ikpi (1981) found that labour used in rice production varies from 188-man days in the improved upland system to 143-man days in irrigated farms. Unevenhr and Stanford (1985), however, report that the excessively high manual labour input in various stages of rice production could be reduced to less that 50 percent through application of relevant technological inputs.

The fifth factor in rice production is water accessibility. Water for rice production is usually obtained from such natural sources as rain and periodic floods in the low plains. In some areas in Nigeria, rainfall uncertainty is the main handicap to increased rice production. In some of these areas supplementary irrigation water obtained through dams and pipes is often necessary to raise productivity (Olayide and Heady, 1982). IRRA (1977) has also shown that water control through various technologies is a prerequisite to ensuring all-year round cultivation and enhanced yield of the crop. From the foregoing, it is evident that technological inputs play a crucial role in enhancing production. This implies that a nation's level of agricultural output will depend to a large extent on the flexibility of the country's agro-policy in ensuring farmers' access to the relevant technological inputs.

Chapter Three

Policy on Technological Inputs Procurement and Dissemination

Different countries have policies for their technological-based agricultural programmes. Such policies, however, differ depending on local peculiarities. It has been observed that in Third World countries policies on agro-technological inputs procurement and distribution favour male farmers (Saito and Spurling, 1992). In Nigeria the acute problem of inadequate technological inputs which characterised early agricultural activities led the government to formulate the National Policy on Agriculture (FMA 1989) which shows, among other things, that:

(i) The Nigerian agricultural system suffers a gross inadequacy of growth-promoting technological farming inputs.

(ii) There is need for a timetable for attainment of self-sufficiency in various food crops, including rice, and that this need should be vigorously pursued by ensuring that farmers have easy access to relevant technological inputs.

(iii) These technological inputs should disseminate to the small-scale farmers who constitute 90 percent of food producers, producing an equivalent percentage of food crops in Nigeria.

(iv) Effective strategies need to be worked out for procuring and subsidizing farmers with such resources as land, capital and technological inputs.

However, because of the inconsistences in policy formulation and implementation in Nigeria, agro-policy modification and reversals end up frustrating the farmers (Idachaba, 1984).

Farmers' Access to Technological Inputs

Saito and Spurling (1992) observe that despite advances in agricultural technological inputs, as much as a fifth of mankind - mostly in developing countries - still goes hungry as a result of low output of food crops. In Nigeria's Enugu State, one of the most active rice growing states with a population of 3,161,205 (FGN, 1992), the output of rice per hectare goes down

to as low as 2.29 tonnes per hectare (APMEU, 1995). This situation has been attributed to factors beyond the control of farmers. Gender barriers (Poats amd Feldsten 1989) or gender bias (Feldsten, Poats and Cloud, 1989) or gender issues (Ojeniyi, 1994) have been suggested as typical factors. Others suggest that the low agricultural output is caused by discrimination in access to agro-technologies against women farmers (Due and Gladwin, 1991, Gladwin, 1991, Saito and Spurling, 1992).

Some studies examine the extent of farmers' access to agro-technological inputs, (Ogbonna, 1989; Ogagua, 1989; Olarewaju, 1991; Njoku, 1992, 1992; Ezeh and Okoli, 1995). Ogbonna reports that farmers generally lack access to adequate technological inputs for agricultural production. Olarewaju, (1991) also shows that although farmers are willing to use technological farming inputs, they lack access to them. About 66.67 percent of the farmers in parts of Enugu State, Nigeria, have also been reported to lack access to crop extention services through which they would have access to technological information (Ogugua, 1984). In a more recent study, Ezeh and Okoli (1995) examine the extent of women farmers' access to agro-technologies. The study shows, among other things, that out of the 40th technological inputs examined the weeding knife was "very accessible", cutlass, long and short hoes were "moderately accessible" while the remaining 36 inputs including harvesting, extraction and processing inputs were "rarely accessible". It is further shown that the extent of women farmers' access to these inputs is independent of the farmers' geographical locations. While studies show that farmers generally lack access to technological inputs, the study by Njoku (1992) shows that farmers have access to technological inputs. From the findings, 100 percent of the farmers examined have access to fertilizer, 40 percent to herbicides, 88 percent to insecticides, 90 percent to yam minisett dust and 53 percent to fungicides. Low adoption rate of those inputs is identified as being responsible for their inaccessibility.

These studies focused only on farmers' access to technological inputs. While some of the studies reveal farmers' access to technological inputs, others indicate the contrary. Of these studies only Ezeh and Okoli (1995) and Ngwu (1989), respectively, identify the farmer's location and low adoption rate as factors of access to technological inputs. In none of the studies are gender differences in farmers' access to technological inputs or the factors influencing such differences examined.

From the literature therefore, it is evident that serious gaps exist with respect to rice farmers' gender differences and there are implications for such differences for rice output. The need to fill the gaps underscores the relevance of this study.

Chapter Four

Conceptual Framework

The term "technology" has been differently conceived. In its simple form, technology has been seen as the application of scientific knowledge to practical tasks of life. Some definitions of this general concept of technology are by Sterwart (1977) who views it as skills, knowledge, procedures or methods used to carry out man's activities. Banjo (1988) sees technology as the application of scientific knowledge, including the skill necessary to deploy principles and processes that can be used to modify, manipulate or otherwise produce change in specific features of the physical world to serve a human or social purpose. Caprioles (1979) sees technology as human or scientific knowledge applied in production.

From the general concepts of technology emerges more specific concepts reflecting specific disciplines. Thus technology has been conceived by agriculturists as that which includes machines, equipment and implements; processes, steps and techniques applied in agricultural production, storage, processing, marketing and management (Ayichi, 1995). Similarly, the World Bank (1991) defines technology as any practice, which tends to reduce farmers' risk in order to raise output and income of crop.

From the definitions, the following clarifications about the concept of technology emerge:

(i) Technology, whether in a general or restrictive sense, includes techniques that reduce farmers' risks in order to raise output.

(ii) Equipment, machines, implements, methods, procedures or techniques put into a system to reduce manual labour inputs and to maximize output are technological inputs.

(iii) Technological innovations are technological inputs that are newly introduced.

The focus of this study, however, is on the concept of technological inputs, which reflects those of Ayichi (1995) and the World Bank (1991). These technological inputs are conceptualised as those that include skills, processes, procedures and methods, equipment and machines applied by man to reduce risk and enhance output. The following specific inputs are relevant to rice growing conditions (Ngwu, 1988), and are also contained in Carr's (1988) list of rice technological inputs and are examined in this study.

- Improved rice seed
- Agro-chemicals
- Irrigation facilities
- Fertilizers
- Improved techniques
- Farm mechanisation

These rice farming technological inputs have been shown by Carr (1988) to interact with other resources in rice production to promote output. Because of gender differences in the extent of involvement in rice farming activities in favour of female farmers (Nwafor, 1993), it is conceived that rice output would increase if other factors influencing farmers' access to relevant rice farming technological inputs differentially enhanced female farmers' access to the inputs. If, however, these factors discriminate in favour of the male farmers who are less involved in rice farming, the implication is that rice output would decline. Either of the two possibilities would have implications on a change or revision of policy on inputs dissemination.

Chapter Five

Research Problem and Methodology

Research Objectives

The general objective of the research is to ascertain the extent of gender differences in small-scale rice farmers' access to agro-technological inputs, namely, improved rice seed, fertilizer, agro-chemicals, improved techniques, irrigation facilities and mechanized farming and its implications for rice output in Enugu State. Specifically, an attempt is made to:

- Ascertain the extent of gender differences in access to these technological inputs.
- Identify factors influencing differences in access to rice farmers' access to technological inputs.
- Examine and analyze the implications of the differences in access to rice output.
- Examine and analyze the implications of the interaction of other relevant resources with access to technological inputs by male and female farmers on rice output.
- Suggest policy guidelines for ensuring gender equity in farmers' access to rice technology inputs.

Research Hypotheses

The following hypotheses guided the study:

i) Both male and female rice farmers have equal access to rice technological inputs.
ii) A rice farmer's personal background, including age, level of education and economic status, influences gender differences in rice farmers' differences in access to technological inputs.
iii) Farm size and a farmer's access to manual labour equally influence gender differences in rice farmers' access to rice technological inputs.
iv) Policy on technological inputs distribution through farmers' co-operatives influences gender differences in farmers' access to rice farming technological inputs.

v) The policy of predominantly focusing technological input dissemination to small-scale rice farmers influences the farmers' gender differences in access to technological inputs.

vi) Male and female rice farmers' differences in access to rice farming technological inputs and interaction with their access to such resources in rice production as land, time available to the farmer, and farm practice system do not influence rice outputs.

Research Methodology

The following approaches were adopted in carrying out this study. Firstly, an early workshop was organized in which the researcher, regular extensions agents who served as research assistants and rice farmers participated. The rationale for holding the workshop was to acquaint the farmers and research assistants with the purpose and organisation of the survey and to provide a forum for them to make contributions to a workable sampling frame and find solutions to factors that could affect the survey. Contributions made during the workshop guided the development of questionnaire and interview schedule for the study. Murphy, Casely and Curry (1991) recommend an early workshop of this kind because it makes farmers part of the initial planning and organization of the survey in which they will be the subject. This enhances their understanding of, and support for, the survey and thus eases collection of data.

Secondly, there were two separate Focus Group Discussions (FGD) which involved the researcher, the assistants and (i) male rice farmers (ii) female rice farmers only. The rationale for the use of FGD was to provide closer forum for critical and analytical discussions between the researcher and the subjects of a study on the relevant issues through which more objective qualitative data would be obtained. Two separate FGDs for male and female farmers separately were used so as to prevent collection of biased data by either of the sexes as a result of the co-participation of the opposite sex in one FGD. Qualitative data obtained during the FGD included:

- Factors which influence their access to the inputs.
- Farmers' suggestions on how to ensure gender equity in access to the technological inputs in line with the male or female farmers' level involvement in rice production.

Thirdly, there was interview/administration of questionnaire to the rice farmers during which quantitative data were measured on the following:

Access to Technological Inputs

This was measured using a validated interview/questionnaire in which the relevant rice technological inputs were listed. Against each of the inputs, farmers indicated on a four-point likely-type response scale of Excessively Accessible (EA), Sufficiently Accessible (SA), Rarely Accessible (RA) and Not Accessible (NA), the extent to which each of the inputs is accessible to them on the basis of which the mean accessibility rating of each of the inputs was determined as follows:

0.00 — 1.49 = Not accessible (NA)
1.50 — 2.49 = Rarely accessible (RA)
2.50 — 3.49 = Sufficiently accessible (SA)
3.50 — 4.00 = Excessively accessible (EA)

Other Factor Resources Accessible to the Farmers

Extent of land and time accessibility were obtained using an interview schedule in which the farmers' responses indicated extent of measure of each of the variables accessible to them. Type of production system practised was measured by the farmers' choice of the practice system from a list of production systems contained in the interview schedule.

Personal Background Characteristics of the Farmers

These include age which was measured by the farmers chronological age, level of education measured by the number of years spent in formal schooling, and economic status determined by the farmer's annual income.

Farm-Related Factors

These include farm size which measured in hectares, and access to manual labour which was measured by the number of adult household members that assist on the rice farms.

Rice Output

The method used in measuring a farmer's rice output was the crop-cut method. This method involves randomly demarcating a 100 square metre triangular sub-plot as a sample for a measured rice farm; harvesting from the sub-plot of the basis of which the output from the entire measured farm is computed.

A mid-term workshop was organized during the data collection stage involving the researcher, the assistants and the rice farmers. This workshop was aimed at reviewing and validating preliminary results, identifying possible obstacles encountered in the survey and finding solutions to the problems encountered jointly.

Data collection during which less problems and obstacles were encountered continued after the mid-term workshop.

Area of Study

The study was conducted in the old Enugu State comprising Enugu and Ebonyi States. Old Enugu State is rich in agricultural resources. It has a population of 3,161,205 inhabiting 12,727.1 square kilometres (FGD, 1992). Most of the inhabitants are small-scale farmers. The old state is in the tropical forest region which transcends the tropical rain forest to the savannah. The climate is fairly stable with a mean temperature of about 37°C during the hot February and April. Rain is almost entirely seasonal, most of it falling between May and October each year. The annual rainfall ranges between 152 and 203 cm (Enugu State). These agro-climatic conditions fall within the ranges specified by Delta (1975) as being suitable for rice production. The major food crops of the state are rice, cassava, yam and vegetables. Old Enugu State is divided into three agricultural zones, Abakaliki, Enugu and Nsukka.

Population Sample and Sampling Technique

The population of the study consisted all the small-scale farmers in the old Enugu State who, according to ENADEP (1991), number about 88,457 (41,566 males and 46,891 females) distributed in the three major agricultural zones in the state as follows: Abakaliki 44,711, (21,196 males and 23,515 females; Enugu 18,658 (8,328 males and 10,330 females); Nsukka 25,088 (12,042 males and 13,046 females).

From the list of accessible active rice farmers complied during the preliminary survey, random sampling technique involving balloting was used in drawing 309 rice farmers (186 females, 122 males) for the study. The distribution of the farmers by agricultural zone and gender is as shown below:

Agricultural Zone	Female	Male	Total
Abakaliki	93	78	171
Enugu	32	20	52
Nsukka	62	24	86
Total	187	122	309

Method of Data Analysis

Frequency counts and percentages were used in analysing qualitative data for the study. Specifically, the number of respondents to the response options were counted and the percentage computed. Mean accessibility rating (MAR) derived from the likely-type response scales provided the scores on which the t-test statistic was used to analyze the quantitative data.

Chapter Six

Gender Differences in Access to Technological Inputs: The Results

Gender differences in access to some of the technological inputs were observed. *Table 1* shows that such technological farming inputs as improved rice seed, fertilizer, and mechanized farming are rarely accessible to both male and female rice farmers as their mean accessibility rating (MAR) for both gender groups range form 1.50 to 2.49. Even though these three categories of technological inputs are rarely accessible to both male and female rice farmers, there is significant difference in access to fertilizer and mechanized farming in favour of the male rice farmers with MAR of 2.11 and 2.41, respectively, compared to the respective MAR 1.72 and 1.93 for their female counterparts. Agro-chemicals, improved techniques and irrigation facilities are rarely accessible to the male rice farmers but not accessible to the female rice farmers. The difference in access to improved techniques between male and female rice farmers is, however, not significant.

Thus, of all the six rice technological inputs, there is significant difference in access to fertilizers, agro-chemicals, irrigation facilities and mechanized farming between male and female farmers in favour of the male farmers.

Personal Background as Factors Influencing Gender Differences in Rice Farmers' Access to Technological Inputs

Age of the Farmer

The farmer's age influences gender differences in access to rice farming technological inputs (*Table 2*). Among young rice farmers, the rice technological inputs are either rarely accessible (MAR: 1.50-1.80) or not accessible (MAR: 1.04-1.41) to both male and female farmers. Improved rice seeds are, however, rarely accessible to the female farmers (MAR:1.63) but not accessible to the male (MAR: 1.43) among young-aged farmers. Agro-chemicals improved techniques and irrigation facilities are rarely accessible to the male among the middle-aged farmers (MAR: 1.63-1.76), but not accessible to the female farmers (MAR: 1.34-1.35 in the

Table 1: T-test of Farmers Mean Accessibility Rating (MAR) of Rice Farming Technological Inputs (by Gender)

Technological Inputs	Gender	No. of Farmers	MAR	Standard Deviation	Degree of Freedom	t-values Observed	Critical P<0.05	Inference
Improved rice seed	Female Male	187 122	1.68* 1.95*	1.88 1.51	307	1.39	1.65	NS
Fertilizers	Female Male	187 122	1.72* 2.11*	0.66 0.62	307	5.25	1.65	S
Agro-chemicals	Female Male	187 122	1.40* 1.67*	0.68 0.71	307	3.32	1.65	S
Improved techniques	Female Male	187 122	1.41* 1.30*	1.66 1.11	307	1.33	1.65	NS
Irrigation Facilities	Female Male	187 122	1.47* 1.62*	0.66 0.60	307	2.06	1.65	S
Farm Mechanization	Female Male	187 122	1.93* 2.41*	0.99 1.96	307	2.77	1.65	S

Note: (1) 0.00 - 1.49 = Not accessible
1.50 - 2.49 = Rarely accessible*
2.50 - 3.49 = Sufficiently accessible
3.50 - 4.00 = Excessively accessible

(2) NS=Not Significant
S = Significant

Table 2: Farmers' Mean Accessibility Rating (MAR) of Rice Technological Inputs (by Age and Gender)

	Rice Technological Inputs											
	Improved Rice seed		Fertilizer		Agro-chemicals		Improved techn.		Irrigation facilities		Farm mech.	
	F	M	F	M	F	M	F	M	F	M	F	M
Young	1.63*	1.43*	1.77*	1.80*	1.29*	1.04	1.38	1.36	1.41	1.30	1.68*	1.59*
Mid-aged	1.60*	2.00*	1.66*	2.16*	1.35*	1.76*	1.35	1.63*	1.34	1.66*	2.51**	1.51*
Old	1.84*	1.92*	1.77*	1.91*	1.52*	1.42*	1.52*	1.55*	1.67*	1.55*	2.47*	1.87*

MAR: 0.00-1.49 = Not accessible
1.50-2.49 = Rarely accessible*
2.50-3.44 = Sufficiently accessible**
3.50-4.00 = Excessively accessible***

Age: 1-30 years = Young
31 -45 = Middle-aged
Above 45 years= Old

Gender: F = Female
M = Male

same group. Mechanized farming is, however, sufficiently accessible to the female farmers in the middle-aged group (MAR: 2.57) and, rarely accessible to their male counterparts (MAR: 1.51). With respect to the older farmers, all the rice technological inputs are accessible to both male and female farmers (MAR: 1.52-2.47), except agro-chemicals to which males have rare access viewed against the females who have no access MAR: 1.42 to the inputs.

Thus, male and female rice farmers' differences in access to improved rice seed, agro-chemicals, improved techniques, irrigation facilities and mechanized farming are influenced by age. Gender differences in access to fertilizer is, however, not influenced by the farmers's chronological age.

Farmer's Level of Formal Education

Table 3 shows that while improved rice seed, fertilizer, agro-chemicals and irrigation facilities are rarely accessible to both male and female farmers with no formal education (MAR: 1.55-2.37) improved techniques and mechanized farming are differentially accessible to male and female farmers in this group. Improved techniques are rarely accessible to the male (MAR: 1.79) but not accessible to the female (MAR: 1.40). Mechanized farming is, however, sufficiently accessible to the males (MAR: 2.71) but rarely accessible to the females (MAR: 2.43) in the no-formal education group. Among the farmers who attained up to primary education level, gender difference in access to agro-chemical and irrigation facilities in favour of the males (MAR: 1.59 and 1.58) is observed. All the other technological inputs are either rarely accessible (MAR: 1.54-2.48) or not accessible (MAR: 1.46) to both male and female farmers. Irrigation facilities and mechanized farming are rarely accessible to the females with secondary education (MAR: 1.50 and 1.57) and not accessible to the males in the same group (MAR:1.27 and 1.40). Male farmers who attained tertiary education are differentially favoured in access to improved rice seed, improved techniques, and irrigation facilities (MAR: 1.66-2.17) while their female counterparts have no access to the technological inputs (MAR: 1.24-1.43).

Table 3: Farmers' Mean Accessibility Rating (MAR) of Rice Technological Inputs (by Level of Education and Gender)

	Rice Technological Inputs											
	Improved Rice seed		Fertilizer		Agro-chemicals		Improved techn.		Irrigation facilities		Farm mech.	
	F	M	F	M	F	M	F	M	F	F	F	M
No formal education	1.86*	2.17*	2.03*	2.37*	1.55*	1.85*	1.40	1.79*	1.74*	1.66*	2.45*	2.71
Primary	1.79*	1.80*	1.76*	1.97*	1.36*	1.59*	1.46	1.46	1.43	1.58*	2.09*	2.48*
Secondary	1.46	1.38	1.60*	1.77*	1.39	1.00	1.41	1.41	1.50*	1.27	1.57*	1.40
Tertiary	1.24	2.17*	1.81*	2.37*	1.53*	1.85	1.29	1.29	1.43	1.66*	1.64*	1.71**

MAR: 0.00-1.49 = Not accessible
1.50-2.49 = Rarely accessible*
2.50-3.44 = Sufficiently accessible**
3.50-4.00 = Excessively accessible***

Consequently, gender differences in rice farmers' access to the technological inputs: improved rice seed, agro-chemicals, improved techniques, irrigation facilities and mechanized farming are influenced by farmers' level of formal education. Gender differences in farmers' access to fertilizer due to their level of education is, however, not observed.

Farmers' Economic Status

Farmers economic status influences gender disparity in their access to rice technological inputs (*Table 4*). There is no gender difference in access to any of the technological inputs among the very rich farmers. Improved rich seed, fertilizer, irrigation facilities and mechanized farming are rarely accessible to both male and female farmers in the group (MAR: 1.54-2.13) and agro-chemicals and improved techniques are not accessible to both male and female farmers in the same group (MAR 1.32-1.49). Among the moderately rich farmers (MAR: 1.76-2.40), agro-chemicals, improved techniques and irrigation facilities are rarely accessible to female farmers (MAR:1.65-1.84) compared to their male counterparts to whom the inputs are not accessible (MAR: 1.32-1.36). Mechanized farming is, however, sufficiently accessible to the moderately rich female farmers (MAR: 2.81) but rarely accessible to the males in the same group (MAR: 1.90). Improved rice seed, fertilizer and mechanized farming are rarely accessible to both moderately poor female and male farmers (MAR: 1.50-2.06) while agro-chemicals and improved techniques are not accessible to both gender groups within that same economic level (MAR: 1.11-1.43). Irrigation facilities are, however, rarely accessible to the males in the same economic level (MAR:1-41). Agro-chemicals, improved techniques and irrigation facilities are not accessible to very poor female and male rice farmers (MAR: 1.00-1.40) while improved rice seed, fertilizers and mechanized farming are rarely accessible to very poor female farmers (MAR: 1.55 - 2.00) and not accessible to the very poor male farmers (MAR: 1.21 - 1.49).

Table 4: Farmers' Mean Accessibility Rating (MAR) of Rice Technological Inputs (by Level of Economic Status and Gender)

	Rice Technological Inputs											
	Improved Rice seed		**Fertilizer**		**Agro-chemicals**		**Improved techn.**		**Irrigation facilities**		**Farm mech.**	
	F	M	F	M	F	M	F	M	F	F	F	M
Very rich	1.73*	1.69*	1.68*	1.70*	1.45*	1.49	1.48	1.32	1.54*	1.56*	2.01*	2.13*
Moderately rich	1.76*	2.18*	2.03*	2.40*	1.84*	1.32	1.77*	1.35	1.65*	1.36	2.81**	1.90*
Moderately poor	1.62*	1.50*	2.06*	1.58	1.11	1.21	1.32	1.43	1.63*	1.41	1.91*	1.67*
Very Poor	1.85*	1.31*	2.00*	1.29*	1.25	1.00	1.11	1.40	1.20	1.20	1.55*	1.49

MAR: 0.00-1.49 = Not accessible
1.50-2.49 = Rarely accessible*
2.50-3.44 = Sufficiently accessible**
3.50-4.00 = Excessively accessible***

In all gender, differences in access to all the six rice farming technology inputs under study are influenced by the farmer's economic status.

Farm-related Factors Influencing Gender Differences in Access to Rice Farming Technological Inputs

Farm Size

Farm size influences the farmer's access to rice farming technological inputs (*Table 5*). While mechanized farming is rarely accessible to both male and female farmers with large farms (MAR: 2.04 and 1.64), fertilizers, agro-chemicals and improved techniques are not accessible to female and male farmers with large farms (MAR: 1.15-1.47). On the other hand, improved rice is rarely accessible to the female farmer (MAR: 1.50) and not accessible to their male counterparts (MAR: 1.38). Irrigation facilities are rarely accessible to the males in this group (MAR: 1.60) but not accessible to the females (MAR: 1.39). Among farmers with average size farms, improved rice seed and mechanized farming are rarely accessible (MAR: 1.50-1.82) and improved techniques are not accessible (MAR: 1.17 and 1.43) to both female and male farmers. Gender differences, however, are observed in their access to fertilizers and to irrigation facilities in favour of the female (MAR:1.80) and male (MAR: 1.50), respectively. Both male and female rice farmers with small farms have rare access to improved rice seed and to fertilizer (MAR:1.55-2.24). Their access to agro-chemicals, improved techniques, irrigation facilities and mechanized farming, however, vary by gender. Agro-chemicals, improved techniques and irrigation facilities are rarely accessible to male farmers with small farms (MAR: 1.24-1.39); mechanized farming is rarely accessible to the females (MAR: 1.65) and not accessible to their male counterparts (MAR: 1.49).

Table 5: Farmers' Mean Accessibility Rating (MAR) of Rice Technological Inputs (by Farm Size and Gender)

	Rice Technological Inputs											
	Improved Rice seed		Fertilizer		Agro-chemicals		Improved techn.		Irrigation facilities		Farm mech.	
	F	M	F	M	F	M	F	M	F	M	F	M
Large	1.50*	1.39	1.47	1.11	1.33	1.30	1.28	1.23	1.38	1.60*	2.04*	1.64*
Average	1.68*	1.50*	1.80*	1.46	1.52*	1.29	1.43	1.17	1.49	1.50*	1.82*	1.55*
Small	1.58*	1.88*	1.55*	2.24*	1.29	1.63*	1.39	1.59*	1.32	1.59*	1.65*	1.49

MAR: 0.00-1.49 = Not accessible
1.50-2.49 = Rarely accessible*
2.50-3.44 = Sufficiently accessible**
3.50-4.00 = Excessively accessible***

From the foregoing, it is clear that farm size influences gender differences in access to all the six technological inputs under study.

Access to Manual Labour

Table 6 shows that there is no gender difference in access to improved rice seed, fertilizers, improved techniques and mechanized farming among farmers who have access to very many labourers. Improved rice seed, fertilizers and mechanized farming are rarely accessible (MAR: 1.53-2.23) and improved techniques not accessible (MAR: 1.31 and 1.49) to both male and female farmers in this category. Agro-chemicals and irrigation facilities are, however, rarely accessible to male farmers with very many labourers (MAR: 1.80 and 1.51) but not accessible to the females in the group (1.31 and 2.40). Among farmers with access to many labourers, improved rice seed, fertilizers and mechanized farming are rarely accessible (MAR: 1.62-2.26) and improved techniques not accessible (MAR: 1.30 and 1.31) to both males and females. In the same group, agro-chemicals and irrigation facilities are rarely accessible to male farmers (MAR: 1.56 - 1.63) but not accessible to the females (MAR: 1.32 and 1.49). For the group with access to few manual labourers, while there is no gender difference in the farmer's access to improved rice seed, fertilizer, and improved techniques as each of the three inputs is rarely accessible to both male and female farmers (MAR: 1.54 -2.24), gender differences in access to agro-chemicals, irrigation facilities and mechanized farming abound. Agro-chemicals and irrigation facilities are rarely accessible to the males in the group (MAR: 1.75 and 1.65) but not accessible to the females in the group (MAR: 1.48 and 1.46). Mechanized farming is rarely accessible to the females in the group (MAR: 1.94) but is sufficiently accessible to their male counterparts (MAR: 2.63).

Table 6: Farmers' Mean Accessibility Rating (MAR) of Rice Technological Inputs (by Access to Manual Labour)

	Rice Technological Inputs											
	Improved Rice seed		Fertilizer		Agro-chemicals		Improved techn.		Irrigation facilities		Farm mech.	
	F	M	F	M	F	M	F	M	F	M	F	M
Very many	1.53*	1.99*	1.56*	2.23*	1.31	1.80*	1.31	1.49	1.40	1.51*	1.74*	2.11*
Many	1.68*	1.76*	1.62*	1.87*	1.32	1.56*	1.31	1.30	1.49	1.63*	2.02*	2.26*
Few	1.74*	2.06*	1.85*	2.24*	1.48	1.75*	1.54*	1.74*	1.46	1.63*	1.94*	2.63**
Very few	1.86*	1.86*	1.89*	1.70*	1.53*	1.00	1.30	1.80*	1.74*	1.13	1.91*	1.80*

MAR: 0.00-1.49 = Not accessible
1.50-2.49 = Rarely accessible*
2.50-3.44 = Sufficiently accessible**
3.50-4.00 = Excessively accessible***

For the farmers with access to very few manual labourers, there is no gender disparity in their access to improved rice seed, fertilizers and mechanized farming as inputs are rarely accessible to both males and females in the group (MAR: 1.69 - 1.91). Agro-chemicals and irrigation facilities are, however, rarely accessible to females in this group (MAR: 1.00 and 1.13). Improved techniques are rarely accessible to the males (MAR: 1.80) but not accessible to the females (MAR: 1.30).

Thus gender differences in farmers' access to improved rice seed and fertilizers are not influenced by their access to manual labour. Access to manual labour, however, influences gender differences in access to agro-chemicals, improved techniques, irrigation facilities and mechanized farming.

Policies on Dissemination of Agro-Inputs as Factor of Gender Differences in Rice Farmers' Access to Technological Inputs

Policy on Agro-inputs Dissemination through Farmers' Co-operatives

A very small proportion of the rice farmers are members of farmers' co-operatives. *Table 7* shows that 28 percent, (39 percent and 12 percent of whom are females and male farmers respectively) are members of farmers' co-operatives while *Table 7b* shows that only 14 percent (11 percent and 17 percent of whom are females and males, respectively) obtain rice farming technological inputs through farmers co-operatives. As high as 64 percent and 78 percent of female and male farmers respectively (72 percent of the rice farmers) indicated that gender differences in their access to technological inputs are not influenced by membership of farmers' co-operatives (*Table 7c*).

Policy Emphasis on Input Dissemination to Small-scale Farmers

Table 7b, Table 8a and *Table 8b* reveal that rice farmers are generally not aware of the existence of any policy aimed at ensuring that dissemination of agro-inputs is directed towards exclusive access by small-scale farmers let alone its influence on gender differences in their access to technological inputs.

Table 8a shows that as high as 76 percent (78 percent and 73 percent of these are females and males respectively) are not aware of the existence of any policy aimed at exclusive access of technological inputs to small-scale farmers. For such a policy to be effectively implemented, government agencies or farmers' co-operatives should be directly involved. However, while most rice farmers (as high as 93 percent) procure their technological inputs directly from open markets and a negligible proportion (3 percent and 14 percent) of the farmers procure their technological inputs directly from government agencies and farmers' co-operatives (*Table 7b*) there are indicators of non-involvement of these agencies in techno-input distribution and thus non-implementation of policy. Consequently as high as 83 percent and 80 percent of the female and male rice farmers, respectively, indicated that gender differences in their access to technological inputs are not influenced by government policy (*Table 8b*). The very low proportion of farmers (3 percent and 15 percent) who indicated that such policy influences gender differences in their access to technological inputs, 'much' and 'rarely' are likely to be

Table 7a: Rice Farmers' Membership of Farmers' Co-operatives

Membership	Rice Farmers	%
Member	All Female Male	28 39 12
Non-member	All Female Male	72 66 88

Table 7b: Sources of Rice Farmers' Technological Inputs

Source	Rice Farmers	%
Direct from open market	All Female Male	93 94 88
From politicians and/or government friends	All Female Male All	5 4 7 3
Direct from government agents	Female Male All	2 5 14
Farmers' co-operatives	Female Male	11 17

the same (3 percent and 14 percent) of the farmers shown earlier show (*Table 7b*) to have indicated their sources of inputs as being directly from government agencies and farmers' co-operatives.

Rice Farmers' Suggested Policy Guidelines for Ensuring Gender Equity in Access to Technological Inputs

Both female and male rice farmers are almost unanimous in their suggestion of guidelines for ensuring gender equity in access to rice farming technological inputs (*Table 13*). Procurement of sufficient quantities of physical technological inputs was suggested by 89 percent of the

Table 7c: Rice Farmers' Responses on the Extent of Influence of Membership of Co-operatives on Gender Differences in their Access to Technological Inputs

Extent	Rice Farmers	% Responses
Much	All	6
	Female	9
	Male	4
Rarely	All	22
	Female	27
	Male	18
Never	All	72
	Female	64
	Male	78

Table 8a: Rice Farmers' Awareness of Agro-policy focus on Input Distribution to Small-scale Farmers

Awareness	Rice Farmers	% Indication
Aware	All	24
	Female	22
	Male	27
Not aware	All	76
	Female	78
	Male	73

Table 8b: Rice Farmers' Responses on the Extent to Which Agro-policy on Inputs Dissemination Influence Gender Differences in their Access to Technological Inputs

Extent	Rice Farmers	% Responses
Much	All	3
	Female	0
	Male	8
Rarely	All	15
	Female	17
	Male	12
Never	All	82
	Female	83
	Male	80

farmers. The physical technological inputs are improved rice seed, fertilizers, agro-chemicals, irrigation and mechanized farming facilities. Both female and male farmers indicated highly on the need for procurement of these inputs in large quantities because gender differences in access are limited by factors arising from their insufficient quantities.

79 percent and 64 percent of female and male farmers respectively (73 percent of the rice farmers) suggested reactivation and encouragement of farm settlements and farm co-operatives through which thet would have direct contacts with government agencies as a way out of gender differences in their access to the technological inputs. This suggestion may have arisen because the farmers feel that this strategy would enable government agencies to identify the actual rice farmers, the extent of their involvement in rice cultivation and thus provide a basis for equitable distribution of technological inputs. The fairly high rating of this suggestion by female farmers indicates the interest attached to this strategy, perhaps because it could stem the traditional dominance of men in public life. The dominance could have resulted in inequitable male access to the inputs.

Employment of a proportionate number of female and male extension agents from the farming community to guide the rice farmers was suggested by 85 percent of the farmers, with the female farmers rating it higher (94 percent) that the males (72 percent). Through the extension agents, the farmers would have access to improve techniques of planting and application of physical technological inputs. An equal number of male and female extension agents may have been suggested so as to avoid male-female contact through a system where farmers assume the role of teaching their colleagues, a system that is traditionally frowned upon particularly by the married in Nigeria.

Distribution of technological inputs through farm settlements or farmers' co-operatives is suggested by 87 percent of the farmers so as to avoid diversion of the inputs originally directed by middle-men to undeserving male or female farmers or to non-farmers.

Ensuring access to land irrespective of gender was suggested by 77 percent of the farmers, perhaps as a result of the fact that gender differences in access to all the technological inputs was influenced by farm size resulting likely from gender disparity in access to land.

72 percent of the farmers suggested provision of financial assistance to the rice farmers irrespective of sex, for procurement of inputs. This would be expected as it has been shown that economic status influences gender disparity in rice farmers' access to all the relevant rice technological inputs.

Chapter Seven

Implications of Gender Differences in Access to Technological Inputs on Rice Output

Gender Differences in Access to Technological Inputs and their Implications on Rice Output

Table 9a shows that output means of the four interaction groups of gender and access to technological inputs range from 2.25 to 2.49 tonnes per hectare. The output means for female and male farmers who have access to technological inputs are 2.49 and 2.32 tonnes per hectare, respectively. These two output means are shown not to be significant (*Table 9b*). This means that the combined influence of gender and access to technological inputs result in female and male farmers' rice output not being significantly different from each other.

As shown in *Table 1* that male rice farmers have significantly higher access to most of the technological inputs that their female counterparts. The expectation is that there would be a corresponding significant gender disparity in rice output in favour of the male rice farmers. That no-significant difference in male and female farmers' rice output was observed despite the evident gender difference in access to most of the rice farming technological inputs implies that rice output by female farmers would be higher than that of males if both groups of farmers lacked access to technological inputs. This claim is vindicated by the significant differences in rice output mean between female farmers and male farmers without access to technological inputs *(Table 9a).*

Gender Differences Access to Technological Inputs by Extent of Accessible Land Interactions on Rice Output

The eight rice output means of the eight interacting groups of gender differences in access to technological inputs and extent of accessible land on rice output range from 1.79 to 2.54 tonnes per hectare (*Table 10a*). The highest output mean for the female farmer is 2.54 tonnes for

Table 9a: Influence of Gender by Access to Technological Inputs on Rice Output (Tonnes)

			Gender	
			Female	**Male**
Technological Inputs	Access	N	42	67
		X	2.49	2.32
		S	0.77	0.56
	No Access	N	1.45	55
		X	2.46	2.25
		S	0.65	0.11

N = Number of farmers
X = Mean accessibility rating
S = Standard deviation

Table 9b: T-test on Female and Male Farmers' Rice Output Means of Gender Differences in Access on Rice Output (Tonnes)

	N	X	S	df	t_o	t_c
Female - Access to techno-inputs	42	2.49	0.77	107	1.24*	1.66
Male - Access to techno-inputs	67	2.32	0.56			
Female - No access to techno-inputs	145	2.46	0.65	198	3.75**	1.65
Male - No access to techno-inputs	55	2.25	0.11			

N = Number of farmers
X = Mean accessibility rating
S = Standard deviation
df = Degree of freedom
t_o = Observed t-value
t_c = Critical t-value
* = Not significant 0.05 level
** = Significant at 0.05 level

females who have access to technological inputs and a small portion of land. The highest output mean for the male farmers is 2.40 tonnes for those who have access to technological inputs and a small portion of land.

Table 10b shows that the two rice output means are not significant. Thus, the highest rice output is obtained from the interaction of gender, access to technological inputs and extent of land accessible to the farmers from two interacting groups: female and male farmers who have access to both technological inputs and a small land portion.

Table 10a: Influence of Gender by Access to Technological Inputs, and Extent of Accessible Land Interaction on Rice Output (Tonnes per Hectare)

			Access to technological input			
			Access		No Access	
			Female	Male	Female	Male
Extent of accessible land	Large	N	35	63	29	9
		X	2.10	2.35	2.36	1.79
		S	2.80	2.56	0.69	0.40
	Small	N	7.	4	116	46
		X	2.54	2.40	2.41	2.34
		S	0.68	0.33	0.65	0.73

N = Number of farmers
X = Mean accessibility rating
S = Standard deviation

Table 10b: T-test on Female and Male Farmers' Rice Output Means of Gender by Access to Technological Inputs by Extent of Accessible Land Interaction on Rice Output (Tonnes)

	N	X	S	df	t_o	t_c
Female - Access to techno-inputs-large land Male - No access to techno-inputs-small land	35 46	2.10 2.35	0.80 0.73	79	1.38*	1.67
Female - Access to techno-inputs-small land Male - No access to techno-inputs-large land	7 9	2.40 1.79	0.68 0.40	14	2.11**	1.76
Female - No access to techno-inputs-small land Male - Access to techno-inputs-large land	116 63	2.41 2.35	0.65 0.56	14	2.11**	1.76
Female - No access to techno-inputs-large land Male - Access to techno-inputs-small land	29 4	2.36 2.58	0.69 0.37	31	1.05*	-1.70

* = Not significant at 0.05 level
** = Significant at 0.05 level

Since access to technological inputs and a small portion of land are common to both male and female farmers, the possible influence of the two factors on gender differences in rice output evens out in the two groups leaving gender as the only differing factor that could exert influence in rice output differences. As significant difference in the rice output of female and male farmers without access to technological inputs has been shown to be in favour of females (*Table 9b*), the expectation is that there should be a significant difference between the rice

output of female farmers who have access to both technological inputs and a small portion of land and male farmers who have access to both technological inputs and a small portion of land in favour of the former. That the difference in rice output between these two groups has been shown not to be significant implies that access to both technological inputs and small portion of land exerts more influence on rice output by male farmers than on the output by their female counterparts.

Gender Differences in Access to Technological Inputs by Time Availability Interaction on Rice Output

The rice output means of the eight interacting groups of gender, access to technological farming inputs and time availability on rice output range from 2.13 to 2.58 tonnes per hectare (*Table 11a*). The highest output mean is 2.58 tonnes for female farmers who have access to both technological inputs and time while the highest output mean for the males is 2.32 tonnes for those who have access to both technological inputs and time. These two output means are shown to significantly differ in favour of the female farmer (*Table 11b*). This means that the highest rice output from gender interaction, access to technological inputs and time availability is from female farmers who have access to both technological inputs and time.

The implication of this is that since access to both technological inputs and time are common to both males and females in these two groups, the possible influence of the two factors in enhancing gender differences in rice output for the two groups cancels out. The observed difference in rice output by the two groups could therefore be attributed principally to gender as shown on *Table 9a*.

The differences in rice output between females who have both technological inputs and time (*Table 11a*) and female farmers who lack technological inputs (*Table 9a*) on the one hand, and male farmers who have access to both technological inputs and time and male farmers who lack technological inputs on the other hand, could be attributed to the combined influence of access to both technological inputs and time.

Table 11a: Influence of Gender, Access to Technological Inputs, and Time Availability Interaction on Rice Output (Tonnes/ha)

			Access to Technological Inputs			
			Access		No Access	
			Female	Male	Female	Male
Time availability	Time	N	40	61	127	47
		X	2.58	2.32	2.14	2.24
		S	0.78	0.56	0.68	0.60
	No time	N	2	6	18	8
		X	2.40	2.13	2.36	2.26
		S	0.56	0.63	0.73	0.73

Table 11b: T-test on Mean Rice Output (Tonnes/ha) of Gender by Access to Technological Inputs by time Availability Interaction

	N	X	S	df	t_o	t_c
Female - Access to techno-inputs -time Male - No access to techno-inputs -No time	40 8	2.58 2.26	0.78 0.76	79	2.55**	1.68
Female - Access to techno-inputs -no time Male - No access to techno-inputs -time	2 47	2.40 2.24	0.56 0.60	47	0.39*	1.68
Female - No access to techno-inputs -no time Male - Access to techno-inputs -time	18 61	2.36 2.32	0.73 0.56	77	2.11*	1.67
Female - No access to techno-inputs -time Male - Access to techno-inputs -no time	127 6	2.14 2.13	0.68 0.63	313	0.04*	1.64

* = Not significant at 0.05 level
** = Significant

Table 12a: Influence of Gender, Access to Technological Inputs, and Production System on Rice Output (Tonnes/ha)

		Access to Technological Inputs			
		Access		No Access	
		Female	Male	Female	Male
Production System	Swamp N	31	55	88	45
	X	2.19	2.32	2.38	2.20
	S	0.78	0.55	0.62	0.71
	N	11	12	57	10
	Upland X	2.02	2.46	2.51	2.49
	S	0.77	0.54	0.65	0.60

Gender Differences in Access to Technological Inputs by Rice Production System Interaction on Rice Output

The rice output means of the eight interaction groups of gender differences in access by rice production system interaction range from 2.02 to 2.51 tonnes per hectare (*Table 12a*). The highest rice output for the females and males is 2.51 and 2.46 tonnes per hectare, respectively. The highest mean output for females was obtained by females farmers who have no access to technological inputs and use upland production systems while the highest output means for the males was obtained by male farmers who have access to technological inputs and use the

Table 12b: t-test on Mean Rice Output (Tonnes/ha) of Gender by Access to Technological Inputs by Rice Production Systems Interaction

	N	X	S	df	t_o	t_c
Female - Access to techno-inputs -Swamp	31	2.19	0.78	39	1.27*	1.68
Male - No access to techno-inputs -Upland	8	2.49	0.60			
Female - Access to techno-inputs -Upland	11	2.02	0.77	54	0.71*	1.67
Male - No access to techno-inputs -Swamp	45	2.20	0.71			
Female - No access to techno-inputs -Swamp	88	2.38	0.62	98	0.44*	1.66
Male - Access to techno-inputs -Upland	12	2.46	0.59			
Female - No access to techno-inputs -Upland	57	2.51	0.65	110	1.58*	1.66
Male - Access to techno-inputs -Swamp	55	2.33	0.55			

* = Not significant
** = Significant

upland production system. The difference between these two output means is not significant (*Table 12b*). Thus, the highest rice output obtainable from gender by access to technological inputs by rice production system interaction is from female farmers who have no access to technological inputs and adopt upland production system and males who have access to technological inputs and adopt upland rice production system.

This implies that since the upland production system is common in the two groups it evens out leaving gender and access to technological inputs as the determinant factors of rice output in the two groups. It has been shown that female farmers' rice output is significantly higher than that of males (*Table 9b*). Therefore, in the two groups producing the highest rice output in gender by access to technological inputs by production system interaction, males make up the significantly higher output because of their access to technological inputs which the females lack, the influence of which manifests itself in non-significant difference in rice output means between the two groups.

Table 13: Farmers' Suggested Policy Guidelines for Ensuring Gender Equity in Access to Technological Inputs by Both Male and Female Rice Farmers

Suggestions	% Indication		
	Female	Male	All
Procurement of sufficient quantity of physical technological inputs such as farm mechanization, fertilizers, agro-chemicals.	88	91	89
Reactivation of equipment of farm settlements and farm co-operatives through which government agencies would have direct contact with the farmers.	79	64	73
Recruiting as many female extension agents as the males from the growing communities.	94	72	85
Dissemination of physical technological inputs through farm settlement or farmers co-operatives.	88	84	87
Ensuring access to land, irrespective of gender.	93	52	77
Providing access to financial facilities without difficult collateral from the active small-scale farmers irrespective of gender.	74	68	72

Chapter Eight

Summary of Findings and Conclusions

Summary of Findings

The major findings of the study are as follows:

1. There is a significant gender difference in rice farmers' access to most of the rice farming technological inputs in favour of the male farmers in Enugu State.

2. Personal background of the farmers and farm-related characteristics influence gender differences in rice farmers' access to rice farming technological inputs. It was specifically found that:
    i) Chronological age, level of education, the economic status of the farmers and their farm size influence gender differences in their access to improved rice seed. Specifically, younger female farmers with larger farms are favoured in access to improved rice seed. On the other hand, male farmers who have attained tertiary education are favoured in access to improved rice seed.
    ii) Farmers' economic status and farm size are the only factors that influence gender differences in access to fertilizers. Very poor female farmers with average sized farms are favoured in access to fertilizers.
    iii) Gender differences in access to agro-chemicals are influenced by farmers' age, level of formal education, economic status, farm size and availability of labour, while moderately rich female farmers with few or very few manual labourers are favoured in access to agro-chemicals. Middle-aged and older male farmers with primary education, small-sized farms and a few-to-many manual labourers are favoured in access to agro-chemicals.
    iv) Gender disparity in access to agro-chemicals in influenced by the level of formal education, farm size, and economic status, while female farmers' differences in access to improved techniques are influenced by their being moderately rich. Male farmers differences in access are enhanced by their being middle aged,

having small-sized farms, very few labourers and no formal educational background.

v) Age, educational level, economic status, farm size and availability of manual labour influence gender differences in rice farmers' access to irrigation facilities while female farmers' differences in access to irrigation facilities are enhanced by their having acquired secondary education, average farm size, very few manual labourers, and being moderately rich. Males' differences in access to the inputs are enhanced by their being middle-aged and having acquired primary school education, small-sized farms and few-to-many manual labourers.

vi) Gender differences in access to mechanized farming are influenced by farmers' age, educational level, economic status, farm size and availability of manual labour. Middle-aged female farmers with a secondary school education, who are moderately rich with small-sized farms and few manual labourers are favoured in access to mechanized farming. Male farmer with no formal education have differences in access to mechanized farming in their favour.

3. Membership of farmer' co-operatives does not influence gender differences in rice farmers' access to technological inputs. Most of the farmers do not belong to farmers' co-operatives. Consequently, the extent of influence exerted by the membership of farmers' co-operatives cannot be determined from most of the farmers. However, most of the negligible proportion of the farmers who are members of farmers' co-operatives indicated that their membership exerts no influence on gender disparity in access to technological inputs.

4. Most of the female and male rice farmers are not even aware of the existence of a policy aimed at ensuring exclusive access of technological inputs to small-scale farmers let alone the influence of such a policy on gender differences in their access to technological inputs. The implication of the farmers' general unawareness of the existence of such policy is that it either has not been implemented or is not being implemented.

5. The interaction of gender and access to technological inputs showed that:
   i) There is no significant difference between the rice output mean of 2.49 tonnes per hectare for the female farmers who have access to technological inputs and 2.32 tonnes per hectare for males who have access to technological inputs.
   ii) There is a significant difference between the rice output mean of 2.46 tonnes per hectare for females who have no access to technological inputs and 2.25 tonnes per hectare for males who have no access to technological inputs.

6. The implications of the interaction of gender differences in access to technological inputs are that:
   i) Accessible land results in the highest rice output mean of 2.54 tonnes by female farmers who have access to both technological inputs and small land. These two rice mean outputs are not significantly different.

ii) Time availability results in the highest rice output mean of 2.58 tonnes per hectare by females who have access to both technological inputs and time. These two rice output means were shown to be significantly different.

iii) Rice production system results in the highest rice output means of 2.51 tonnes per hectare by females who have no access to technological inputs but who adopt upland production system and 2.46 tonnes per hectare by males who have access to technological inputs and adopt upland production system. These two rice output means are not significantly different.

Conclusions

The findings of the study have significant implications on the country's agro-policy on procurement and distribution technological inputs. The fact that several years since the adoption of the nation's agro-policy, rice farmers in Enugu State rarely or do not have access to the needed rice technological inputs indicates a serious lapse in both the relevance of the policy or the effectiveness of implementation. In other words the agro-policy on technological inputs procurement and dissemination has not only failed to ascertain farmers' access to technological inputs but has also failed to ensure gender equity in access to the limited rice farming technological inputs. Consequently, male rice farmers are shown in this study to have differences in access to most of the farming technological inputs which do not reflect corresponding differences in rice output. Female rice farmers, who are disadvantaged in access to the inputs, have a higher rice output although not significantly different from that of males.

There is, therefore, a crucial need to re-examine the agro-policy on procurement and distribution of technological inputs with a view to ensuring gender equity in farmers' access to the inputs. In so doing, efforts should be directed towards evolving specific strategies which will aim at:

i) Procuring the relevant technological inputs directly by relevant government agencies such as the ADP and not through middle-men by which the prices of these inputs are raised beyond the reach of an average small-scale rice farmer in Enugu State. The importance of the strategy lies in the fact that economic factors have been shown to play a major role in influencing gender disparities in access to the inputs.

ii) Educating the rice farmers on the relevance, use and techniques of application of the physical technological inputs by the extension agents. This study shows that ignorance of the advantages and methods of application of some of the physical inputs constitutes a major barrier in access to the inputs especially among the females who are less outgoing due to socio-cultural inhibitions. Availing information on various techniques of rice cultivation and irrigation can only be made accessible to the farmers through farmers' education.

iii) Reinforcing the Agricultural Development Programme (ADP) through improved funding, staff training, motivation and supervision in order to meet a major statutory responsibility of farmers' extension education. In addition, government agencies responsible for technological inputs dissemination like ADP should have a central forum for farmers' extension education during which the farmers'

problems relating to input procurement are identified and resolved. In addition, such government agencies as ADP should visit farmers' plots periodically to assess the technological input requirements of the farmers.

iv) Encouraging formation of rice farmers' co-operative societies which should be registered with, and supervised by, the government. Government would then end distribution of the inputs through middle-men but ensure the responsibility is carried out by government agencies or farmers' co-operatives.

v) Seeking government intervention in allocation of land to ensure gender equity in access of land.

vi) Conducting research from time to time aimed at identifying ways and means of eliminating barriers that militate against gender equity in access to rice farming technological inputs.

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