MLS PSYCHOLOGY RESEARCH
https://www.mlsjournals.com/Psychology-Research-Journal
ISSN: 2605-5295

How to cite this article:

Cossa, A. F. y Angst, F.A. (2019). The Role of Non-Farm Paid Labor in Agricultural Productivity and Welfare: Evidence from Gaza and Maputo, Southern Mozambique in 2015. *MLS Psychology Research*, *2*(1), 45-64 Doi: 10.33000/mlspr.v2i1.164

THE ROLE OF NON-FARM PAID LABOR IN AGRICULTURAL PRODUCTIVITY AND WELFARE: EVIDENCE FROM GAZA AND MAPUTO, SOUTHERN MOZAMBIQUE IN 2015

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Abstract. In order to make livelihood viable, small and medium holders of agricultural holdings participate in non-farm activities such as wage work. This situation reduce the time devoted to agriculture and causes food insecurity but in other cases increases their agricultural productivity and welfare.This paper assess the role and determinants of non-farm wage labor (NFWL), agricultural productivity and well-being of holders of small and medium farms in Gaza and Maputo, Southern Mozambique. The study is based on the results database of the integrated agrarian survey of 2015, conducted by the Mozambique Ministry of Agriculture and Food Security. Thus, the families participating in NFWL were estimated, segmented by the socio-demographic, productive process and the family welfare indicators by province. The findings show that 55.4% of the farmers occupied by the NFWL in 2015, a major contribution to employment. The factors associated with that participation were the relatively low age, large family size, being unmarried, male household Chief, relatively high schooling, small extension of cultivated land and low food reserve. This situation led to higher agricultural productivity and well-being among NFWL participants by high access to drinking water, domestic animals, cell phones and bicycles. This has led to a favorable self-assessment of the household's economic situation compared to the previous three years, suggesting that NFWL combined with agriculture can constitute a sustainable rural development policy strategy.

Keywords: Small and medium-sized farms; non-farm labor; agricultural productivity; welfare.

PAPEL DO TRABALHO REMUNERADO NÃO-AGRÍCOLA NA PRODUTIVIDADE AGRÍCOLA E BEM-ESTAR: EVIDÊNCIAS DE GAZA E MAPUTO, SUL DE MOÇAMBIQUE EM 2015

Resumo. Na procura de viabilização das condições de vida, os pequenos e médios detentores de explorações agrárias participam em actividades não-agrícolas, como trabalho remunerado, reduzindo assim o tempo dedicado à agricultura, situação que provoca insegurança alimentar mas noutros casos aumenta a sua produtividade agrícola e o bem-estar.Este artigo avalia a importância e os determinantes do trabalho remunerado não-agrícola (TRNA) na produtividade agrícola e bem-estar das famílias agrícolas de Gaza e Maputo, Sul de Moçambique, baseando-se nos resultados do inquérito agrário integrado de 2015, realizado pelo Ministério de Agricultura e Segurança Alimentar. Para alcance desse desiderato, estimaram-se as famílias participantes do TRNA, segmentadas por indicadores socio-demográficos, processo produtivo e bem-estar por província. Os resultados revelam que 55.4% das famílias agro-pecuárias ocuparam-se também do TRNA em 2015, facto que é um grande contributo para emprego. Os factores associados à essa participação foram a idade relativamente baixa do chefe da exploração, tamanho numeroso da família, chefe da família do sexo masculino, não casado, escolaridade relativamente alta, pequena extensão da terra cultivada e baixa reserva alimentar. Essa situação contribuiu para maior produtividade agrícola e melhoria do bem-estar entre participantes do TRNA, avaliado pelo acesso à àgua potavel, posse de animais domésticos, telefone celular e bicicleta. Este facto propiciou à uma auto-avaliação favoravel da situação económica familiar se comparado com os três anos anteriores, o que sugere que o trabalho remunerado não-agrícola combinado com agricultura pode constituir uma estratégia política sustentável do desenvolvimento rural.

Palavras-chaves: Pequena e médias explorações, trabalho remunerado, produtividade agrícola, bem-estar.

PAPEL DEL TRABAJO REMUNERADO NO AGRÍCOLA EN LA PRODUCTIVIDAD AGRÍCOLA Y BIENESTAR: EVIDENCIAS DE GAZA Y MAPUTO, AL SUR DE MOZAMBIQUE EN 2015

Resumen. Para viabilizar las condiciones de vida, proprietarios de las pequeñas y medianas explotaciones agrarias participan en actividades no agrícolas, como trabajo remunerado, reduciendo así el tiempo dedicado a la agricultura, situación que provoca inseguridad alimentaria, pero en otros casos aumenta su productividad agrícola y bienestar. Este artículo evalúa la importancia y los determinantes del trabajo remunerado no agrícola (TRNA) en la productividad agrícola y el bienestar de los agricultores familiares de Gaza y Maputo, sur de Mozambique, basado en los resultados de la encuesta agraria integrada 2015, realizada por el Ministerio de Agricultura y Seguridad Alimentaria. Para ello, fueron estimadas las familias participantes del TRNA, segmentado por los indicadores socio-demográficos, proceso productivo y bienestar por provincia. Los resultados revelan que el 55,4% de las explotaciones se ocuparon en 2015 del TRNA, una gran contribución al empleo. Los factores asociados a esa participación fueron la edad relativamente baja, tamaño numeroso de la familia, responsable familiar del sexo masculino, soltero escolaridad relativamente alta, pequeña extensión de la tierra cultivada y baja reserva alimentaria. Esta situación contribuyó a una mayor productividad agrícola, así como a mejorar el bienestar familiar entre los participantes del TRNA, en términos de acceso a agua potable, animales domésticos, teléfono móvil y bicicleta. Este hecho propició una autoevaluación favorable de la situación económica del hogar en comparación con los tres años anteriores, lo que sugiere que el trabajo remunerado no agrícola combinado con agricultura puede constituir una estrategia política sostenible del desarrollo rural.

Palabras clave: Pequeñas y medianas explotaciones, trabajo remunerado, productividad agrícola, bienestar.

Introduction

In the search for maintaining and imporving living conditions, small and medium-sized family farmers engage in non-agricultural activities, such as paid work or self-employment, thereby reducing the time spent on agricultural activities. In Mozambique, for example, agricultural holdings, as a main activity, decreased from 54 % in 2012 to 49 % in 2015 (Ministério da Agricultura e Segurança Alimentar [MASA], 2017). In the provinces of Maputo and Gaza, exploitation in this condition accounted for 35 % and 48 % of the total, respectively, in 2015 (MASA, 2017).

According to the United Nations Statistics Division [UNSD], (2004), non-agricultural activities are those that do not involve direct work linked to land use, animal husbandry and fishing. Thus, agricultural activity is the cultivation of land, animal production, forestry, fishing, hunting and related services that do not cover the processing of products (UNSD, 2004). Family farming is the agricultural activity carried out by small and medium-sized farms, whose main worker is the family member, with limited access to land and capital resources (Food and Agriculture Organization of the United Nations [FAO], 2012).

The participation of rural families in the non-agricultural sector is a widely studied phenomenon, especially by classical agrarian authors such as Kautsky and Chayanov. For Kautsky (1980 quoted in Schneider 2003, p.106), the development of capitalism in agriculture tends to be subordinated to industry, suppressing the small family farm by the technical progress and superiority of large property. However, Kautsky emphasizes that this process does not necessarily eliminate family farms if they carry out complementary work, whether or not related, to agriculture for their subsistence, a situation that was due to the reduced possession of land and low technological modernization, restricting the capacity of competition.

For Chayanov (1966 quoted in Blad, 2014, p.50), when there is low land tenure for family needs or excess active family members, there is a tendency to occupy the labor force in the non-agricultural sector, ensuring the balance between work and consumption. Thus, for this author, the working family unit is only an advantageous investment if it enables a high level of well-being. For the author, this situation is associated with the age and size of the family. That is, if there are many members of active age, the demand for non-agricultural work increases, if compared with the situation of predominance of the elderly and minor children in the family.

At the developing country level, participation in non-agricultural activities increases employment, demand for inputs, agricultural production, household income and reduces poverty (Anang, 2017; Awoniyi & Salman, 2011; Babatunde, 2015; Dary & Kuunibe, 2012; Kaur, Kulkarni, Gaiha, & Pandey, 2010; Mehta, 2002; Silva & Kodithuwakku, 2005; 2010). In African countries such as Ghana and Nigeria, non-agricultural activities account for between 30 % and 60 % of rural families (Awoniyi & Salman, 2011; Dary & Kuunibe, 2012). In Latin American countries such as Argentina, Mexico and Brazil, between 20 %

and 30 % of the rural population already held non-agricultural activities by the end of 1990 (Schneider, 1999).

In addition, about 35 % to 45 % of Africa's total household income comes from the non-agricultural sector (Haggblade, Hazell, & Reardon, 2007, 2010) and much of the employed earn higher incomes than in agriculture (Jatta, 2013; Ovwigho, 2014; Rantšo, 2016).

The reasons for the participation of rural family producers in non-agricultural activities are diverse, but include a reduction in the risk of agricultural specialization, fluctuations in food prices on the international market (Boughton et al, 2006; Massingarela, Nhate & Oya, 2005), rapid urbanization, economic prosperity linked to non-agricultural employment (Paudel, 2002, Schneider, 2003), declining farm incomes, climate change, and even as a means of subsistence for the rural family (Ellis, 2000; Rantšo, 2016).

In Mozambique, many farming families demand non-agricultural activities due to low agricultural productivity and high levels of poverty and food insecurity in rural areas (Boughton et al., 2006; Cunguara, 2011; Ministério de Economia e Finanças [MEF], 2016; Massingarela et al., 2005). The expansion of non-agricultural work in rural areas is also associated with the implementation of mega-projects of foreign investment in the extractive industry in the last twenty years (Feijó & Agy, 2015), the improvement of roads, the granting of micro-credits by non-governmental organizations and the State (Ministério da Planificação e Desenvolvimento, 2009). Feijó and Agy (2015) found that in areas where large projects of multinational companies such as Tete, Nacala and Maputo are being implemented, non-agricultural activities help cover the costs of health, children's education, improved housing and even the payment of seasonal labor.

The situation described above gives rise to the discussion of the determinants of participation in the non-agricultural sector, as well as its role in risk reduction, as a welfare solution and as a rural development policy.

For some authors, such as Bartlett (1986), where large agricultural areas are divided into small agricultural areas for part-time use, agricultural production may be reduced. Chikwama (2004) and Rantšo (2016) confirm a decline in agricultural productivity in Southern African countries as a result of the steady migration of the labor force to South Africa. Brazil, Nascimento (2005) points to agricultural abandonment in the northeast of the country as an effect of policies to promote non-agricultural activities. This suggests that participation in the non-agricultural sector, in this case work outside the country or in cities, harms agriculture.

On the other hand, participation in the non-agricultural sector depends on family and local conditions. At the household level, available non-agricultural work opportunities differ among income groups (Reardon, 1997; Haggblade et al., 2010; Cunguara, 2011; Cunguara, Langyntuo, & Dranhofer, 2011). In other words, the poorest families demand non-agricultural activities driven by pressure factors, the so-called "push factors", such as risk reduction, diminishing returns on capital, reaction to the crisis or restricted liquidity (Barrett, Reardon, & Webb, 2001; Reardon, 2015). On the other hand, the richest farmers look for non-agricultural activities due to pull factors, mainly accumulation and strategic complementary activities with greater access to means such as credit and higher-yielding non-agricultural jobs (Barrett et al., 2001; Reardon, 2015). At the local level, participation

in the non-agricultural sector depends on infrastructure, such as roads, access to credit and the sale of products (Reardon, 2015). There is a high credit crunch in many African areas, forcing people to engage in agricultural activities (Haggblade et al., 2010).

However, many studies show that farming families associated with non-farming activities as a lifestyle, are more stable than exclusively farming families (Bryceso, 2002; Davis, 2006; Fuller, 1990; Paudel, 2002), reducing poverty and inequality (Kaur et al., 2010; Mehta, 2002; Silva & Kodithuwakku, 2005; 2010; Zhu & Luo, 2005). In Africa, for example, non-agricultural activities contribute to the access of productive assets such as animals and seeds, fertilizers, improved housing and even labor (Cunguara et al., 2011; Feijó & Agy, 2015). In India, the income of farming families engaged in non-farming activities is higher than that of farm-only families (Kaur et al., 2010; Mehta, 2002).

Faced with this scenario, this article seeks to understand: To what extent does participation in non-farm wage labor (NFWL) influence agricultural productivity and the well-being of families on small and medium-sized farms in southern Mozambique? What are the factors influencing participation in non-agricultural paid work?

The article is a reflection, contributing to the design and implementation of sustainable rural development projects and policies.

The overall objective of the article is to assess the importance and determinants of the participation of families with small and medium-sized farms in non-agricultural paid work, in terms of agricultural productivity and well-being in Gaza and Maputo, southern Mozambique, in 2015. The specific objectives are the following:

- To systematize existing theoretical knowledge on family farming, non-agricultural activities, agricultural productivity and welfare.

- To characterize the socio-demographic aspects and the productive process of agriculture and the welfare of the area of study, indicating the determinants and importance of NFWL in productivity and family economic situation.

Structurally, this article presents an introduction, methodology, results, discussion and conclusion.

Methodology

This study consisted of bibliographic research and analysis of the results of the 2015 Integrated Agricultural Survey (AGRIS) conducted by the Ministério da Agricultura e Segurança Alimentar (MASA). The AGRIS is a national survey conducted annually by sampling farms based on an archive resulting from the 2009-2010 agricultural census. The main sample of small and medium-sized farms, the target group of this study, was based on a stratified two-stage design, consisting of 3,500 enumeration areas of the mother sample (MASA, 2017).

An agricultural holding is an isolated or cumulative economic unit, based on the cultivation of plants or the breeding of animals, both for self-consumption and for sale (MASA, 2017). The small and medium farm is an isolated or cumulative property with less

than 50 hectares of cultivated area, with 100 heads of cattle, 500 ruminants (goats, sheep or pigs) and 20,000 birds.

The concept of family nucleus, family and family farm will be used interchangeably as synonyms because most small and medium-sized farms coincide with the household unit.

The family nucleus is the set of individuals living in the same household, under a common budget, excluding members absent for more than one year, although they share responsibilities for consumption, investment and production (MASA, 2017).

Within small and medium-sized farms, only those that had any agricultural or animal production in the reference year were studied, with the results extrapolated to the universe.

The processing of the results was done with the statistical package SPSS. Thus, farms were evaluated, segmented according to the variable "Did the person in charge or any member of the family participate in the non-agricultural paid work?", whose answer was "yes" or "no". This is a categorical variable created from the questions on various non-agricultural remunerated occupations asked in the survey questionnaire. With this variable, the information was collated by province according to three aspects of analysis: sociodemographic, productive process and well-being. Sociodemographic aspects included the analysis of frequency by sex, marital status, but also of mean, median and standard deviation of age, school level and size of the family nucleus. Marital statuses were grouped into two groups: married and single. Married people are officially married, polygamous, and common-law partners while single people included single, widowed, separated, and/or divorced people.

In the production process, the mean, median and standard deviation of cultivated area, external labor, agricultural productivity and yield were analyzed. With respect to welfare, the average and standard deviation of domestic animals, food reserves, frequency of families using drinking water, possession of goods (car, bicycle and cell phone) and by family economic situation were evaluated, compared to 3 previous years.

To check the validity of the results of the continuous variables for the dependent variable (participation in the NFWL), the simple independent t test was used for two samples, assuming equality of variance and mean, at a significance level of 5% and a confidence interval of 95%. To evaluate the association of categorical variables, such as sex, marital status, possession of goods, with participation in the NFWL, the Pearson chi-square test was used, valid at a significance level of 5%.

Indicators of agricultural production, productivity and yield were derived from the database, survey results. Agricultural production comprised the sum of the quantity of cereal, peanut and bean production. Thus, agricultural productivity was calculated by the following formula: APA=AP where:

APA – Agricultural productivity in kg/adult; AP – Agricultural production (kg)

NMF – Number of members of the family nucleus

Thus, agricultural yield was calculated by the following formula:

AY=AP/CA, where:

AY – Agricultural yield (Kg/ha);

AY – Agricultural yield (Kg/ha);

Cultivated area (ha).

Results

The results of AGRIS on family farms of participants in non-agricultural paid work in southern Mozambique are presented here. The interpretation focuses on two major subunits, which guide the main axes of analysis; namely:

- Socio-demographic aspects
- Agricultural production process and welfare

Socio-demographic Aspects

The results of the analysis refer to 60,700 farms, of which 55.4% participated in non-fam wage labor (NFWL) in 3015, compared with 24.7% at the national level (Tables 1 and 2). This meant that in the southern region of Mozambique, there are many farming families participating NFPW.

Table 1
Socio-demographic characteristics of farms in southern Mozambique by 2015

		Gaza			Maputo			Total		
		PArticipated in NFLW								
		Yes	**No**	**Total**	**Yes**	**No**	**Total**	**Yes**	**No**	**Total**
Agricultural Holdings (1000)		22.3	15.8	38.1	11.4	11.1	22.5	33.6	27.0	60.6
Portion of holdings (%)		58.5	41.5	100	50.4	49.6	100.0	55.4	44.6	100.0
Nf Gender (%)	Male	50.6	49.4	100	67.3	32.7	100.0	55.9	44.1	100.0
	Female	49.7	50.3	100	31.0	69.0	100.0	41.2	58.8	100.0
HNf Marital status (%)	Single	62.3	37.7	100	68.3	31.7	100.0	64.4	35.6	100.0
	Married	51.7	48.3	100	40.0	60.0	100.0	47.0	53.0	100.0

Note: HNF – Head of nuclear family Nf – Nuclear family

Source: Adapted from MASA (2017). Results from the Integrated Agricultural Survey 2015.

However, at the geographical level, the results differ as there is a higher frequency of NFWL participants in Gaza (58.5%) than in Maputo (50.4%), which may suggest that there are fewer farms in Maputo involved in non-agricultural work, a consequence of the higher urbanization in the latter province.

In terms of the gender of the farm chief, there are more explorations involved in NFWL among those headed by men (55.9%) than among those headed by women (41.2%).

But that is only noticeable in Maputo, where the number of NFWL participants among these headed by men was 67% compared to 31% of those headed by women in that group.

Regarding marital status, it should be noted that there are more farms with single chiefs (64%) than married chiefs (47%) among NFWL participants, a fact that can be extended to the two provinces, indicating that there is more availability among solitary people to participate in NFWL than among those who live in a conjugal union. In many African areas, such as southern Mozambique, regarding conjugal union, women tend to work mainly in agriculture and children's education.

The participation of family farms in NFWL according to sex, marital status, by province, is statistically significant according to Pearson's chi-square tests as the result of the significance level was less than 5% (Table 2). This suggests that in rural southern Mozambique there is a greater participation in NFWL among members of male-headed, single and Gaza households.

Table 2
Results of chi-square tests for paid work by province, sex and marital status of the chief in southern Mozambique in 2015.

Pearson Chi-Square Tests						
				Gender of the Head of the Nf	**Marital status**	**Province**
Province	Gaza	AF Participated in Nf of the NFWL	Chi-square	3.0	1160.8	
			df	1	1	
			Sig.	.082[b]	.000[*,b]	
	Maputo		Chi-square	2975.3	4815.4	
			df	1	1	
			Sig.	.000[*,b]	.000[*,b]	
Nf PArticipated in NFWL	Chi-square					1412.6
	df					1
	Sig.					.000[*,b]

Note: Results are based on nonempty rows and columns in each inner most subtable.

*. The Chi-square statistic is significant at the .05 level.

b. Some cell counts in this subtable are not integers. They were rounded to the nearest integer before the computation of Chi-square test.

Source: Adapted from MASA (2017). Results from the Integrated Agricultural Survey 2015.

As for the size of the family nucleus, it was high among the participants of the NFWL, registering approximately eight members as opposed to six persons among non-participating farms (Tables 3 and 4).

Table 3
Family size, age, educational level of the farm manager and paid work in southern Mozambique by 2015

		Gaza		Maputo		Total	
		Participated in the NFWL					
		Yes	**No**	**Yes**	**No**	**Yes**	**No**
Nf Size (No.)	Average	8.8	6.4	5.4	6.1	7.6	6.3
	Standard deviation	7,2	5.6	3.5	4.0	6.4	5.0
	Standard error of the average	0.03	0.02	0.02	0.02	0.02	0.02
Age of JNf (years)	Average	44.0	47.7	48.7	49.4	45.7	48.4
	Mean	40.0	46.0	47.0	48.0	44.0	46.0
	Standard deviation	14.6	14.4	11.0	14.4	13.6	14.4
	Standard error of the average	0.11	0.10	0.10	0.14	0.08	0.08
Level of education of JNf (years)	Average	3.8	2.9	5.3	4.1	4.4	3.4
	Mean	4.0	1.0	7.0	2.0	4.0	2.0
	Standard deviation	3.0	3.3	3.6	4.6	3.3	3.9
	Standard error of the average	0.02	0.02	0.03	0.04	0.02	0.02

Note: Source: Adapted from MASA (2017). Results from the Integrated Agricultural Survey 2015.

However, there is great variability, as the standard deviation of the average is 6.4 members among NFWL participants versus 5 members among non-participants. While in Gaza the average family size among NFWL participants registered 8.8 members and a standard deviation of 7.2 compared to an average of 6.4 and a deviation of 5.6 members from non-participating farms, in Maputo the average family size on farms involved in NFWL was 5.4 members, slightly less than non-participating farms. However, in the southern region, with the exception of rural areas influenced by urbanism such as Maputo, agricultural families that develop NFWL have a larger family size than non-involved agricultural units.

As for the average age of the head of the household, this was relatively low in farms engaged in NFWL (45.7 years) compared with non-participating farms (48.4 years), a situation that represents a difference of 2.7 unfavorable years and similar behavior in the two provinces. On average, age maintained the previous structural pattern, with the difference of 2 unfavorable years of NFWL participants versus non-participating farms. The standard deviation was low in relation to the average, assuming the same number of years in the two observation groups (14 years). This situation evidences that the members of the agrarian families participating in the NFWL are younger than those of the non-participants.

The educational level among farm chiefs was very low in rural areas of southern Mozambique in 2015, but slightly high among NFWL participants in a school year, with an average of 4.4 years of educational level in this group compared to 3.4 school years among non-participants. This behavior was similar in the two provinces, with Gaza having the lowest levels of the average. The standard deviation was large to the point of reaching levels close to the average with a difference of one school year in farms with NFWL and above the average among non-participants.

It is evident, according to the results of the statistical tests (Table 4), that the equality of the assumed variance (F) for family size, schooling and age is small in the total of the farms, which configures statistically significant differences since the result of the level of significance is below 5%. In terms of the difference of the average for the same variables, in spite of being slight, a behavior similar to that observed in the variance is highlighted in the t-test. In other words, there is a greater tendency for farms with many family members, with younger people and with more education to participate in NFWL.

Table 4
Results of t-test for equality of variance and average demographic characteristics of family farms in southern Mozambique in 2015

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Size of the Nf	Equal variances assumed	2543	0.000	53.6	230091	0.000	1.30	0.02	1.26	1.35
	Equal variances not assumed			55.0	229811	0.000	1.30	0.02	1.26	1.35
Age	Equal variances assumed	282	.000	-23.5	60669	.000	-2.67	0.11	-2.89	-2.45
	Equal variances not assumed			-23.5	60434	.000	-2.67	0.11	-2.89	-2.45
Educational level	Equal variances assumed	1339	.000	34.7	60669	.000	1.02	0.03	0.96	1.07
	Equal variances not assumed			34.7	59170	.000	1.02	0.03	0.96	1.07

Note: Source: Adapted from MASA (2017). Results from the Integrated Agricultural Survey 2015.

The majority of these remunerated non-farm wage activities are of low level (Figure 1), not requiring high qualifications, a fact explained by the low educational level of those in charge of the farms, as mentioned above.

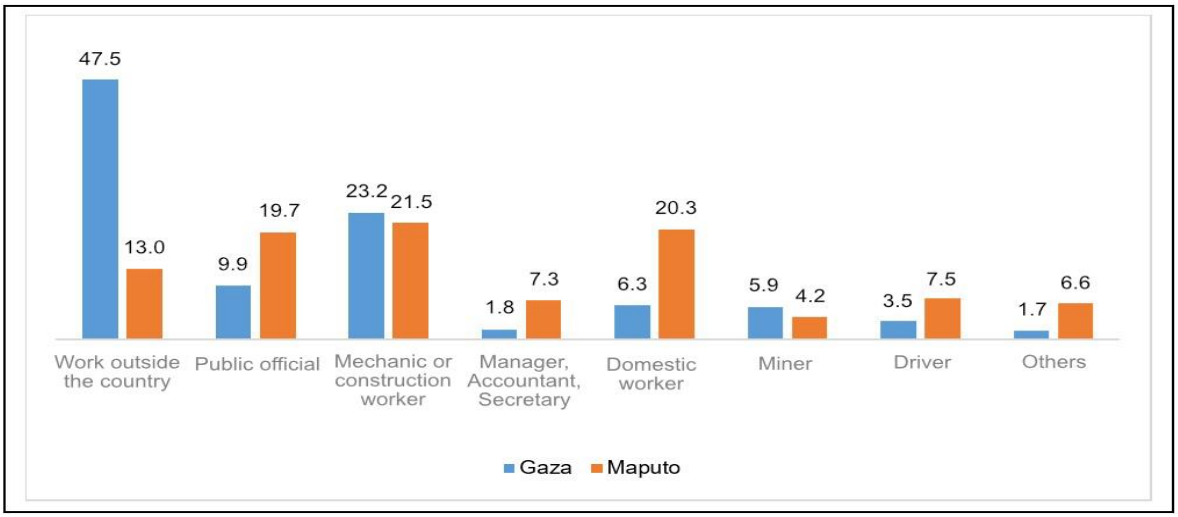

Figure 1. Farms by non-agricultural occupations in southern Mozambique 2015 (%)
Note: Source: Adapted from MASA (2017). Results from the Integrated Agricultural Survey 2015.

These are, in order of importance, work outside the country (47.8%) in the province of Gaza, domestic work (20.3%) and as a public servant (19.7%), generally in low-quality occupations in Maputo, as well as mechanical repair and construction work, common in both provinces.

In Maputo, transport activities still stand out, with many members being car drivers, management, accounting and office workers in small numbers, as well as other unspecified activities, including informal trade, accommodation, catering, surveillance and security. Work outside the country is currently different from that of miners, consisting of migrant work in the areas of agroindustry, construction, transport, tourism, trade and beauty services in neighboring countries such as South Africa and Eswatini.

Agricultural production process and welfare

In family farms in the south of the country, the cultivated area is very low as in the rest of the country, averaging 0.45 hectares among NFWL participants versus 0.74 hectares among non-participating farms, revealing a statistically significant difference of 0.28 hectares (Tables 5 and 6). The standard deviation of the average slightly supplanted the average in the two groups. At the geographical level, the unfavorable trend of the difference in the average cultivated area of the farms participating in NFWL (Table 6) versus non-participating farms was similar, with very high variability among Maputo farms.

Table 5

Characteristics of the family agricultural production process in southern Mozambique 2015

		Gaza		Maputo		Total	
		Participated in NFWL					
		Yes	No	Yes	No	Yes	No
Cultivated area	Average	0.405	0.602	0.52	0.96	0.446	0.736

(ha)	Standard deviation	0.516	0.561	0.29	1.021	0.449	0.786
Temporary contracts (No.)	Average	2.0	6.6	2.3	2.6	2.1	3.7
	Standard deviation	0.5	1.9	1.1	1.8	0.7	2.5
Full-time contracts (No.)	Average	1.8	1.0	1.0	1.1	1.4	1.1
	Standard deviation	1.1	0.0	0.0	0.5	0.9	0.4
Agricultural productivity (Kg/person)	Average	245.8	81.6	109.1	75.7	182.0	80.4
	Median	57.8	26.8	57.8	11.0	57.8	25.0
	Standard deviation	379.7	173.1	157.4	116.6	305.1	163.7
Agricultural output (Kg/ha)	Average	1940.8	463.4	474.3	394.9	1236.1	450.2
	Median	321.5	169.3	122.7	111.8	157.4	148.1
	Standard deviation	3312.8	978.7	778.4	498.7	2555.1	906.2
Domestic animals (No.)	Average	5.6	5.8	10.4	6.1	6.6	5.9
	Standard deviation	6.0	5.0	11.4	3.7	7.7	4.7
Food reserve (months)	Average	2.06	2.60	1.90	1.30	1.96	2.39
	Standard deviation	1.0	1.4	0.3	0.5	0.7	1.4

Note: Source: Adapted from MASA (2017). Results from the Integrated Agricultural Survey 2015.

Table 6

Results of t-test for family agricultural production in southern Mozambique 2015

Independent Samples Test										
		Levene's Test for Equality of Variances		**t-test for Equality of Means**						
		F	**Sig.**	**t**	**df**	**Sig. (2-tailed)**	**Mean Difference**	**Std. Error Difference**	**95% Confidence Interval of the Difference**	
									Lower	**Upper**
Cultivated area (ha)	Equal variances assumed	3357	0.000	-55.81	60669	0.000	-.290	.005	-.30	-.28
	Equal variances not assumed			-55.77	48150	0.000	-.290	.005	-.30	-.28
Temporary contracts (No.)	Equal variances assumed	10550	0.000	-43.39	13767	0.000	-1.612	.037	-1.68	-1.54
	Equal variances not assumed			-55.72	11098	0.000	-1.612	.029	-1.67	-1.55
Full-time contracts (No.)	Equal variances assumed	1193	.000	19.33	9506	.000	.276	.014	.25	.30
	Equal variances not assumed			20.15	7828	.000	.276	.014	.25	.30
Agricultural productivity (Kg/person)	Equal variances assumed	3916	0.000	39.66	40281	0.000	101.57	2.56	96.55	106.59
	Equal variances not assumed			42.94	36857	0.000	101.57	2.37	96.93	106.21
Agricultural output (Kg/ha)	Equal variances assumed	4287	0.000	38.57	39623	0.000	785.88	20.37	745.95	825.82

	Equal variances not assumed			42.66	29253	0.000	785.88	18.42	749.77	821.99
Domestic animals (No.)	Equal variances assumed	605.8	.000	6.6	13278	.000	.71	.11	.50	.92
	Equal variances not assumed			6.0	7754	.000	.71	.12	.48	.94
Food reserve (months)	Equal variances assumed	3286.4	0.000	-19.9	9112	.000	-.43	.02	-.47	-.38
	Equal variances not assumed			-16.0	3716	.000	-.43	.03	-.48	-.37

Note: Source: Adapted from MASA (2017). Results from the Integrated Agricultural Survey 2015.

In table 5, it is indicated that outsourcing of labor recruitment on fixed-term contract registered an average difference slightly unfavorable for the exploitations involved in NFWL for two individuals, with standard deviation below average in both groups. However, this difference was only observed in Gaza.

Concerning full-time job, in Table 5 we observe that exploitations involved in NFWL employed 1.4 individuals, as opposed to the 1.1 individuals observed for non-involved exploitations, in an environment in which standard deviation was below average in both groups. Nevertheless, this result is statistically significant according to the results of the observed evidence T (Table 6), registered as related to temporary labor, only in Gaza, where the average was above that of the non-involved by a difference of one individual.

In Table 5 the fact that agricultural productivity in family exploitations involved in NFWL was, on average, 182 kg as opposed to 80.4 kg in non-involved exploitations, a difference of 101.6 kg but with great variability. However, standard productivity deviation in the NFWL-participating exploitations is 123.1 kg, as opposed to 83 kg in the non-participating ones. On Table 6, we should note that in the variance assumed with evidence F for agricultural productivity, certified by the the significance level result which is under 5%, the difference is statistically significant. The average distribution tendency and standard deviation in agricultural productivity was similar in both provinces. When considering the median, the behavioral pattern assumed on average is proved to be similar, but in low productivity levels. Half of the families (median) participating in the TRNA had over twice the agricultural production (57.8 kg) that those who did not participate. There is a tendency, observed in both regions alike, for the exploitations involved in NFWL in Maputo to surpass the agricultural production of those not involved by five times.

The data on farm income, available on Table 5, also indicates the same tendency explained before concerning productivity in terms of average, standard deviation and median. In fact, average farm income of the exploitations involved in NFWL more than doubled (1236.1 kg/ha) that of non-participating exploitations, a situation in which standard deviation doubled the average. This fact leads to the consideration that median is a better indicator whose tendency shows a positive average difference in favor of the exploitations involved in NFWL in general and in both regions.

The average difference between agricultural productivity and output, significantly favorable for the exploitations focused on NFWL (Table 6) opposes the difference of the average cultivated area and seasonal labor, unfavorable for this group. However, we must remember that family exploitations participating in NFWL register more men and single people in terms of marital state, education level and family members (Table 3), important assets for agricultural productivity.

Concerning well-being, and considering property ownership, such as domestic animals, the results of evidence T underline a positive difference in the average of these assets in favor of exploitations focused on NFWL, in a situation in which standard deviation surpasses the average one. This difference is particularly large in the province of Maputo, where it reaches 4 animals. The domestic animals analyzed were, ranked by importance, chickens, ducks, goats, pigs, sheep and cows, among which the first group is present in many exploitations.

For high productivity among family exploitations focused on NFWL, high agricultural food reserve was expected. On Tables 5 and 6 we can observe that thes reserve was given in average in two months, without great variability, but the average difference is statistically significant and unfavorable for the exploitations involved in NWFL.

When considering other indicators of well-being such as access to drinking water, possession of a bicycle, car and cell phone in the two provinces, a higher relative frequency of farms participating in NFWL than those not involved is highlighted (Table 7), the results being statistically significant according to the Pearson's chi-squared tests (Table 8). Exception to this assertion are cars in Maputo province, where the slight difference of farms is unfavorably significant of the farms participating in NFWL.

Table 7
Possession of assets and family economic situation in southern Mozambique in 2015 (%).

		Gaza		Maputo		Total	
		Participated in NFWL					
		Yes	No	Yes	No	Yes	No
Nf with automobile		9.6	0.5	5.2	7.0	8.0	3.0
Nf with bicycle		30.4	15.5	8.8	3.2	22.4	10.9
Nf with mobile phone		96.5	81.5	90.5	64.7	94.3	75.2
Nf with access to drinking water		23.1	6.4	8.7	1.7	17.8	4.6
Nf economic situation compared to 3 previous yearss	Better tan 3 years ago	9.8	3.1	13.7	6.7	11.2	4.4
	Same as 3 years ago	13.9	21.7	11.3	24.3	13.0	22.7
	Wrose tan 3 years ago	76.3	75.2	75.0	69.0	75.8	72.9
	Total	100.0	100.0	100.0	100.0	100.0	100.0

Note: Source: Adapted from MASA (2017). Results from the Integrated Agricultural Survey 2015.

Table 8
Results of the Pearson's chi-square test for the asset holding and the family economic situation in southern Mozambique in 2015

Pearson Chi-Square Tests					
	Nf with automobile	Nf with bicycle	Nf with mobile phone	Nf with access to drinking	Family economic situation

						water	
Province	Gaza	Chi-square	1619.7	1184.1	2206.3	2096.8	986.3
		df	1	1	1	1	2
		Sig.	.000[*,b]	.000[*,b]	.000[*,b]	.000[*,b]	.000[*,b]
	Maputo	Chi-square	31.9	322.9	2157.3	569.3	831.8
		df	1	1	1	1	2
		Sig.	.000[*,b]	.000[*,b]	.000[*,b]	.000[*,b]	.000[*,b]
Nf Participated in NFWL	Chi-square		738.4	1452.2	4290.6	2629.9	1710.7
	df		1	1	1	1	2
	Sig.		.000[*,b]	.000[*,b]	.000[*,b]	.000[*,b]	.000[*,b]

Note: Results are based on nonempty rows and columns in each innermost subtable.

a.*. The Chi-square statistic is significant at the .05 level.

b. Some cell counts in this subtable are not integers. They were rounded to the nearest integer before the computation of Chi-square test.

Note: Source: Adapted from MASA (2017). Results from the Integrated Agricultural Survey 2015.

Moreover, the holding of these assets is greatly affected by the province of Gaza, as the frequency and difference with non-participating farms are much higher than in Maputo. Actually, family farms with these means are more frequent in Gaza, with relative frequency differences overwhelmingly favorable for farms participating in NFWL.

With regard to the economic situation of the nuclear family compared to 3 years ago, according to the farm manager, he highlights that few farms were in better living conditions in 2015 than 3 years ago in the two provinces (Table 7). Of these few farms, there is a higher frequency of farms participating in NFWL with better living conditions, with a 7% difference in proportion, compared to non-participating farms. However, these results are statistically significant both at the general level and at the level of the two provinces.

Discussion

The results of the study highlight a high participation of family farms participating in NFWL (55.4%). This frequency is above that the reported by Haggblade et al. (2007), when they estimated non-farm employment at 35% to 45% of the rural African population; they still correspond to studies by Awoniyi and Salman (2011) and Dary and Kuunibe (2012) on Nigeria and Ghana, respectively, which found that between 30% and 60% of farms develop non-farm wage labor.

However, there are some geographical differences with the province of Gaza assuming a higher frequency of farms participating in NFWL (58.5%) compared to Maputo (50.4%), which can be linked to the higher level of urbanization in the latter.

The results show an increased participation of men and single men, as farm managers, in the NFWL, mainly in Maputo, suggesting the continuation of male-dominated power in gender relations. To this end, in Mozambique, women have a low schooling level,

which prevents them from doing quality non-agricultural work far from home, as observed by Babatunde (2015) and Cunguara et al. (2011). Data also show an apparent NFWL participation equality between men and women in farm leadership. This is due to the trend of men migrating to urban areas and neighboring countries in search of employment opportunities, as noted by Anang (2017), Awoniyi and Salman (2011) and Cunguara et al. (2011).

The results show a tendency towards a higher level of education and family size, as well as a relatively low age among NFWL participants. It confirms Chayanov's theory, suggesting these factors as intrinsic determinants of non-agricultural paid work demand within the family or for individuals owning farms, according to Schneider (2003), Nacimiento (2005) and Cardoso (2013).

In terms of the production process, low numbers of cultivated area and temporary labor for farms engaged in NFWL stand out. They suggest that paid work reduces cultivated area, especially when agriculture is not mechanized. Bartlett (1986), Chikwama (2004) and Ovwigho (2014) have already pointed this out.

It depends on the production process that full-time workers' use, agricultural productivity and yields are significantly favorable to NFWL farms. A seemingly paradoxical fact, given that the cultivated area and temporary labor in that group are unfavorable. However, farms involved in NFWL have more family members, men, single people and slightly higher schooling in the family: essential assets for increasing productivity. In addition, the fact that these farms are engaged in NFWL suggests that they invest part of their income in agriculture to pay for full-time external labor. This situation confirms that participation in non-agricultural work contributes to increased agricultural productivity (Barrett & Reardon, 2000; Davis, 2006; Haggblade et al., 2007, 2010; Paudel, 2002) and contradicts Chikwama (2014) and Rantšo (2016).

In terms of welfare, evaluated by the goods' possession (animals, access to drinking water, possession of a bicycle, car and cell phone), it is found to be favorable to farms dedicated to NFWL. However, its agricultural food reserve is slightly low when compared to purely agricultural holdings. This suggests that, given the big family size among NFWL participating farms, agricultural productivity is not sufficient for maintaining a high agricultural food reserve during the year. It indicates that both food insecurity and the need to acquire more assets, e.g. from domestic animals, are NFWL participation's demanding factors.

Regarding the family's economic situation, an improvement in NFWL participating farms is highlighted, although reduced (9%). It suggests that they have a relatively better welfare than those that only develop agriculture. This fact confirms Feijó and Agy (2015) as well as Rantšo (2016) empirical work. They underlined that non-agricultural work, permanently combined with agriculture, at family or individual level in rural areas, contributes to poverty reduction.

Conclusion

This article had the aim of analyzing the importance and the determinants of Non-Farm Wage Labor among small and medium-sized farm owners in the south of Mozambique regarding productivity and welfare.

The analysis emphasizes that the NFWL has many adhesions in the south of the country because more than half of the family producers are dedicated to this activity, being more salient the rural areas with more migration, such as Gaza, the farmers leaded by men, with single people and with little ownership of cultivated land. The families involved in the NFWL have many members in the family core, relatively young and with higher schooling levels. However, in Maputo, it is necessary to consider this situation relatively due to the family size of the holding participating is smaller than in the non-participating ones, which reflects the urbanization and the greater possibility to get access to education.

The participating holdings in the NFWL have few temporary staff working and more people hired full-time in more rural areas such as Gaza face to the exclusively agricultural holdings, but in more affected areas by urbanism, such as Maputo, there is no difference between both groups due to the several non-farm employment and output sale opportunities.

Subsequently, the agricultural productivity and performance were higher in the holdings involved in the NFWL, but the food reserve was low in the areas dominated by rurality such as Gaza, which might be due to the large family size which dilutes the effect of the high productivity. In the areas affected by urbanism. Such as Maputo, the engagement in the NFWL results in a better food security.

However, there is an improvement of welfare in the families involved in the NFWL, assessed by the possession of basic mobility means, such as a bicycle, and by the access to the information and communication technologies, as well as the access to drinking water, which leads to a favorable assessment of the family economic situation.

This situation suggests that a sustainable rural development policy for Mozambique goes through a conception of rurality as a multi-sectoral and multi-functional areas, a food and raw material production space and consumption, leisure, processing of goods and service provision area.

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Date received: 07/02/2019
Date reviewed: 11/02/2019
Date accepted: 26/04/2019