



## IMPACT OF WEST AFRICAN SOY LIMITED (WASIL) ON MAIZE FARMERS PRODUCTIVITY IN NORTH WESTERN, NIGERIA

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### ABSTRACT

The study examined the impact of West African Soy Limited Maize Farmers Intervention Scheme on maize farmers' productivity. The study employed farm budgeting technique Gross Margin Analysis and Net Farm Income in order to net out the impact of the programme on the maize productivity of the beneficiaries. Purposive and proportionate sampling technique was used in selecting 282 households' heads who benefitted from the programme while another 282 non-beneficiaries' households were randomly selected and used as control group. Data were collected through the administration of questionnaire and analyzed using descriptive and inferential statistics. The result of the socio-economic characteristics revealed that both beneficiaries and non-beneficiaries are in their active years with a mean of 40 years and they are mostly married 83% and 77% for both beneficiaries and non-beneficiaries respectively. On the part of household size, the beneficiaries have a household size of an average of 9 persons while the non-beneficiaries are with an average of 7 persons, for the years of experience the beneficiaries and non-beneficiaries have a mean of 12 and 13 years respectively. The results of gross margin analysis revealed that for every N1 invested in maize production by the beneficiaries and non-beneficiaries in the study areas a profit of N 9.9k/ha and N5.5k/ha is made respectively. Thus, it could be concluded that maize production for beneficiaries is more economically viable when compared with the N9.9k/ha profit made by the beneficiaries, it can be concluded that the beneficiaries make more profit from maize production in the study area than the non-beneficiaries. The programme, though a private sector initiative is such that has the potential of ensuring increased income for the poor resource small holder farmers in the rural areas of North-Western, Nigeria. The study therefore recommends that female household heads need to be encouraged to key into the programme in order to improve their income base.

**Keywords:** Gross, Margin, Analysis, Farm, Income, WASIL

### INTRODUCTION

Despite the discovery of crude oil and the rapid development in the industrial sector in recent years, Nigeria's economy is still greatly influenced by agricultural sector (Food and Agricultural Organization, (FAO) 2019). This is evident in the fact that some Nigeria communities are mostly rural and agrarian by occupation as over 70% of the 150 million people in these rural areas are engaged in agricultural production Iheanacho and Ozegbe (2020). However, the Nigerian agriculture is still at subsistence level hence the need to increase research and development efforts as well as extension outreach. Several agricultural empowerment projects and funding windows aimed at boosting food production and farmer's income through the provision of agricultural infrastructure, inputs and effective extension services have been introduced. A few of these programmes made positive impact to the economy while others could not. To boost food production, some of the introduced programmes included the following (Foreign Direct Investment (FDI), 2020): National Accelerated Industrial Crops programme (NAICP) in 1981, Special Rice Programme (SRP) 1997, Sasakawa Global (SG) 2000, Agricultural Research Council of Nigeria 2007, and Agricultural Transformation Agenda 2011, the Fadama I, II, III and the Fadama Additional Finance, Anchor Borrowers scheme, Agricultural Transformation Agenda and Commercial Agricultural Development Project. Government and Non-governmental organization have taken several steps over the years to use agriculture as a vehicle to alleviate poverty and attain food security, yet there is low and declining production of Nigeria agricultural sector due to poorly developed irrigation facilities, non-access to funds, inadequate



infrastructure, ineffective agricultural research and extension systems, non-availability and poor distribution of key inputs (Fertilizers, chemicals, machinery and improved seeds (Nwaobiala, 2019). Supporting this view, FDI (2020) argued that the various attempts by Nigerian government in initiating agricultural development projects aimed at achieving food security have failed to yield the desired objective. These government projects and interventions are essential for agricultural development in Nigeria, as Egbunike and Emadamowo (2018) asserted that such government projects are considered not only as key determinant for driving economic transformation but also as a critical element for fostering innovation and competitiveness. Iheanacho and Ozegbe (2020) posited that several constraints are associated with such government projects and their implementation. These include poor project funding, low level of local government support, poor community support, capacity building. It is worthy of note at this point that apart from the above-mentioned national efforts, Nigeria has had and is still having other livelihood enhancement programmes being powered by several Non-Governmental Organizations (NGOs). An example of such NGO is the West African Cotton Limited (WACOT) through its subsidiary, the West Africa Soy Limited (WASIL).

WASIL a subsidiary of WACOT with the mandate of promoting maize farming and enhancing maize farmers livelihood in North West Nigeria. WASIL has its presence in four (4) North Western states (Kaduna, Katsina, Kano and Jigawa) with a mandate of working with farmers, granting extension support, provision of credit facilitation, market outsourcing, provision of inputs and promotion of maize farming in those states. WASIL commenced operation about 2016 which is about 7 years ago in North Western Nigeria and the programme is targeted its own cotton farmers whose means of livelihood is maize farming. The programme has as its main objective, livelihood enhancement through increased production, income and food security. WASIL intends to increase production of the its maize farmers in the study area through the deliverables they provide such as fertilizer, chemicals, planting materials, credit supply and facilitation, and extension services which is all aimed at increasing their farm productivity which they hope will later translate into increased output in terms of bags per hectare (WASIL, 2018). While WASIL has been in operation and has been carrying out its poverty alleviation, food security and livelihood enhancement activities through provision of inputs such as chemicals, seeds, fertilizer and advisory services, credit facilitation, and market linkages in the North-West region of Nigeria for the past 7 years. There are anecdotal evidences that some challenges are responsible for its inability to spread its influence to other parts of the region and as well make its impact felt in the region since its inception. This reality provides the justification for an empirical study such as this to assess the constraints faced by beneficiaries of WASIL intervention programme in the study area with the following specific objectives,

- i. describe the socio-economic characteristics of programme beneficiaries and non-beneficiaries in the study area
- ii. to determined maize productivity among beneficiaries and non-beneficiaries in the study area.

## **METHODOLOGY**

### **Study Area**

The North-Western region of Nigeria comprises of seven states namely Katsina, Kaduna, Zamfara, Kebbi, Sokoto, Kano and Jigawa. The region is located between Latitude  $9^{\circ} 0' 0''$  N and  $13^{\circ} 0' 0''$  N of the Equator and Longitudes  $6^{\circ} 0' 0''$  and  $10^{\circ} 7' 0''$  E of the Greenwich meridian as revealed by Figure 1. The region occupies a land mass of about 216 065 km<sup>2</sup> which translates to about 18% of the total land area of Nigeria. As projected from the National Population Commission (NPC) (2006) estimates, there are 53, 154, 891 million people living in the region with majority having agriculture as their major means of livelihood. The soil is reddish brown or brown soils of the semi-arid and arid areas and are known as tropical ferruginous soils which are made up of about 85% sand with pH values that varied between 6.0-7.0 (Dogonyaro *et al.*, 2022). The area is known for low annual rainfall with less than 1000 mm of rain with prolonged dry season of up to 9 months. The rainfall intensity is between the months of July and August with a minimum rainfall of 60mm and a maximum of 99mm. The major crops grown in the region are maize, millet, sorghum, cowpea and beans. The North



Western region of Nigeria is bounded to the North by Niger Republic, North East by Yobe state, South East by Bauchi and Plateau State, to the South by FCT and Nassarawa state, South West by Niger State and to the North West by Zamfara state (Multidimensional Poverty Peer Network (MPPN, 2019).

### **Sampling Procedure and Sample Size**

The study was carried out in Jigawa State, which consist of the four (4) States where WASIL is present such as (Katsina, Kaduna, Kano and Jigawa) out of which (3) States (Kaduna, Katsina and Jigawa) were purposively selected for this study because of the specificity of WASIL on maize production in the states. A Multi-stage sampling technique was used to select the sample for the study which involves the following stages: Stage I: involves a purposive selection of Kaduna, Katsina and Jigawa States because WASIL programmes in these selected states is specific on maize production; Stage II: involves a purposive selection of two (2) LGAs from each State. In this regard, Zaria and Giwa in Kaduna State, Malumfashi and Kafur in Katsina State, and Gagarawa and Gumel LGAs Jigawa State. The reason for the selection of the LGAs in these states was based on the concentration of maize farmers in them more than in other LGAs in the states. Stage III: From a list of WASIL register made available, there were 1,052 maize farmers in the selected LGAs out of which 282 maize farmers were proportionately selected with RAOSOFT sample size calculator using 5% of the population at 5% level of significance. Stage IV: A list of 2710 registered maize farmers who were not on WASIL list of farmers was obtained from ADPs of the three states out of which 282 was randomly and proportionately selected as control group. As revealed by Table 1.

**Table 1: Sampling Procedure and Sample Size**

<b>PARTICIPANTS</b>				<b>NON- PARTICIPANTS</b>			
<b>STATE</b>	<b>Local Government Area</b>	<b>Sample Frame</b>	<b>Sample Size</b>	<b>STATE</b>	<b>Local Government Area</b>	<b>Sample Frame</b>	<b>Sample Size</b>
Jigawa	Gagarawa	73	19	Jigawa	Gagarawa	100	10
	Gumel	81	22		Gumel	160	17
Kaduna	Zaria	59	16	Kaduna	Zaria	1000	104
	Giwa	8	2		Giwa	1000	104
Katsina	Malumfashi	660	177	Katsina	Malumfashi	250	26
	Kafur	171	46		Kafur	200	21
<b>TOTAL</b>		<b>1052</b>	<b>282</b>	<b>TOTAL</b>		<b>2710</b>	<b>282</b>

### **Data Collection and Data Analysis**

Data for the study were collected through the administration of structured questionnaire and analyzed using descriptive statistics such as means percentages to achieve the socioeconomic characteristics of both beneficiaries and non-beneficiaries while The impact of WASIL farming intervention on maize producers income was determined using the farm budgetary technique such as the Net-farm Income and Gross Margin Analysis.

$$GM = TR - TVC \dots \dots \dots (1)$$

$$NFI = GM - TFC \dots \dots \dots (2)$$

Where GM= Gross Margin/Ha

TR= Total Revenue/Ha

TVC= Total Variable Cost/ Ha

TFC = total fixed cost

Total revenue is the monetary value of the output.

TR=Py.Y

Where

Py = Price per unit of output

Y = maize output (kg).



## RESULTS AND DISCUSSION

### **Socioeconomic Characteristics of Beneficiaries and Non-beneficiaries of WASIL Maize Intervention Programme**

The distribution of respondents by age is presented in Table 2. shows that both beneficiaries and non-beneficiary household head. The mean age of the beneficiaries and non-beneficiaries were 44 years and 40 years respectively which implies that both the beneficiaries and non-beneficiaries are in their active age range which can influence their participation. This result is consistent with the findings of Matere, Busienel and Mbatia (2020) who obtained 46 and 48 years as mean age of rice farmers in Ekiti and Ogun States respectively. Mani *et al.* (2022) found that the estimated average age of rice farmers under traditional technology was 42 years while 45 years was obtained among rice farmers under improved technology. They asserted that farmers within the productive age of 20-45 years are likely to have the necessary physical stamina required to carry out farm operations. The pooled result shows that there are more male maize farmers among the beneficiaries of the WMIP when compared with their female counterpart (95.4%) and (70.9%) respectively. The implication of these result is that men were the head and bread winner in most homes and due to the demands of running the home/family they will have to take any form of risk not limited to participation in any intervention programme such as WMIP so as to increase their productive capacity as well as more income which can further translate into improved standard of living.

The findings, is in agreement with Mba and Mgbenka (2016) who noted that yam production in Rivers State, Nigeria was dominated by males and it could be attributed to the energy demanding activities involved in yam production which require men who are naturally endowed with abundant strength necessary for the job. The results further showed that majority (83%) of the respondents were married among beneficiaries as compared to (77%) among non-beneficiaries. Respondents that were single by marital status constituted (9.6%) and (20.9%) among beneficiaries and non-beneficiaries of WMIP, respectively. Farmers who are married are likely to have family labour force that can contribute to farm labour especially when the agricultural intervention programme is labour intensive as its always the case with agricultural driven programmes. Mani *et al.* (2022) reported that large percentage of married respondents among maize farmers is an indication that more members will likely be available for crop production. The results also showed that the beneficiaries had a mean household-size of 9 persons while the non-beneficiaries have a mean household-size of 7 persons. The household-size maybe related to the number of household members that will be available for farm work. There is a probability that the larger the household-size the greater the volume of farm work that will be absorbed by household labour. This socio-economic variable is expected to influence the participation in programmes that are beneficial and has considerable labour requirement. Olanrewaju *et al.* (2020) asserts that household-size is an important index in rural development intervention which can affect the outcome of such intervention. In addition, the results from Table 2 showed that the mean years of experience in maize farming among beneficiaries of WMIP was slightly lower (12years) than that of non-beneficiaries (13years). Conversely the mean years of experience in maize farming among beneficiaries in Kaduna State (20 years) was higher than that of non-beneficiaries (13years). In Katsina State, mean years of experience in maize production among beneficiaries (11years) was slightly lower than that of the beneficiaries 12years. In Jigawa, State the mean years of experience among beneficiaries 10 years was lower than that of the non-beneficiaries which is 16 years. Farming experience can have both negative and positive effect/influence on programme participation. With more experience, maize farmers can be cautious and unwilling to take risk with less experience they might be eager and anxious to embrace any intervention programme that promises to improve their living standard.



**Table 2:** Socio-Economic Characteristics of Beneficiaries and Non-beneficiaries of WASIL Maize Intervention Programme in Kaduna, Katsina and Jigawa States

	Kaduna		Katsina		Jigawa		Pooled	
Age	N.B	B	N.B	B	N.B	B	N.B	B
10-19	0	1(0.5)	0	0	0	0	0	1(0.4)
20-29	0	44(21.2)	12(5.4)	8(17.0)	3(7.3)	0	15(5.3)	52(18.4)
30-39	4(22.2)	50(24.0)	64(28.1)	15(31.9)	12(29.3)	4(14.8)	80(28.4)	69(24.5)
40-49	8(44.4)	66(31.7)	65(29.2)	9(19.1)	10(24.4)	11(40.7)	83(29.4)	86(30.5)
50-59	6(33.3)	36(17.3)	56(25.1)	8(17.0)	12(29.2)	10(37.0)	74(26.2)	54(19.1)
60-69	0	10(4.8)	26(11.6)	4(8.5)	4(9.8)	2(7.4)	30(10.6)	16(5.7)
70-79	0	1(0.5)	0	3(6.4)	0	0	0	4(1.4)
<b>X</b>	<b>45</b>	<b>39</b>	<b>44</b>	<b>42</b>	<b>43</b>	<b>46</b>	<b>44</b>	<b>40</b>
<b>Sex</b>								
Male	18(100)	197(94.7)	155(69.5)	45(95.7)	21(51.2)	27(100)	200(70.9)	269(95.4)
Female	0	11(5.3)	68(30.5)	2(4.3)	20(48.8)	0	82(29.1)	13(4.6)
<b>Marital Status</b>								
Married	18(100)	152(73.1)	184(82.5)	38(80.9)	32(78)	27(100)	234(83)	217(77)
Single	0	51(24.5)	23(10.3)	8(17.0)	4(9.8)	0	27(9.6)	59(20.9)
Divorce	0	3(1.4)	8(3.6)	0(0)	3(7.3)	0	11(3.9)	3(1.1)
Widow	0	2(1.0)	5(2.2)	1(2.1)	1(2.4)	0	6(2.1)	3(1.1)
Widower	0	0	3(1.3)	0(0)	1(2.4)	0	4(1.4)	0
<b>X</b>							<b>X=1.3</b>	<b>X=1</b>
<b>House Hold Size</b>								
0-9	8(44.4)	158(76)	134(60.1)	35(74.5)	34(82.9)	14(51.9)	176(62.4)	207(73.4)
10-19	7(38.9)	42(20.2)	88(39.5)	10(21.3)	7(17.1)	10(37)	102(36.2)	62(21.9)
20-29	2(11.1)	7(3.4)	1(0.4)	2(4.2)	0	3(11.1)	3(1.1)	11(3.9)
30-39	1(5.6)	1(0.4)	0	0	0	0	1(0.3)	2(0.7)
<b>X</b>	<b>12</b>	<b>6</b>	<b>9</b>	<b>8</b>	<b>6</b>	<b>11</b>	<b>9</b>	<b>7</b>
<b>Farming Experience</b>								
0-9	1(56)	88(42.3)	82(36.8)	0	15(36.6)	7(25.9)	98(34.8)	95(33.7)
10-19	6(33.3)	58(27.9)	123(55.2)	0	25(61.0)	11(40.7)	154(54.6)	69(24.5)
20-29	6(33.3)	35(10.8)	15(6.7)	8(17.0)	1(2.4)	3(11.1)	22(7.8)	46(16.3)
30-39	4(22.2)	22(10.6)	2(0.9)	15(31.9)	0	5(18.5)	6(2.1)	42(14.9)
40-49	1(5.6)	5(2.4)	1(0.4)	9(19.1)	0	1(3.7)	2(0.7)	15(5.3)
50-59	0	0	0	8(17.0)	0	0	0	8(2.8)
60-69	0	0	0	4(8.5)	0	0	0	4(1.4)
70-79	0	0	0	3(6.4)	0	0	0	3(1.1)
<b>X</b>	<b>20</b>	<b>13</b>	<b>11</b>	<b>12</b>	<b>10</b>	<b>16</b>	<b>12</b>	<b>13</b>
<b>Total</b>	<b>18(100)</b>	<b>208(100)</b>	<b>223(100)</b>	<b>47(100)</b>	<b>41(100)</b>	<b>27(100)</b>	<b>282(100)</b>	<b>282(100)</b>

Source: Authors' Analysis, 2022

KEY:

1. N.B = Non- beneficiary
2. B = Beneficiary
3. X = Mean

### Cost and Return on Maize Production in Naira/Ha

Results presented in Table 3. indicates that for the beneficiary the Total Fixed Cost (TFC) was N51,351.00 while the (TC) was 66,785,417.00 and the Net Farm Income (NFI) was N664,142,582.00, the TR=N73092800 and the gross margin (G.M) was N664,193,934.00 while the Total Variable Cost (TVC) is N667,340,65.00 and the Total Revenue (TR) is N730,928,000.00. The average rate of return on Investment (Return Per Naira Invested) is 9.94, indicating that every 1 percent increase in maize production in the study area will lead to a profit of N9.9k. while for the non-beneficiaries the result on the table 18 showed that the gross margin (G.M) was N627,367,880.00 and the Total Variable Cost (TVC) is N775,526,19.00. Total Fixed Cost (TFC) was N304,483,67.00, then



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the Total Cost (TC) was N108,000,986.00, the NFI was N596,919,513.00 while the Total Revenue (TR) was N704,920,500.00 for the non-beneficiaries. Then for every N1 invested in maize production in the study areas a profit of N5.5k is made. Thus, it could be inferred that maize production for beneficiaries is more economically viable when compared with the N9.9k profit for the beneficiaries. This finding is similar to that of Mani *et al.* (2022) studied the profitability and economic efficiency of bambaranut production, Nigeria where it was observed that bambaranut is profitable by returning N1.40 to every N1.00 spent. economic efficiency of bambaranut production, Nigeria where it was observed that bambaranut is profitable by returning N1.40 to every N1.00 spent.



**Table 3:** Cost and Return on Maize Production in Naira/Ha (Beneficiary combine)

<b>NET FARM INCOME</b>			
<b>VARIABLES COST</b>			<b>(VC %)</b>
Seed	=	N27,135	0.5
Chemical	=	N 394,600	8.3
NPK	=	N 2,926,000	61.6
Urea	=	N 1,129,000	23.7
Hired Labour	=	N 3,202.5	0.06
Family Labour	=	N 38	0.0008
Cost of renting tractor	=	N 253,000	5.3
Cost of renting traction	=	N14,000	0.2
<b>Total Variable Cost (TVC)</b>	=	<b>N4,746,975.5</b>	
<b>FIXED COST</b>			<b>(FC %)</b>
Land Renting	=	N 55,925.9259	91
Sprayer	=	N 2,014.0740	3
Cutlass	=	N 200	00
Hoe	=	N 1,518.8888	3
Wheel barrow	=	N 1,637.0370	3
<b>Total Fixed Cost (TFC)</b>	=	<b>N 61,295.9257</b>	
<b>Total Cost (TC) = (TVC + TFC)</b>	=	4,746,975.5+ 61,295.9257	= <b>N4,808,271.4257</b>
<b>Gross Margin (GM) = (TR-TVC)</b>	=	51,951,500 – 4,746,975.5	= <b>N 47,204,524.5</b>
<b>Net Farm Income (NFI) = (TR-TC)</b>	=	51,951,500 – 4,808,271.4257	= <b>47,143,228.574</b>
<b>Return Per Naira Invested (ROI)</b>	=	(NFI/TC) = 47,143,228.574 / 4,808,271.4257	= <b>N9.804K</b>

**Source: Authors' Analysis, 2021**

1 % increase in the WASIL intervention package will lead to N9.944k increase.



**Table 4:** Cost and Return on Maize Production in Naira/Ha (Non-Beneficiary combine)

<b>NET FARM INCOME</b>			
<b>VARIABLES COST</b>			<b>(VC %)</b>
Seed	=	N 427,365	0.5
Chemical	=	N 7,106,500	9.1
NPK	=	N 44,793,500	57.7
Urea	=	N 18,410,500	23.7
Hired Labour	=	N 58,721.7	0.07
Family Labour	=	N 414,032.85	0.5
Cost of Renting Tractor	=	N 4,753,000	6.1
Cost of Renting Traction	=	N 1,589,000	2.0
<b>Total Variable Cost (TVC)</b>	=	<b>N 77,552,619.55</b>	
<b>FIXED COST</b>			<b>(FC %)</b>
Land Renting	=	N68,960.9929	91
Sprayer	=	N2,629.6453	3
Cutlass	=	N485.8865	1
Hoe	=	N405.3191	1
Wheel Barrow	=	N3037.5886	4
<b>Total Fixed Cost (TFC)</b>	=	<b>N30,448,367.84</b>	
<b>Total Cost (TC) = (TVC + TFC)</b>	=	77,552,619.55 + 30,448,367.84	<b>= 108,000,986.84</b>
<b>Gross Margin (GM) = (TR-TVC)</b>	=	704,920,500-7,752,619.55	<b>= 627,367,880.45</b>
<b>Net Farm Income (NFI) = (TR-TC)</b>	=	704,920,500-108,000,986.84	<b>= 596,919,513.16</b>
<b>Return Per Naira Invested (ROI)</b>	=	(NFI/TC) = 596,919,513.16/108,000,986.84	<b>= N 5.526k</b>

**Source: Authors' Analysis, 2021**

1 % increase in the WASIL intervention package will lead to N5.526k increase.





## CONCLUSION AND RECOMMENDATIONS

The study concluded that WASIL maize intervention Programme (WMIP) has impacted positively on the income of its intended beneficiaries in the North Western, Nigeria in terms of achieving its set out objectives of income improvement among small scale maize farmers. The programme has great potential, which if properly managed and sustained could serve as the spring board for future private agricultural development initiatives.

Based on the findings that there are more male beneficiaries in the programme,

1. Female household heads need to be encouraged to key into the programme in order to improve their income base.
2. For every N1 invested in maize production by the non-beneficiaries in the study areas a profit of N5.5k is made. Thus, it could be concluded that maize production for beneficiaries is more economically viable when compared with the N9.9k profit for the beneficiaries, it can therefore be concluded that the beneficiaries make more profit from maize production in the study area than the non-beneficiaries as a result of participation in the WASIL intervention programme, it is therefore recommended that the programme be sustained.

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