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RURAL AGE DISTRIBUTION AND FARM LABOUR SUPPLY IN FOOD CROP PRODUCTION SYSTEMS IN ABIA STATE, NIGERIA

[DISTRIBUCIÓN DE EDAD Y TRABAJO RURAL EN SISTEMAS DE PRODUCCIÓN DE GRANO EN EL ESTADO DE ABIA, NIGERIA]

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SUMMARY

Rural age distribution and its interrelationships with household level socio-economic variables, were analysed in relation to farm labour supply. The data suggested an ageing farm labour force in the study area, Abia State. This result could be applied to the entire southeastern Nigeria, since the rural life and agricultural characteristics are largely homogeneous. Certain household-level socio-economic factors including migration, primary occupation, level of education, and others were analysed with regard to their influence on household adult equivalent labour supply. With a coefficient of multiple determination (R^2-value) of 0.895 and a highly significant F-ratio, the regression model showed that the socio-economic variables strongly influenced adult equivalent labour supply. It is suggested that governments and policy makers must articulate rural development strategies that can reduce the high rate of youth outmigration from rural areas. Also, effort should be made to once more encourage young people in rural foodcrop production. It is also suggested that agricultural mechanization programmes be introduced in land-rich rural communities in the state.

Key words: Rural, Age distribution, Farm Labour, Abia State, Nigeria

RESUMEN

La distribución de edades y su relación con variables socio-económicas familiares fueron analizadas en relación al su contribución al trabajo de las fincas. Los datos sugieren una fuerza de trabajo en envejecimiento en el área de trabajo, Estado de Abia, Nigeria. Los resultados podrían ser extrapolados a la totalidad de la región Sureste de Nigeria, dado que la vida rural y las características agrícolas son en general muy homogéneas. Algunas de las variables, tales como, migración, ocupación primaria y nivel de educación, fueron analizadas con respecto a su influencia al aporte de trabajo equivalente a un adulto. Con un coeficiente de determinación múltiple (R^2) de 0.895 altamente significativo, el modelo de regresión mostró que las variable socio-económicas tienen una influencia muy fuerte sobre el aporte de trabajo. Se sugiere que las políticas gubernamentales deben estructurar estrategias de desarrollo rural que reduzcan la migración de áreas rurales. Los esfuerzos deben también, motivar a los jóvenes a mantenerse en la actividad de producción de alimentos. Se sugiere también que programas agrícolas de mecanización sean introducidas en las comunidades con disponibilidad de superficie agrícola.

Palabras clave: Desarrollo rural, distribución de la edad, trabajo en finca, Estado de Abia, Nigeria

INTRODUCTION

That human labour is about the only form of farm labour available to smallholder farmers in Abia State, Nigeria is not in doubt. And, that smallholder farmers contribute over 85 percent of total domestic agricultural output in the area is equally not in doubt. By extension, therefore, it implies that human labour accounts for domestic food supplies in Abia State and Nigeria in general. At present there are no indications that farming will be mechanized in Abia State and most other states in southeastern Nigeria in the foreseeable future. Therefore, the hope to continue to supply the food need of the ever growing population anchors very auspiciously on human labour productivity. This assertion does not just underscore the importance of human labour in the peasant farming system. It goes further to elicit concern and research interest in issues that affect farm labour supplies in the region.

The various studies on farm labour supply and use confirm that human labour on the farm is not homogenous and job contents differ. For instance, Nweke (1980) and King (1992) found that in general men performed heavy operations such as land preparation while women and children performed lighter operations such as planting, fertilizer application, weeding etc, the studies also confirm that separate wage rates obtain for these labour categories.

Commentators on farm labour supply have observed that total supply of labour depends on such factors as the size of the population, its age composition and

certain institutional factors (Hardwick, 1994). On the other hand, Lele and Stone (1989) argued that rapid population growth which increases farm labour supply exerts so much pressure on land and reduces farm size per hectare. The paper further argued that increases in child enrolment rates in primary and secondary schools have tended to reduce overall farm labour supply in most parts of Sub-Saharan Africa (SSA).

Empirical evidence and even *a priori* observation have shown an apparent skewing of available farm labour force to comprise mostly old people to the exclusion of young men and women within the active working age. The role of youths in agriculture has been empirically investigated and highlighted by reports like Anyanwu (1979), Uwaka (1982) and Iwueke (1987), among others. The increasing absence of people within the active working age has been attributed to farm drudgery, absence of social infrastructure in the rural areas, poor farm incomes and the general low life expectancy in rural societies (Harris, 1970; Obibuaku, 1983; Gill, 1991). As a result, young people within the active working age and with the requisite education to cope with the challenges of modernizing food crops production are compelled to migrate to urban centers in search of better economic opportunities and improved standard of living. This trend has not helped rural productivity as it has left farming in the hands of the old, the illiterate and very few energetic young men who reside in the villages perhaps only due to unavoidable circumstances (Adebayo, 1999).

A very important fact emerging from the foregoing is the decreasing availability of an energetic working population that can cope with the task of farm operations. Several empirical studies have given insight into the age distribution of farm families in southern Nigeria. Eze (1993) observed that the mean age of rural households across the various states of southeastern Nigeria was 53 years. In an earlier study Obibuaku (1983) had found that a large proportion of farmers in South-East Nigeria were advanced in age.

The World Bank (1996) gave a very clear picture of what an ideal age distribution in the rural societies of Africa should be. According to the report, the distribution of the economically active population among various age groups can be categorized as follows 10-19 years (21.3%), 20-29 years (26.2%), 30-39 years (20.8%), 40-49 years (15.4%), 50-59 years (10.2%) and 60 years and above (6.2%). This kind of rural age distribution can only obtain in a country where the social dichotomy between rural and urban areas is minimal and in an economic situation where rural food production systems are not only modernized but offer attractive employment alternatives.

The responsiveness of farm labour supply to profitable employment opportunities in other sectors, the need to optimize labour in the farm, as well as the role of exogenous factors in labour supply make labour the most crucial limiting factor in smallholder agriculture. In addition, the constraints to labour use by technical, seasonal and socio-economic requirements of crops and livestock operations further stress the need for detailed analysis of supply and demand relations in farm labour.

Olayide (1980) had estimated that the rural population of Nigeria accounted for as much as 75 percent of the total population in the late 1970s. Within the same period, the sector accounted for only 57 percent of the nation's total labour force. Worse still, the rural farm population constituted only 16 percent of total active labour force in Nigeria. Granted that much less percent of total labour force are employed in agriculture in developed economies, the fact still remains that Nigeria's food production system is human labour-intensive rather than mechanized. Moreover, there is an intolerable level of youth unemployment and urban population explosion arising from a continuous outmigration of people from the rural areas in search of opportunities in the modern sectors. Although present estimations of population indicate that the rural sector still harbours over 75 percent of Nigeria's total population, yet it is most unlikely that rural age distribution is in favour of the farm sector.

It is therefore considered pertinent in this study to address the following research questions which invariably articulate the objectives of the study.

i. What is the pattern of age distribution in the farming communities of Abia State?
ii. How do socio-economic factors affect adult equivalent labour supply in the farm sector in Abia State?
iii. What relationship exists between age of food crop workers and farm labour supply?
iv. Is there any relationship between rural age distribution and farm output?

To conduct empirical analyses that may provide answers to these questions, this study is therefore focused on rural age distribution and its impact on farm labour supply using primary data from rural farming communities in Abia State. Each question as posed above translates to a specific research objective which integrates into the broad objective of the study.

METHODOLOGY

Study Area

Abia State situates in the southeastern geopolitical region of Nigeria. It is located within latitude $4^{o} - 7^{o}$N and longitude $7^{o} - 8^{o}$E. According to the 1991 trial census, Abia State covers an area of about 6700km^2

with a population of 2,293,978, hence the average population density is in the range of 400 inhabitants per square kilometer. Farming is a major occupation of the people. About 70% of the population earn their livelihood from foodcrop production systems. Two local government areas, Isi-Ala-Ngwa South and Ukwa West Local Government Areas were selected for the study. Isi-Ala-Ngwa South is predominantly known for farming as the main rural occupation. It has a vast area of fertile land. Ukwa West L.G.A. is situated in the southern part of Abia State. It has a land area of 542.127km. The chief occupation of the people is farming. The two local government areas are noted for the production of cassava (*Manihot spp*), Maise (*Zea mays spp*), yam (*Dioscorea spp*), plantain and bananna (*Musa spp*) melon (*Citrulus spp*). Cocoyam (*Colocasia spp*) and several vegetable crops and legumes. In addition, they grow a wide variety of tree crops which produce fruits, leaves, timber and other useful products.

Sampling Procedure and Method of Data Collection

A multi-stage random sampling technique was adopted. The first stage involved a selection of five rural communities from each of the two local government areas. From Isi-Ala-Ngwa South LGA the following communities were randomly selected: Umunkpeyi, Omoba, Ndiolumbe, Orungwo and Obuba. From Ukwa West LGA, Ozaa West, Okeikpe, Obuzo, Asa and Ipu East communities were also randomly selected. Eight respondents were selected from each of the communities except Obuba from which 13 respondents were selected. A total of 85 respondents made up of farmers were sampled using structured questionnaire. This sample was drawn from the population of food crop farmers in the study areas. Although the population was not strictly enumerated, a sample of 85 respondents was considered representative enough for inferential observations on the farming systems of the study area.

Techniques of Data Analysis

The first objective was analysed by use of descriptive statistics and cross-tabulation. Two hypotheses were formulated from the second and third specific objectives. For the second objective the null hypothesis was stated as follows:

There is no significant variation in the relative effect of household socio-economic variables on adult equivalent labour supply.

The alternative hypothesis was simply that there is significant variation in the relative effect of household socio-economic variables on adult equivalent labour supply. This hypothesis was analysed by a multiple regression technique. The explicit function is of the form.

$$Y = b_o + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + U$$

Where
Y = Household adult equivalent labour supply (Mandays)
X_1 = Gender of respondent
X_2 = Marital status
X_3 = Household size
X_4 = Level of education of household head (in years)
X_5 = Level of education of spouse (in years)
X_6 = Primary occupation of household head
X_7 = Primary occupation of spouse
X_8 = Absolute values of household net migration to live-in population ratio
b_0 = Intercept
b_1-b_8 = Coefficients
U = Stochastic error term

The modes of measurement of some of the variables are implicit in the concepts and therefore require no further explanation. The variables in this category include household size (X_3) and level of education (X_4 and X_5). The modes of measurement of household adult equivalent labour (Y), gender of respondent (X_1), marital status (X_2), primary occupation (X_6 and X_7) require some clarification. The responses to the questions on these variables were assigned certain codes in the questionnaire and these codes were used in the regression analysis. In the case of adult equivalent labour, the labour output of children was taken as half that of adults. Children were considered as people below the age of 15 years. The method was considered approvirate in line with Nweke (1980), Chidebelu (1991) and Ezeh, (1993). The adult equivalent labour supply variable was therefore calculated for every respondent household as the labour mandays supplied by that household within the crop production period. This, of course, varied widely among households. Gender of household head marital status and primary occupation were used as dummy variables. In the case of gender a code of 1 was assigned to 'male' and O to 'female'. The same was done for marital status in which 1 was assigned to 'married' and O to 'single'. Also, primary occupation was used in the equation by assigning 1 to farming and O to every other occupation. Adoption of these codes requires no further explanation since it is in common use in ordinary least squares analysis involving a combination of dummy and numerical variables. Thus, a multiple regression technique was preferred to correlation analysis because the former provides a better basis for explaining joint causal relationship between a dependent variable and several independent variables household socio-economic factors (Koutsoyiannis, 1979). Household net migration to live-in population ratio was estimated as the quotient of the difference between household number of

immigrants and emmigrants and live-in population at the time of survey. The ratio is given by:

$$\frac{H_{IM} - H_{EM}}{H_{LP}}$$

Where:
H_{IM} = Household Immigrants
H_{EM} = Household Emmigrants
H_{LP} = Household Live-in Population

Household live-in population was made up of total household size and household immigrants who ordinarily are not permanent members of the household. Relatives and friends on visit or taking temporary residency with households for periods long enough for active participation in household economic activities were classified as immigrants while aborigene members of the households who had migrated to distant places for permanent residency or for temporary residency lasting over three months, were classified as emmigrants. The household net migration ratio was extrapolated from Adepoju (1974; 1986), Lele and Stone (1989) and Okafor (1991). It was considered a useful variable because it captures the net effect of household-level migration as well as the ratio of young and educated household members to the live-in population. It has been said that rural outmigration is selective of age and level of education (Malton 1981, McNamara 1991, World Bank, 1993).

The ordinary least squares (OLS) technique was used to derive estimates of the parameters of socio-economic variables from the data. Since theory does not give any direct indication of the appropriate functional forms, three functional forms: linear, semi-log and double-log were fitted with the data. A stepwise regression technique was adopted. The semi-log form however gave the best fit and was therefore chosen as the lead equation. The choice of the lead equation was based on the magnitude and significance of the F-ratio and t-values and the sign and significance of the coefficients of the explanatory variables.

The corresponding null and alternative hypotheses for the third objective were stated as follows:

Ho: *R<O: Farm output (arable cropholding) and mean age of foodcrop workers were negatively correlated.*

H_1: *R>O: Farm output (arable cropholding) and mean age of foodcrop workers were positively correlated*

In analyzing the relationship between age of foodcrop producers and farm output, a simple regression analytical technique was applied.

Farm output of labour was taken in proxy as total cultivated area of cassava and yam-based crop mixtures. The mean estimates for households made up the dependent variable while mean age of food crop workers who performed the various operations was the explanatory variable.

RESULTS AND DISCUSION

Sources of Farm Labour

Smallholder farmers in the sampled communities had five main sources of labour in the study period (Table 1). In most (92.30%) cases the head of the family (the respondent) provided a ready source of labour on his farm. The farmer's nuclear family was apparently the most important source of farm labour as indicated by about 98% of the respondents.

Table 1: Sources of Farm Labour Among Smallholders in Rural Abia State, Nigeria

Source of Labour	Number (N= 85)	%
Farmer (Respondent)	79	92.30
Family	83	97.65
Hired labourers	64	75.29
Friends and Relatives	21	24.29
Exchange	11	12.94
Mechanized	3	3.53

Multiple responses were recorded.

It is important to note that mechanized labour was quite rare among smallholder farmers in the area. The rarity of mechanized farming was primarily due to the collapse of tractor hiring services in the state as is the case in most other states of southeastern Nigeria. However, in a survey of smallholders in Anambra State, Chidebelu (1991) had found that hired labour was the most dominant source of farm labour (90 percent), followed by the farmer himself (79 percent), family members (69 percent), friends (16 percent) and tractors as much as 13 percent. Chidebelu's survey was conducted in 1987 when tractor hire services were in vogue in many states including Anambra State. The report also identified age grades as specifically constituting 5 percent. Age grades and village producer cooperatives as well as other socio-cultural groups operated labour exchange arrangements in the study areas and were therefore collectively grouped into exchange labour in this study. The results in the table suggest that family labour is a major component of farm labour in the area. Thus, imbalances in farm output should be expected between small and large households.

Age Distribution of Food Crop workers

Table 2 contains the age distribution of Food crop workers among the six main sources of human labour identified in the study area. In addition to the 85 respondents, the data showed that 540, 203, 92 and 69 persons were sourced from family members, hired labour, friends and relatives and exchange labour respectively. In each source, the modal class of age is indicated with an asterik. The modal class of age of farmers (head of farm families or respondents) was 45-54 years. Family labour and hired labour had the same modal class, while friends and relatives and exchange labour had modal classes of 14 years and less and 15-24 years respectively. The overall indication here is that old people dominated the three most important sources of farm labour. This indication agrees with Nweke (1982), Obibuaku (1983) and Chidebelu (1991). Chidebelu (1991) found that the mean age of hired labourers was about 30 years while that of farmers was 40 years. The results presented in Table 2 suggest an upward trend in mean age both of hired food crop workers and farmers. If there is no deliberate effort to encourage young people to dwell in the rural areas and engage in farming, then food production will obviously suffer a serious setback in future.

Age-Sex Distribution of Rural Farm Families

Table 3 shows that children 14 years and less made up the modal class for both male and female. On the aggregate, however, household members who were 15-24 and 25-34 and less and 65 and above, made up as much as 34 percent of the aggregate household live-in population. These findings do not differ substantially from those of World Bank (1996) with regard to the less active age ranges. The result stated above show that rural out-migration in the area is selective of people in the productive age bracket. There is need to redress this through improvement in rural infrastructure and provision of employment opportunities in the farm sector.

Table 2: Percentage Distribution of Food Crop Workers by Age and Source of Farm Labour in Rural Abia State, Nigeria

Age (Years)	Farmer	Family	Hired	Friends & Relatives	Exchange
14 and less	0	83	3	26	5
	(0)	(15.37)	(1.5)	(28.3)*	(7.2)
15-24	1	57	29	18	31
	(1.2)	(10.56)	(14.3)	(19.6)	(44.9)*
25-34	15	41	37	17	24
	(1.8)	(7.60)	(18.2)	(18.5)	(34.8)
35-44	21	59	53	11	5
	(2.5)	(10.92)	(26.1)	(12.0)	(7.2)
45-54	26	148	58	11	4
	(30.5)*	(27.41)*	(28.6)*	(12.0)	(4.3)
55-64	17	118	21	6	1
	(20.0)	(21.85)	(10.3)	(6.5)	(1.4)
65 and above	5	34	2	3	0
	(5.9)	(6.30)	(1.0)	(3.3)	(0.0)
Total	85	540	203	92	69
	(100)	(100)	(100)	(100)	(100)

Figures in parenthesis are percentages. * = Modal Age range, Multiple responses were recorded.*

T**able 3: Age-Sex Distribution of Rural Farm Families in Abia State, Nigeria**

Age (Years)	Male	%	Female	%	Aggregate	%
14 and less	107	12.0	98	11.0	205	23.0
15-24	69	8.0	81	9.0	150	17.0
25-34	31	3.5	57	6.5	88	10.0
35-44	40	4.6	52	6.0	92	10.0
45-54	58	6.6	49	6.0	107	12.6
55-64	67	7.7	72	8.0	139	15.0
65 and above	44	5.0	50	6.0	94	11.0
Total	416	47.5	459	52.5	875	100

Relative Influence of Household Socio-economic Variables on Rural Adult Equivalent Labour Supply in the Crop Production Systems

As indicated earlier, the semi-log function provided the best fit and was therefore adopted as the lead equation. It had a relatively high R^2-value and more variable coefficients with significant t-values. The results of the semi-log function are presented below. The explicit semi-log model can be summarized thus.

$$Y = In9.802 - In1.924X_1 + In5.486\ X_2\ *** + In6.810\ X_3\ *** + In1.469\ X_4* + In0.761\ X_5 + In1.078\ X_6* - 0.055\ X_7 + In1.091\ X_8 + 2.574$$

*(R^2 = 0.815, F-ratio = 19.600, *** and ***, **, * significant at 1%, 5% and 10% levels respectively).*

With a coefficient of multiple determination (R^2) of 0.895 and an F-ratio significant at 1 percent, it implies that the eight independent variables could explain as much as 82 percent of total variations in household adult equivalent labour supply in the rural areas of Abia State within the period of study. However, five out of the eight variables exerted significant influence on household adult equivalent labour supply. These include gender of household head (X_1), household size (X_2), marital status (X_3), level of education of household head (X_4) and occupation of household head (X_6). The effect of gender of household head was negative and significant at 10 percent level. On a more general and realistic note, however, the fact is that female-headed households often tend to be smaller in size and have lower adult equivalent labour workforce. In the case of a widowed female head, the tendency is for the older children to seek residency with relatives and friends in distant places, often in the urban centres. The influence of marital status on household adult equivalent labour supply was equally negative and highly significant at 1 percent level of significance. The result agrees with a priori knowledge that a household headed by an unmarried person rarely has very young children, and should as a result have relatively higher adult equivalent labour supply.

The highly significant positive influence of household size on adult equivalent labour supply of household was somewhat unexpected. Ordinarily, the *a priori* expectation is that children would have outnumbered adults in most households. But on the other hand it is not quite unexpected judging from the age-sex distribution in Table 3. Although children made up a substantial percentage of household composition, the overall ratio of children to adults was very supportive of the result.

Level of education of household head had positive influence on household adult equivalent labour supply. The positive effect was significant at 10 percent level of significance. It is likely that educated household heads may have preferred to have small household sizes. Occupation of household head also had positive effect on household adult equivalent labour supply, and this was significant at 10 percent level. It is not so easy to suggest a strong reason for such a positive correlation. However, it was the practice among big farmers in the olden days to marry more than one wife and have a large number of children who would constitute their farm workforce. If this olden day practice obtained in its entirety in the study areas, the result would have been a strong negative correlation, perhaps because of large number of children.

The remaining three variables, level of education of spouse (X_5), occupation of spouse (X_7) and net migration-live-in population ratio (X_8), all had negative influence on household adult equivalent labour supply. The negative signs of level of education of spouse was not expected, while that of occupation of spouse cannot be said to have contradicted any straight *a priori* expectation. It means that greater net migration (i.e. more people joining the household than leaving it) meant less mean age of household members. This suggests that those who left the households were older than those who joined them. Those who left were mostly people in the active age. Of course, it is known that most immigrants into rural households are often younger relatives who reside permanently or temporarily to assist or give company to elderly people, in most cases grand-parents, godfathers, and so on.

On the whole, the regression analysis confirmed a strong causal relationship between household adult equivalent labour supply and socio-economic characteristics of the household. Although the direction and extent of significance of the relationship as indicated by the t-values can best be interpreted within the context of the study, they posit considerable relevance to theory and existing literature. The null hypothesis was therefore rejected and the alternative accepted. The results of the regression analysis suggest that agricultural development policy in Abia State should articulate gender of farmers, household size and level of education as major determinants of age-specific farm labour supply.

Relationship between Mean Age of Foodcrop Producers and Farm Output.

An R-calculated value of 0.736 at 1 percent level of significance was estimated while the R-tabulated value was 0.733. With this R-values, it became clear that the null hypothesis should be rejected and the alternative accepted. There was therefore a positive correlation between household arable cropholding and mean age

of food crop workers. The result suggests that households whose farm labour was primarily comprised of younger people (including children) produced less and vice versa. If the data used for this analysis were disaggregated, say, into children less than 15 years, adults 15-40 years, 41 years-65 years and their respective output levels, the expectation would have been a very strong positive correlation between age and output for adults 15-40 years and followed by adults 41-65 years. Such an idealized situation was not practicable within the context of the study, and in fact, in real life. Overall, there is urgent need to redress the shortage of young people within the production age bracket in the farm sector.

CONCLUSION AND IMPLICATIONS

The data generated and analysed in this study show clearly that the farm labour force in Abia State is getting old. Results of the analyses suggest a very strong relationship between household adult equivalent labour supply and the socio-economic variables. The results show in particular that household size, gender of household head and level of education of household head were major determinant variables in the model. There are indications as suggested by the results that large family size favoured crop production. This implies that majority of rural residents are still employed in the firm sector. This means that rural non-farm employment in the study area is yet to be developed. It also means that labour may have been utilized very inefficiently on the farm among such large households. On the other hand, households with small sizes would need to source labour from the commercial sector at whatever is the going rate. The imbalances in household size and farm output among rural households in the study area suggest that farm labour supply is facing a serious threat if rural outmigration is not checked. The negative correlation of gender of household head further lends credence to the need to enhance the production capacity of rural women. Education has continued to prove a major human asset whose positive influence on productivity needs no further emphasis. Adoption of new technologies in farming as well as ability to take sound decisions in production, input and credit sourcing and farm product marketing is enhanced by higher level of education.

It is needful therefore, that policy makers must come up with policy perhaps in food crops production that will attract young and educated people back into the farm sector. It will certainly serve a good purpose to enhance youth residency in rural areas through infrastructural development. One way to encourage youth residency in the rural communities would be to introduce off - and on-farm employment programmes for youths who have some appreciable level of education. Perhaps the skill acquisition programme should be given a rural focus. For youths in agriculture, some policy back-up programmes are urgently needed to encourage them. These would include back-up in credit, input delivery, land consolidation, marketing and technology back-up in agronomy and processing. It is also high time government of the state started a mechanization programme for land-rich communities.

The relevance of gender considerations in agricultural production in southeastern Nigeria and Abia State in particular is very paramount. There is no doubt that women play major roles in foodcrop production in the area. But their productive capacity is hampered by the cultural inhibitions that deny them access to productive assets. Some policy framework is therefore required to improve the farm productivity of women by availing them of increased access to land, credit and extension services, and adult education, if possible.

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