

**CONTRIBUTION OF NON-FARM AND FARM ENTERPRISES TO
RURAL POVERTY ALLEVIATION IN SOUTH-WESTERN TANZANIA¹**

BY

DR. VINCENT B.M.S. KIHIO

KIM. A. KAYUNZE AND

FLORA L.K. MAKUNDI

SOKOINE UNIVERSITY OF AGRICULTURE

DEVELOPMENT STUDIES INSTITUTE

P.O. BOX 3024

MOROGORO

TANZANIA

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ABSTRACT

This study uses one-year (1997) data and two poverty lines to determine poverty incidence, poverty depth and contributions of rural non-farm activities (NFAs) and farm activities (FAs) to total income in terms of net household product (NHP) per adult equivalent among rural households of two districts of Mbeya Region in South-Western Tanzania. The upper and lower poverty lines used are of Tsh 103,657/= (USD 168) and 69,594/= (USD 113), respectively, which are per adult equivalent per year in 1997 prices. Households getting NHPs per adult equivalent which are equal to and greater than the upper poverty line are taken to be non-poor; those getting NHPs which are less than the upper poverty line are taken to be poor. Those with NHPs which are equal to or greater than the lower poverty line but less than the upper poverty line are taken to be less (relatively) poor. Those with NHPs less than the lower poverty line are taken to be very (absolutely) poor. Poverty incidence is the percentage of households whose NHPs are less than a poverty line while poverty depth is the average difference between the poverty line and NHPs of poor households, expressed as the percentage of the poverty line. The study considers poverty alleviation in a narrow sense of an increase in NHP per adult equivalent per year. Percentages of NHP from NFAs and FAs are taken to be the percentages by which the activities contribute to rural poverty alleviation (RPA). Relative and absolute poverty incidences, based on the above poverty lines, are 54.0% and 38.5%, respectively.

Corresponding poverty depths are 49.4% and 44.9%, respectively. The contributions of NFAs and FAs to RPA are 26.5% and 73.5%, respectively.

Abbreviations: - AEU = Adult Equivalent Units, AAEU = Adjusted Adult Equivalent Units, FAs = Farm Activities, HH = Head of the Household, FHHs = Female-Headed Households, MHHs = Male-Headed Households, GHP = Gross Household Product, NHP = Net Household Product, NFAs = Non-Farm Activities, RPA = Rural Poverty Alleviation, VEO = Village Extension Officer, BoT = Bank of Tanzania, ADB = African Development Bank, URT = United Republic of Tanzania, Tsh = Tanzanian Shilling, USD = United States Dollar (1 USD = Tsh 618.3 in 1997).

INTRODUCTION

Poverty may be defined as deficiency symptoms in various spheres of human life, including nutrition, education, housing, clothing, health, water, sanitation, employment, expenditure, consumption and income. It is an undesirable condition that should be eliminated. Socio-economic indicators show that Tanzania is among the poorest countries in the world. In 1995 her income per capita was \$ 110 and more than 50% of the population were still living below the poverty line (Cleaver and Donovan, 1995). This implies that the government of Tanzania still has a big role to play in order to reduce poverty incidences and depth among

her population. This paper explores the role of off-farm and farm activities in reducing poverty in the rural areas of Tanzania. In this paper income in terms of net household product (NHP) per adult equivalent is taken to imply poverty when it is less than the stipulated poverty line, or well being if greater than the poverty line. Operational definitions of terms used are given in Note 1.

Tanzania's development policies have considered activities of both the formal and informal sectors, including NFAs, in alleviating poverty. Some indicators of the efforts to consider the NFAs are the Government's efforts to measure subsistence activities in national accounts in the late 1960s and early 1970s (Bagachwa, 1995). However, it is probable that NFAs did not expand during the late 1970s due to various reasons, including government's intense controls on, and less demand for, products from these activities. Since the mid-1980s NFAs have been growing, especially after trade liberalization which eliminated trade restrictions and increased availability of raw materials and spare parts. Despite the increased importance of NFAs as a source of income, they have not been duly considered for poverty alleviation. This is indicated by the absence of well-articulated government policies (Limbu, 1995), and the scarcity of data, on NFAs in Tanzania (Bagachwa, 1995). NFAs have been included in the rural informal sector without serious consideration of specific NFAs to be developed. The aim of this paper is to determine

the contribution of NFAs and FAs to rural poverty alleviation. The discussion and conclusions are based on the survey conducted in Mbeya Region in 1997 to determine the contributions of non-farm and farm enterprises to rural poverty alleviation in South-Western Tanzania.

BACKGROUND INFORMATION

Poverty in Tanzania

The percentages of the population with income below the relative and absolute poverty lines (relative and absolute poverty incidences) in rural Tanzania were 59.1% and 44.1% in 1991. These figures were based on poverty lines of Tsh 46,173/= and 31,000/= per adult equivalent per year in 1991 prices. In the same year, using the same poverty lines, the depths of relative and absolute rural poverty were 29.9% and 19.6%, respectively. In the whole country, the poverty incidence was 51.1%. In urban areas, excluding the capital city of Dar es Salaam, the incidence was 39.3% while in Dar es Salaam it was 9.3% (World Bank, 1993). These data show that poverty in Tanzania is a rural phenomenon. Since about three-quarters of the Tanzanian population live in rural areas, many Tanzanians are poor. However, poverty is declining. Poverty incidence between 1983 and 1995 in rural Tanzania declined, although the poverty situation in 1993 was worse than in 1991 (World Bank, 1996a).

Agriculture in the Tanzanian economy

Agriculture is the mainstay of the economy of Tanzania. Its products are vital for feeding the population and some local factories, and earning local and foreign currency. Traditional exports are composed of primary agricultural products, especially coffee, cotton, sisal, tea, tobacco, and cashew nuts. Between 1990 and 1995, their contribution to export earnings ranged between 50% (lowest) in 1991 to 67% (highest) in 1992, the average being 60.1% (BoT, 1995). The agricultural sector accounts for 46% of Gross Domestic Product (GDP) and employs about 90% of Rungwe District people (URT, 1997a). Farm activities constitute over 95% of total GDP in Ileje District (URT, 1997b).

Agriculture is the source of livelihood for the majority of low income Tanzanians. Tanzania's per capita income of USD 120 in 1997 made her the third poorest country in the world in that year. Women and Female-Headed Households (FHHs) tend to be poorer than men and Male-Headed Households (MHHs) due to their less access to land and capital, while their households include fewer secondary income earners (World Bank 1990; ADB 1996). NFAs can reduce income gaps among the rural population, reduce poverty by supplying income to landless, and it is the means to obtain income to supplement what is obtained from agriculture.

Poverty alleviation and NFAs in Tanzania

The Tanzanian Government is committed to reducing poverty (World Bank, 1993). Just after gaining political independence in 1961, poverty was among the three major enemies of the nation, the others being ignorance and diseases, against which a battle was declared. Since then, development plans have been targeted at reducing poverty. However, during the early years after gaining the independence (1961 to 1967), there was no specific action against poverty reduction (Mtatifikolo, 1994). The same author further reported that, the Arusha Declaration which proclaimed the Policy of Socialism and Self-reliance in 1967 addressed poverty reduction by emphasizing rural development to bridge income gaps between urban and rural people and reducing income differentials among regions and wage earners. After the Arusha Declaration there were various policies and sectoral programs which aimed at improving living standards. The policies included socialism and self-reliance, rural development, and basic needs strategy, just to mention a few. The sectoral programs included water for all, Universal Primary Education (UPE), "*Siasa ni Kilimo*" (Politics is Agriculture), and "*Mtu ni Afya*" (Human being is health).

To strengthen the efforts for poverty alleviation, the government strove to improve the national economy to allow individuals and private sectors to operate more efficiently in both the formal and informal sectors. This was

done by undertaking home-grown economic recovery programs: the National Economic Survival Program (NESP) in 1981 and the Structural Adjustment Programs (SAPs) in 1983. Trade liberalization in 1984 was also an important part of the above efforts (Bagachwa *et al.*, 1995). The same author further added that World Bank-sponsored Structural Adjustment Programs which were adopted in 1986 and implemented in the form of the first Economic Recovery Program (ERP I) of 1986/87 to 1988/89 and ERP II of 1989/90 to 1991/92 are other Government's efforts to facilitate poverty alleviation. Recent Government's efforts to reduce poverty are implied in the Policy Framework Paper of 1991/92 to 1993/94 and in the Rolling Plan and Forward Budget for 1993/94 to 1995/96 (Mtatifikolo, 1994). Formation of a unit that coordinates poverty reduction issues at the national level, with an objective to eradicate absolute poverty by the year 2025 (URT 1997c), is another indication that the Government of Tanzania is committed to poverty alleviation. The organ is the Unit for Poverty Eradication and is in the Vice-President's Office.

THE STUDY AREA, SAMPLING PROCEDURE AND DATA ANALYSIS

The study was conducted in Ileje and Rungwe rural districts of Mbeya Region, which is located in the southwestern corner of Tanzania. Mbeya Region has seven districts of Chunya, Ileje, Kyela, Mbarali, Mbeya, Mbozi and Rungwe. Rungwe and Ileje were chosen purposefully because they

are the most and least developed in the region with average per capita gross domestic product (GDP) of Tsh 90,000 and 53,000 in 1995, respectively (URT, 1997a & b). Therefore, their average poverty levels, NFA, FA and NHPs should provide good data for research objectives.

The research was a cross-sectional study in which a one-stage survey was conducted. The population was about 352,095 people in 1997: 89,238 in Ileje and 262,857 in Rungwe. The average household size was 4.9 in both districts. The sampling unit was the household, and the sample size was 200 households. Fifty households were sampled from Ileje and 150 in Rungwe. Multistage random sampling and purposeful sampling were used. The former was used to select villages and ten-cell units. The latter was used to select wards representing different agro-climatic zones and households with different living standards, according to local criteria. In order to make the research sensitive to gender, 47 female-headed households (FHHs) were purposefully included by taking those with low, medium, and high levels of living.

A standard questionnaire was used to collect data. The questionnaire was designed to capture non-farm and farm activities performed by all household members in 1997 and values of products from these activities. Data were collected in December 1997 and January 1998 in 10 and 30 villages of Ileje and Rungwe, respectively, through a one-time social

survey. Market and farm-gate prices were used to value current and intermediate assets for capital and products produced. For commonly traded products, market prices in nearby market places in different months were taken and their averages found. For rare products that were not freely traded, actual prices of acquisition or sale were taken.

Data analysis

The data were analyzed using the Statistical Package for Social Sciences (SPSS) to compute measures of central tendency and of dispersion. In addition, correlations, t-test, and multiple regression were done. The dependent variable was NHP. The independent variables were ages of household heads, adjusted adult equivalent units and years spent in school by household heads. Others were land used, initial capital for NFAs, total costs of production and total gross household product, all per adult equivalent. The multiple linear regression equation that was used is: $NHP = \alpha + \beta_1G + \beta_2A + \beta_3E + \beta_4L + \beta_5S + \beta_6Q + \beta_7C + \varepsilon$, where: -

α = Intercept of the equation;

β_1 to β_7 = Regression coefficients for the independent variables;

G = Total GHP per adult equivalent;

A = Age of the household head;

E = Adjusted adult equivalent units;

L = Land used per adult equivalent;

S = Years of schooling of household head;

- Q = Initial capital per adult equivalent for NFAs;
- C = Total costs per adult equivalent; and
- ε = Error term representing a proportion of the variance in NHP that was unexplained by the regression equation.

Determination of poverty incidence and depth

Since it is conventional to use more than one poverty line in poverty studies (World Bank, 1996a), two different poverty lines were used to find the incidence and depth of poverty. Using several poverty lines as Kumar (1993) proposes was seen inappropriate since, given a sample size of only 200 households, a point would have been reached where numbers of households within certain categories of income levels would have been too small for meaningful statistical computations. Since 1997 poverty lines for Tanzania were not yet documented, the research relied on lower and upper poverty lines that were used in Tanzania to determine well being levels in previous years. The lines were of Tsh 49,600/= and 73,877/= per adult equivalent per year in 1995 prices (World Bank, 1996a; 1996b; URT, 1997c). These were adjusted using headline inflation and the procedure described in Note 2 to get their equivalent values of Tsh 69,594/= and 103,657/=, respectively, per adult equivalent per year in 1997 prices. The former is a lower, hard-core or absolute poverty line. The latter is an upper, relative or soft-core poverty line.

Households getting NHPs per adult equivalent which were equal to and greater than the upper poverty line were taken to be non-poor; those getting NHPs which were less than the upper poverty line were taken to be poor. Those whose NHPs were equal to and greater than the lower poverty line but less than the upper poverty line were taken to be less (relatively) poor. Those with NHPs less than the lower poverty line were taken to be very (absolutely) poor. The poverty gap was found by calculating the amount of NHP by which households' NHPs fell short below the poverty lines. The average total NHP shortfalls were then expressed as percentages of the poverty lines.

Expression of values per adult equivalent

Income per capita is a poor indicator of living standard since households differ in size and composition (Collier *et al.*, 1986; World Bank, 1993; World Bank 1996b). Therefore, numbers of household members were converted into adjusted adult equivalent units (AAEU) using the procedure described in Note 3. Then, values of various variables were divided by AAEU of households to get per adult equivalent values.

Determination of Contributions of NFAs and FAs to RPA

NFA and FAs of every household were expressed as percentages of total NHP among all the 200 households. The average percentages among all the households were taken to be the proportions by which NFAs and FAs

contributed to poverty alleviation. This was also done among various groups of households to assess the relative importance of the activities to poverty alleviation among the groups.

RESULTS AND DISCUSSION

NFAs and FAs done in Ileje and Rungwe Districts

All households were doing FAs, especially crop and livestock production. But 0.5% of them were not growing any crop, while 10.0% did not keep any livestock. About three-quarters (73.0%) of surveyed households were doing both NFAs and FAs. The rest (27.0%) were doing only FAs. NFAs and FAs undertaken are summarized in Tables 1, 2, and 3.

Table 1: Rural non-farm activities (NFAs) done in Ileje and Rungwe Districts (n = 200)²

Non-farm activities done	Households doing the activities					
	Ileje (n=50)		Rungwe (n=150)		Both districts (n=200)	
	No.	%	No.	%	No.	%
No NFA*	7	14	47	31.3	54	27.0
Making mats***	20	40	36	24.0	56	28.0
Farm products trade*	13	26	19	12.7	32	16.0
Selling cooked food*	10	20	17	11.3	27	13.5
Local beer brewing*	17	34	16	10.7	33	16.5
Wage labor*	7	14	15	10.0	22	11.0
Local beer selling*	8	16	8	5.3	16	8.0
Formal employment*	3	6	7	4.7	10	5.0
Tailoring*	5	10	7	4.7	12	6.0
Kiosk*	1	2	8	5.3	9	4.5
Pit sawing**	4	8	5	3.3	9	4.5
Carpentry**	5	10	5	3.3	10	5.0
Second hand cloth sale*	1	2	3	2.0	4	2.0
Trading meat and fish*	1	2	3	2.0	4	2.0
Masonry**	4	8	3	2.0	7	3.5
Watch repair**	-	-	1	0.7	1	0.5
Oxen hiring**	3	6	-	-	3	1.5
Weaving***	-	-	1	0.7	1	0.5
Selling firewood*	2	4	1	0.7	3	1.5
Bicycle repair**	-	-	1	0.7	1	0.5
Transportation*	-	-	1	0.7	1	0.5
Making charcoal**	1	2	-	-	1	0.5
Making bricks*	1	2	-	-	1	0.5
Making winowers ^a ***	4	8	-	-	4	2.0
Trade across Malawian border*	2	4	-	-	2	1.0

Source: Survey data

* = gender neutral

** = male activity

*** = female activity

a = a dish like container made from bamboo slats on which grains or legumes are processed or winnowed.

² Multiple answers were allowed for responses in Tables 1, 2 and 3.

Table 2: Crops grown in Ileje and Rungwe Districts (n = 200)

Crops grown	Households growing the crops					
	Ileje (n=50)		Rungwe (n=150)		Both (n=200)	
	No.	%	No.	%	No.	%
Maize	50	100	135	90.0	185	92.5
Banana	16	32	126	84.0	142	71.0
Beans	48	96	93	62.0	141	70.5
Coffee	15	30	76	50.7	91	45.5
Sweet potatoes	28	56	58	38.7	86	43.0
Tea	-	-	55	36.7	55	27.5
Yams	4	8	55	36.7	59	29.5
Ground nuts	25	50	24	16.0	49	24.5
Irish potatoes	3	6	19	12.7	22	11.0
Cassava	4	8	17	11.3	21	10.5
Avocado	-	-	17	11.3	17	8.5
Sugarcane	2	4	12	8.0	14	7.0
Paddy	2	4	11	7.3	13	6.5
Bambara nuts	2	4	10	6.7	12	6.0
Finger millet	14	28	4	2.7	18	9.0
Cocoa	-	-	6	4.0	6	3.0
Vegetables	1	2	5	3.3	6	3.0
Peas	-	-	5	3.3	5	2.5
Pigeon peas	2	4	-	-	2	1.0
Cardamom	-	-	4	2.7	4	2.0
Pyrethrum	2	4	3	2.0	5	2.5
Sunflower	6	12	-	-	6	3.0
Wheat	3	6	-	-	3	1.5
Sorghum	2	4	-	-	2	1.0
No crop	-	-	1	0.7	1	0.5

Source: Survey data

Table 3: Livestock kept in Ileje and Rungwe Districts (n = 200)

Livestock kept	Households keeping the livestock					
	Ileje (n=50)		Rungwe (n=150)		Both (n=200)	
	No.	%	No.	%	No.	%
Chicken	38	76	112	74.7	150	75.0
Cattle	25	50	74	49.3	99	49.5
Pigs	14	28	42	28.0	56	28.0
Goats	25	50	20	13.3	45	22.5
Rabbits	-	-	4	2.7	4	2.0
Ducks	-	-	4	2.7	4	2.0
Sheep	3	6	2	1.3	5	2.5
Pigeons	1	2	1	0.7	2	1.0
Guinea fowls	1	2	-	-	1	0.5
No livestock	5	10	15	10.0	20	10.0

Source: Survey data

Costs and values of products

Costs on NFAs and FAs

For the two districts combined, average NFA, FA and total costs were Tsh 45,239/=, 9,984/= and 55,223/=, respectively, per adult equivalent per year as seen in Table 4.

Table 4: Per adult equivalent costs of production for NFAs and FAs (n=200)

Categories of respondents	NFA costs (Tsh)	FA costs (Tsh)	Total costs (Tsh)
Ileje (n=50)	11,384	7,288	18,672
Rungwe (n=150)	56,524	10,883	67,407
FHHs (n=47)	35,790	5,171	40,961
MHHs (n=153)	48,142	11,463	59,605
Poor (n=108)	14,942	5,304	20,246
Very poor (n=77)	11,718	4,471	16,189
Less poor (n=31)	22,950	7,373	30,323
Non-poor (n=92)	80,804	15,478	96,282
All (n=200)	45,239	9,984	55,223

Source: Survey data

NFA costs were about five times FA costs. The former were higher than the latter since equipment and materials for NFAs were more expensive than those for FAs. Since NFAs needed more costs than FAs, some households lacked financial resources to undertake them.

Gross values of NFA and FA products

Gross values included costs of production, initial cash capital, values of hired labor, inputs and capital equipment but excluded the values of labor supplied by household members since household labor is the most abundant resource. For the two districts, taken together, average gross values of NFA, FA, and total products were Tsh 80,804/=:, 104,115/=:, and 189,426/=:, respectively, per adult equivalent per year.

Average values of NFA, FA and total gross household product (GHP) among FHHs, MHHs the very poor, the poor, the less poor and the non-poor are presented in Table 5.

Table 5: Per adult equivalent gross values of NFA and FA products (n=200)

Categories of respondents	NFA products (Tsh)	FA products (Tsh)	Total (Tsh)
Ileje (n=50)	42,622	48,968	91,590
Rungwe (n=150)	99,541	122,498	222,039
FHHs (n=47)	64,588	52,393	116,981
MHHs (n=153)	91,677	120,004	211,681
Poor (n=108)	32,395	43,478	75,873
Very poor (n=77)	24,746	34,202	58,948
Less poor (n=31)	51,393	66,517	117,910
Non-poor (n=92)	147,425	175,399	322,824
All (n=200)	85,311	104,115	189,426

Source: Survey data

GHP is not a good indicator of the relative importance of NFAs and FAs as sources of income since costs of production included in it can greatly affect net values of NFA and FA products. For example, the above NFA-GHP³ is 45.0% of the above total GHP, while net household product (NHP) from NFAs (Table 6) is only 29.9% of total NHP. NFA-GHP tends to exaggerate income from NFAs because of high costs included in its calculation.

³ NFA-GHP and FA-GHP mean GHP from NFA and FA, respectively.

Net values of NFA and FA products

Net values of NFA and FA products are presented in Table 6.

**Table 6: Per adult equivalent net values of NFA and FA products
(n=200)**

Categories of respondents	NFA products (Tsh)	FA products (Tsh)	Total (Tsh)
Ileje (n=50)	31,238	41,680	72,918
Rungwe (n=150)	43,017	111,615	154,632
FHHs (n=47)	28,798	47,222	76,020
MHHs (n=153)	43,535	108,541	152,076
Poor (n=108)	17,453	38,174	55,627
Very poor (n=77)	13,028	29,731	42,759
Less poor (n=31)	28,443	59,144	87,587
Non-poor (n=92)	66,625	159,821	226,446
All (n=200)	40,072	94,131	134,203

Source: Survey data

Table 6 shows that NHP from NFAs among FHHs was 66.1%, whereas NHP from FA was only 43.5%, of NHP among MHHs. NFA-NHP among the very poor was only 45.8% of that among the less poor; FA-NHP among the very poor was only 50.3% of that among the less poor. FHHs and the very poor got less NHP from NFAs than MHHs and the less poor since they had poor access to capital. FHHs and the very poor got less NHP from FAs than MHHs and the less poor since they owned and cultivated less land than MHHs and the less poor respectively. FHHs and MHHs used 0.329 hectares (ha) and 0.385 ha per adult equivalent respectively. The very poor and the less poor used 0.280 ha 0.373 ha

respectively, per adult equivalent. These findings show that FHHs and the very poor have poorer access to land than MHHs and the less poor, respectively. The non-poor used 0.471 ha per adult equivalent.

Incidence and depth of rural poverty

Incidence of rural poverty

The number of households which got NHP below the soft-core poverty line of Tsh 103,657/= per adult equivalent per year were 108 out of 200 (54.0%). Those with NHP per adult equivalent per year below the hard-core poverty line of Tsh 69,594/= per adult equivalent per year were 77 out of 200 (38.5%). These findings are presented in Table 7.

Table 7: Incidence of rural poverty in Ileje and Rungwe Districts (n=200)

Groups of respondents	Households							
	Non-poor		Poor		Less poor		Very poor	
	No.	%	No.	%	No.	%	No.	%
Ileje (=50)	10	20.0	40	80.0	10	20.0	30	60.0
Rungwe(n=150)	82	54.7	68	45.3	21	14.0	47	31.3
FHHs (n=47)	13	27.7	34	72.3	8	17.0	26	55.3
MHHs(n=153)	79	51.6	74	48.4	23	15.0	51	33.3
All (n=200)	92	46.0	108	54.0	31	15.5	77	38.5

Source: Survey data

These figures are close to those of World Bank (1993) of 59.1% soft-core and 44.1% hard-core poverty incidence in rural Tanzania in 1991. These findings reveal that poverty incidence in Mbeya Region is high. But some

other regions with lower agricultural potential and poorer roads than Mbeya Region may have higher poverty incidences.

Ileje people were poorer than those of Rungwe. The reasons for that include lower agricultural potential and poor transport facilities for FA and NFA inputs and products in Ileje. People of Rungwe get more income from FAs than those of Ileje and have fewer transport problems since their district is well connected to tarmac roads, unlike Ileje. Female-headed households had high poverty incidence than MHHs. FHHs relative and absolute poverty incidences were 72.3% and 55.3%, while the corresponding figures for MHHs were 48.4% and 33.3%, respectively. FHHs being poorer than MHHs is explained by their less access to capital and land. For example, average total costs among FHHs were Tsh 40,961/=, while among MHHs the costs were Tsh 59,506/=. Land used for FAs among FHHs was also less than that used by MHHs.

Depth of rural poverty

In both districts, taken together, the total soft-core poverty gap was Tsh 5,527,440/=. Since the 108 poor households were each represented by one adult equivalent unit, the soft-core poverty gap per adult equivalent is the above figure divided by 108, which is Tsh 51,180/= (Table 8). If perfect targeting were possible, that would be the minimum amount of money that would be needed per adult equivalent per year to eradicate

both absolute and relative poverty in rural areas of the two districts, taken together. Expressed as the percentage of the relative poverty line of Tsh 103,657/=, that amount is 49.4%. This is the poverty depth in rural areas of Ileje and Rungwe Districts.

Table 8: Depth of rural poverty (n = 108)

Groups of respondents	Poverty depth or gap			
	Soft-core poverty (Tsh<103,657)		Hard-core poverty (Tsh<69,594)	
	Transfer Payment Tsh/AAEU	The transfer payment <i>vis-à-vis</i> the poverty line %	Transfer payment Tsh/AAEU	The transfer payment <i>vis-à-vis</i> the poverty line %
Ileje	58,755	56.7	38,297	55.0
Rungwe	46,724	45.1	26,754	38.4
FHHs	56,500	54.5	35,204	50.6
MHHs	48,736	47.0	29,236	42.0
All	51,180	49.4	31,251	44.9

Source: Survey data

The total hard-core poverty gap was Tsh 2,406,327/=, whereas the hard-core poor households in both districts, each represented by one adult equivalent unit, were 77. Therefore, the absolute poverty gap per adult equivalent is Tsh 31,251/=. If perfect targeting were possible, that is the minimum amount of transfer payment that would be needed per adult equivalent per year to eradicate absolute rural poverty in rural Ileje and Rungwe Districts, taken together. This amount is 44.9% of the absolute poverty line of Tsh 69,594/=. Therefore, the absolute poverty gap in rural areas of Ileje and Rungwe Districts is 44.9%.

Since FHHs and Ileje households are poorer than MHHs and households of Rungwe, respectively (Table 7), their poverty gaps in terms of percentages (Table 8) are higher than those of MHHs and Rungwe. This means that the differences between FHHs and Ileje households NHPs and the poverty lines are bigger than those among MHHs and Rungwe households. Therefore, more transfer payments would be needed to eradicate poverty among FHHs and Ileje households.

Contributions of NFAs and FAs to RPA

Taking NHP to be synonymous to poverty alleviation, rural NFAs and FAs in both districts, taken together, contributed 26.5% and 73.5%, respectively, to rural poverty alleviation among all the 200 households. Among households which did both NFAs and FAs the contributions were 36.4% and 73.6% respectively. Contributions of NFAs and FAs (as percentages of total NHP) to RPA among various groups are presented in Table 9.

Table 9: Contributions of NFAs and FAs to rural poverty alleviation (RPA) (n = 200)

Groups of respondents	Contributions to RPA	
	NFAs (%)	FAs (%)
Ileje (n = 50)	34.5	65.5
Rungwe (n=150)	23.9	76.1
FHHs (n=47)	31.9	68.1
MHHs (n=153)	24.9	75.1
The non-poor (n = 92)	28.5	71.5
The poor (n=108)	24.8	75.2
The less poor (n=31)	32.4	67.6
The very poor (n=77)	21.8	78.2
Those with very fertile farm land (n=45)	17.5	82.5
Those with moderate fertile land (n=149)	29.2	70.8
Those who used only HHs labor on NFAs (n=64)	39.2	60.8
Those who used only h/hold labor on NFAs (n=75)	32.2	67.8
Those who used only h/hold labor on FAs (n=98)	23.5	76.5
Those who used h/hold and hired labor on FAs (n=95)	30.2	69.8
Those who used more time on FAs (n=158)	26.4	73.6
Those who used more time on NFAs (n=37)	66.4	33.6
Those who had contacts with VEOs (n=155)	24.2	75.8
Those who had no contact with VEOs (n=45)	34.5	65.5
Those who did both NFAs and FAs (n=146)	36.3	73.7
All (n = 200)	26.5	73.5

Source: Survey data

The contributions of NFAs and FAs to RPA among households which did not undertake NFAs (those which did only FAs) were taken to be zero and a hundred percent, respectively. In Table 9, NFAs contributed more to poverty alleviation among FHHs than MHHs. The proportion of total NHP from NFA being higher among FHHs than among MHHs was due to two main reasons. The first one is that FHHs owned and cultivated less land than MHHs. Therefore, a bigger proportion of them (than that of MHHs) used more time on NFAs. FHHs and MHHs who spent more time on NFAs

were 21.3% and 17.6% of all FHHs, and MHHs respectively. The second reason is that FHHs used moderate costs (Table 4) on NFAs, hence they got a better margin than those groups that used less or more costs.

Among the poor, the less poor and the very poor, NFAs contributed the least and the most to RPA among the very poor and the less poor, respectively (Table 9). This finding tends to concur with Collier *et al* (1986) that off-farm income as a percentage of total income is probably higher among the less poor rural households than among the poor or the very poor. This is because the less poor have more access to land and capital than the very poor. In Ileje and Rungwe Districts, put together, the less poor used 0.373 ha of land and total costs of Tsh 30,323/=, while the very poor used 0.280 ha and total costs of Tsh 16,189/= per adult equivalent per year. On the basis of the findings in Table 9, NFAs in Mbeya Region, particularly in Ileje and Rungwe Districts, contribute 17.5% to 66.4% to rural poverty alleviation. This finding supports Adams's (1991) argument that NFAs in developing countries contribute between 13 and 67% to rural households' income.

Correlation results

According to Cohen and Holliday (1982), cited by Bryman and Cramer (1992), correlation coefficients are interpreted as follows: - below 0.19 is very low, 0.20 to 0.39 is low, 0.4 to 0.69 is modest, 0.70 to 0.89 is high

and 0.90 to 1.00 is very high. Accordingly, age had low negative and positive correlation with NHP. NHP from NFAs varied inversely proportionally with age. The correlation coefficient between them was -0.2624 and significant at 0.1%. NHP from FAs varied directly proportionally with age. Pearson's r between them was 0.1810 and they were significantly different at 1%. These findings imply that NFAs are more important for RPA among households headed by relatively young household heads (HHs) than those headed by older HHs, whereas it is vice versa for FAs. Overall, age was negatively correlated with total NHP, but the correlation coefficient (-0.0248) was not significant at 5% ($p = 0.727$).

Both household size and adult equivalent units had negative correlation coefficients with NFA, FA and total NHPs. The coefficients for household size were -0.0085 , -0.0328 , and -0.0395 respectively. Those for adult equivalent units were -0.0135 , -0.0349 , and -0.450 , respectively. Although none of these correlation coefficients was significant, they imply that smaller households and those with few adults tend to get more NFA, FA and total NHPs than larger households. This is because some members of large households may be children and the old who may not be able to work or who can work little. But since the coefficients are very low, this implies that household size and AAEU of households have very low influence on NHP. This is especially true in rural areas because even

children can do FAs and some NFAs, assisting their parents and elders.

Schooling years had low, but highly significant at 0.1%, positive correlation with NFA and total NHPs (+0.3012 and +0.2442, respectively). The correlation with FA-NHP was also positive (+0.0786), but insignificant at the 5% level ($p = 0.269$). These findings imply that the more the years of schooling, the higher the NFA, FA and total NHPs. This is so because education improves human capital thereby enabling people to produce more rationally. NFA costs had positive modest (+0.4150) and low (+0.2726) correlation coefficients, which were significant at 0.1%, with NFA and total NHPs. Initial capital for NFAs had low positive Pearson's r values of +0.3784 and +0.2625 with NFA and total NHPs, respectively. These correlation coefficients were highly significant (at 0.1%). FA costs had modest positive correlation with FA and total NHPs (+0.5742 and +0.5965, respectively) and the coefficients were highly significant at 0.1%. Total costs had a low positive correlation coefficient (+0.3261) with total NHP. Since FA costs were more correlated with total NHP than NFA costs, FA costs are more important than NFA costs for increasing total NHP and reducing poverty. However, since the correlation coefficients between NFA costs and initial capital on the one hand and total NHP on the other hand are statistically significant, it is also worth incurring NFA costs, if poverty is to be alleviated with emphasis on NFAs.

The correlation coefficients between land used on the one hand and FA and total NHPs on the other hand were +0.3430 and +0.2838, respectively. These correlation coefficients were significant at 0.1%. These findings support Ghatak and Ingersent (1984) who assert that rural income is directly correlated with land cultivated. Land used was more associated with FA-NHP since FAs are land-based, whereas some NFAs may not need land. The correlation coefficient between FA costs and total NHP ($r=0.5965$) was higher than that between land used and total NHP ($r=0.2838$). This means that capital is more important than land in RPA using FAs. This is because land is easily available in most places of Tanzania, either free of charge or by payment in kind or in cash. Credit provision is one way by which the Government and rural development agencies can help rural people get capital. This is in agreement with Kashuliza *et al.* (1998) study in Iringa and Mbeya Regions in Tanzania which revealed that credit plays an important role in rural poverty alleviation (RPA). But since the correlation between land used on the one hand and FA and total NHP on the other hand are significant at 0.1%, land is also very important for RPA.

NFA-NHP and FA-NHP had modest and high correlation coefficients (+0.6268 and +0.7883, respectively) with total NHP. The correlation was highly significant ($p = 0.000$). These findings imply that the more the NFA

and FA-NHPs, the more the total NHP and poverty alleviation. However, since the coefficient between NFA-NHP and total NHP is less than that between FA-NHP and total NHP, NFAs are less associated with RPA than FAs. The correlation coefficients between GHP from NFAs on one hand and NFA-NHP and total NHP on the other hand were high and modest, that is +0.7303 and +0.4951, respectively. The correlation coefficient between FA-GHP on the one hand and FA-NHP and total NHP on the other hand were very high (+0.9956) and high (+0.8016), respectively. The correlation coefficient between total GHP and total NHP was also high (+0.8047). In all the cases the significance was very high at the 0.1% level. This implies that for effective RPA, GHPs of households have to be increased.

t-test results

In order to confirm the above correlation results, a t-test for unrelated means was carried out to find if means of NFA, FA and total NHPs were significantly different between various pairs of respondents. The pairs involved in the t-test were MHHs and FHHs; households headed by young and old HHs; small and large households; households with many adults and those with few adults; households headed by HHs who completed standard seven and more and those who had either not gone to school or not completed standard seven; and the very poor and less poor.

Mean NHP per adult equivalent from NFAs among MHHs and FHHs were Tsh 43,535/= and 28,798/=, respectively, but the difference was not significant at 5% level ($p = 0.134$). NHP from FAs among MHHs was also higher than among FHHs and they differed significantly at 0.1%. They were Tsh 108,541/= and 47,222/=, respectively. Since NFA-NHP among MHHs and FHHs did not differ significantly, while FA-NHPs between these groups did, MHHs reduce poverty more with FAs than FHHs. Conversely, NFAs are more important for RPA among FHHs than among MHHs. This is also supported by Table 9 which shows that the percentage of NFA-NHP among FHHs was higher than that among MHHs. Total NHP was Tsh 152,076/= among MHHs and Tsh 76,020/= among FHHs. These NHPs were significantly different at 0.1%. Therefore, on the basis of the sample of this research, there is sufficient evidence that FHHs are poorer than MHHs.

Households headed by young HHs got more NFA-NHP (Tsh 59,263/=) than those headed by old HHs (Tsh 22,708/=). These NHPs differed significantly at 1% ($p = 0.003$). This means that NFAs are more important among households headed by relatively young HHs than those headed by older HHs. This relationship was also shown by correlation results that NFA-NHP is negatively correlated with age. But households headed by old HHs got more FA-NHP (109,712/=) than those headed by young HHs

(Tsh 76,910/=). The FA-NHPs were significantly different at 5% ($p = 0.017$). This supports the correlation results that FA-NHP is positively correlated with age. Households headed by old HHs got less total NHP (Tsh 132,420/=) than those headed by young HHs (Tsh 136,173/=). This supports the correlation results that age is negatively associated with total NHP. But the total NHPs did not differ significantly. This implies that, although younger people may get more NFA and total NHPs than older people, and the latter may get more FA-NHP than the former, the association between age and poverty alleviation (total NHP) is low.

Small households (1-5 members) and those with few adults (0.7-3.5 AAEU) got more NFA and total NHPs which were higher than those obtained by large households. NFA-NHPs among small and large households were Tsh 40,118/= and 40,015/=, respectively. Those among households with few and many adults were Tsh 40,363/= and 39,750/=, respectively. FA-NHPs in small households and in households with many adults were lower than those in large households and in households with many adults. So were total NHPs in the households. These findings imply that, in rural areas, households with many adults and members tend to get more FA and total NHPs than those with few adults and members. This is another reason for FHHs being poorer than MHHs for they contain fewer members and adults than MHHs. The former contained an average of 3.9 and 2.8, while MHHs contained 5.7 and 3.9 household

members and adjusted adult equivalent units, respectively. That larger households got more total NHP per adult equivalent than small households, is contrary to the general notion that the larger the household size, the poorer the household. In rural areas where all household members, except the disabled and young children, work, that idea may not hold. Therefore, Omari (1994) assertion that the more people reproduce the poorer they become, is not supported by this study. This idea may hold more where only a few household members, probably only the household head, may work while other members have no income generating activities. But since the NFA, FA and total NHPs did not differ significantly in small and large households, the household size and adult equivalent units, in rural areas, have insignificant influence on poverty alleviation.

The NHP from NFAs among households whose heads had either not gone to school or not completed standard seven was less (Tsh 20,139/=) than that among households whose heads had spent seven and more years on schooling (Tsh 63,948/=). The difference was statistically significant at 0.1% ($p = 0.001$). Therefore, NFAs are more important for RPA among people with more years of schooling. The FA-NHPs among the two groups were Tsh 95,391/= and 92,622/=, respectively. These NHPs did not differ significantly, while the correlation between years of schooling and FA-NHP was very low. This implies that years of formal education hardly

have influence on FA-NHP among rural peasants. Total NHP was higher (Tsh 156,570/=) among households whose heads had gone to school for many (more than 6) years than among households whose HHs had gone to school for few (0 to 6) years. Among the latter, total NHP was Tsh 115,530/=. These values differed significantly at the 5% level ($p = 0.041$). Therefore, education is very important for RPA. This is also supported by the correlation results.

NFA-NHPs among very poor and less poor households were Tsh 13,028/= and 28,444/=:, respectively, and significantly different at the 5% ($p = 0.035$) level. FA-NHPs were Tsh 29,731/= and 59,144/=:, respectively, and differed significantly at 0.1% ($p = 0.000$). NHP from NFAs as percentages of total NHP among the very and less poor households were 21.8% and 32.4%, respectively, but not significantly different at 5% ($p = 0.077$). Therefore, on the basis of the sample of the research, there is sufficient evidence that the percentages of NHP per adult equivalent contributed by NFAs among less poor and very poor rural households do not differ significantly.

Regression results

The regression results are presented in Table 10. The multiple regression correlation coefficient R , was 0.98. This means that the independent variables that were used in the regression model, collectively, were highly

associated with the dependent variable. The multiple coefficient of determination, R^2 was 0.96. Adjusted R^2 was 0.95. These results mean that the independent variables account for 95% of variation in the dependent variable. The other portion, that is 5%, is explained by other independent variables which were not included in the multiple regression analysis model, incorrect model formulation and errors in the research (Mendenhall and Beaver, 1991).

Table 10: Regression results

Variable	Coefficients	t-ratio	p-value
Total GHP per adult equivalent	1.562	56.451	0.0000
Age of the household head	-0.021	-1.106	0.2702
Adjusted adult equivalent units	0.006	0.348	0.7283
Land used per adult equivalent	0.016	0.906	0.3659
Years of schooling of household head	0.007	0.391	0.6963
Initial capital for NFAs	0.009	0.429	0.6687
Total cost per adult equivalent	-0.948	-31.162	0.0000

Source: Survey data

The dependent variable (total NHP) is positively related to total gross household product with a regression coefficient of 1.56. This supports the correlation results which showed very high positive correlation between total GHP and total NHP. The second variable with high positive impact was land used which had a coefficient of 0.016. This had so high impact on total NHP since about more than 70.0% of rural income was obtained from FAs, of which the basis is land. Initial capital for NFAs was the third most important factor for increasing total NHP. Its coefficient

was 0.0093. Initial capital for NFAs had positive impact on total NHP since in rural areas cash capital needed to start non-farm activities is small since most of the NFAs use cheap locally available materials. The coefficient of number of years of schooling of household heads was 0.0072, where as the coefficient of number of adult equivalent units (AAEU) in households was 0.0058. AAEU having a positive coefficient (positive impact on total NHP), supports t-results that households with more AAEU got more total NHP than those which had fewer AAEU.

Total costs and age of household heads had negative impact on total NHP. Their coefficients were -0.95 and -0.021 respectively. The linear correlation coefficient between age and total NHP was also negative (-0.025), implying a negative association between total NHP and age of household heads. Total costs had negative impact on total NHP since they include even those of NFAs, which are normally higher than those of FAs. But correlation results showed positive correlation between total costs and total NHP. Since regression is a more powerful measure than correlation, its results are more reliable than those of correlation. Therefore, more poverty alleviation can be achieved by minimizing costs of production as much as possible together with optimum initial capital for NFAs and land for FAs.

CONCLUSION AND RECOMMENDATIONS

Poverty is high in Mbeya Region, although it may be higher in some other regions of Tanzania. This study reveals that NFAs are very important for reducing rural poverty. They contribute 26.5% to rural poverty alleviation while FAs contribute 73.5%. NFAs can be a source of livelihood especially for families with little land, landless and female-headed households. However, it was observed from the study that NFAs take greater costs than FAs (about five times the costs on FAs in Ileje and Rungwe), hence some households fail to undertake them because of lack of capital. Therefore, the government and rural development agencies should assist the rural poor to get capital so as to diversify their NFAs. This can be done by providing low interest rate credit to rural households wishing to undertake NFAs. Moreover, one major factor that makes FHHs and very poor households get little FA-NHP is their poor access to land. Therefore, the Government should reform land laws so that women and the very poor have better access to land to enable them reduce poverty more using FAs.

Schooling years of household heads and NHP are positively correlated with NHP. Also, NHP in households whose HHs spent more years on formal learning and those whose HHs didn't differ significantly since education improves human capital. Therefore, in order to reduce rural

poverty effectively, RPA programs should have a training component for targeted groups.

It was also found that the majority of FHHs are very poor. Poverty alleviation programs targeting the very poor, without bias on the gender of HHs, can benefit many FHHs. The very poor should be given priority in poverty alleviation programs. Poverty eradication programs by the government should set specific percentages of poverty to reduce each year. Otherwise, the desire by the government to eradicate absolute poverty by the year 2025 will not be realized.

NOTES:

1. Definitions of terms

Adult Equivalent Units (AEU): The number of household members adjusted for composition (by sex and age) and nutrient requirements so that all the members are equivalent to adults. The number is normally smaller than the household size and is even smaller in households with more children, and the old since these need fewer nutrients.

Adjusted adult equivalent units: Adult equivalent units are adjusted for economies of scale, taking into account the fact that larger households may need less resources per person due to sharing of some facilities.

Farm enterprises: Production activities including crop and livestock production, bookkeeping, fishing, aquaculture, forestry and hunting.

Gross Household Product (GHP): Money value of all goods produced and services provided by a household per year.

Household: People who, at the time of the survey, were living together (sleeping under the same roof or in the same compound), including guests who had been there for more than two weeks. Where polygamy existed, the husband, wives and their children were taken to constitute one household.

Household head: The person who is responsible for making day-to-day decisions regarding activities of the household.

Net Household Product (NHP): Total value of products produced and services provided minus total costs incurred to produce the products and provide the services in a year.

Non-farm enterprises: Non-primary economic activities which exclude agricultural and livestock production, forestry, hunting, fishing, aquaculture and bee-keeping, but include services, wage labor, construction, mining, manufacturing, agro-industrial activities, processing and marketing of agricultural commodities.

Poverty alleviation: Gain in net household product.

Poverty line: Income necessary to support a person at the subsistence level for food, shelter, clothing and other necessities per year.

Relative (soft-core) poverty line: Is the same as the poverty line above. It divides a population into the better-off (non-poor) and the poor. The poor include the less (relatively) poor and the very (absolutely) poor.

Absolute (hard-core) poverty line: Is the income level per year below which a person cannot lead life worthy of a human being.

Rural areas: Villages and small towns that were identified as being rural in the 1988 National Population Census.

2. Choice and adjustment of poverty lines

Four different poverty lines have been used to assess poverty in Tanzania. Two of the four lines, that is Tsh 73,877/= and 49,600/= per adult equivalent per year in 1995 prices are more common. Accordingly, they were chosen and used in this research. But their corresponding figures in 1997 are not documented. Therefore, the above lines had to be inflated to get equivalent figures for the year 1997 in which the research was done. Using the monthly percentage change in total national consumer price index for 1995, 1996 and 1997, the upper and lower poverty lines for 1997 were estimated. The upper and lower poverty lines for 1997 were calculated using 1995 upper and lower prices average prices and 1997 average prices. 1997 upper poverty line = upper poverty line (1995) x price index (1997)/price index (1995). This is the same as Tsh. 73,877 x 162.9/116.1 = 103,657 Tsh. Using the same procedure, the 1997 lower poverty line becomes Tsh. 69,594 (Tsh. 49,600 x 162.9/116.1).

3. Expression of variable values per adult equivalent

Adult equivalent scales for Tanzania have not been prepared for any one who may need to use them. In this research they were estimated following Collier *et al.* (1986) procedure in their study in Tanzania. The two-steps procedure was done by combining together nutritional requirement approach and Deaton-and-Muellbauer (1980) approach. In the first step each household member was assigned an appropriate adult equivalent and all weights for all the members were summed up to get household sizes in adult equivalent units (AEU). This step was done to adjust for household composition owing to the fact that, children women and old people need less nutrients than adults, men, and young people, respectively. In the second step the adult equivalent units were multiplied by the average cost factor for a household with the corresponding number of adults to get the adjusted adult equivalent units (AAEU) of each household. This second step was important to take into account economies of scale since larger households need fewer resources per person due to sharing of some facilities. Monetary values for whole households were divided by AAEU of the households to get corresponding values per adult equivalent.

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