ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24JUN1606

Modeling Gender Gap in Access to Empowerment and Agricultural Productive Resources: Evidence from Farming Households in Kaduna State

[1]Umar, O.M.; [2*]Ekenta, C. M.; [3]Adediran, O. I. and [4]Ahmed, S.
[1]Prince Audu Abubakar University, Anyigba -Nigeria
Department of Agricultural Economics, Extension and Rural Sociology
[2]Ahmadu Bello University, Zaria –Nigeria
[3]Department of Pharmaceutical Microbiology and Biotechnology
Gombe State University, Gombe State
[4]Kabba College of Agriculture, Division of Agricultural Colleges
[5]Samaru College of Agriculture, Division of Agricultural Colleges
Ahmadu Bello University, Zaria – Nigeria

Corresponding Author:- [2*]Ekenta, C. M.

Abstract:- This research examined gender access to empowerment and agricultural productive resources with a gender dimension. Respondents were selected with random and stratified sampling techniques. Primary data were generated through the administration of well-structured questionnaire. Generated data were analyzed with descriptive statistics, Women Empowerment Index (WEI), Global Gender Parity Index (GGPI) and Gini Inequality Index (GII). The result shows that 37% and 60.20% of women and men had access to empowerment programmes respectively in the study area. WEI result showed that women had low access to empowerment variable (WEI = 0.67), the GGPI revealed that women (GGPI = 0.63) had low parity as against the men (GGPI = 0.77) with higher parity index. Furthermore, the Gini Inequality Index that there is inequality in access to agricultural productive resources between men (GII = 0.286) and women (GII = 0.383). The research concluded women had low empowerment and low access to agricultural productive resources as against the men. The research recommended that government programmes should be mainstreamed to ensure that more women have access to them and the extension department should design their programmes to ensure that more women have access to extension services in the study area.

Keywords:- *Empowerment, Gender, Gini, Modeling, Productive, Kaduna.*

I. INTRODUCTION

Agriculture is a cornerstone of the Nigerian economy, providing employment and sustenance to millions. Recognizing its significance, the government has taken several steps to support and empower farmers through various agricultural programmes. These initiatives play crucial roles in driving sustainable growth and food security across the nation. The Agricultural Transform Agenda (ATA), launched in 2011, focuses on achieving food security, job creation, and economic diversification. This comprehensive initiative encompasses various sectors, including crop production, livestock, fisheries, and agribusiness development. Achieving food security is also a function of empowerment of males and females and their access to agricultural productive resources.

Empowerment is the degree of autonomy and self-determination in people and in communities. This enables them to represent their interests in a responsible and self-determined way, acting on their own authority. It is the process of becoming stronger and more confident, especially in controlling one's life and claiming one's rights. To empower famers, the agricultural transformation agenda has five components to provide incentives to farmers: Growth Enhanced Support Scheme (GESS), Anchor Borrower Programme (ABP), Youth Empowerment in Agricultural Programme (YEAP), Livelihood Improvement Family Enterprise Programme (LIFE) and Commercial Agriculture Credit Scheme (CACS). These programmes and schemes are designed to assist both male and females to improve their productive through access to these incentives.

Access to agricultural productive resources more often than not favour the male population against the female population in many countries of the developing nations. According to Dwomoh *et al* (2023), women in rural communities remain the most vulnerable population in accessing agricultural productive resources with dire implications for food security, malnutrition, and poverty. According to Nakai (2018), this gender gap hinders the likelihood of achieving the Sustainable Development Goal

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24JUN1606

(SDG) 2 of ending all forms of hunger and malnutrition by 2030, lowers productivity and reduces their contributions to the agricultural sector and the achievement of broader economic, and social development goals. In Africa, women are fully engaged in agriculture at all levels including production, processing, packaging, and marketing but often do not possess the productive resources required for efficient production. This scenario leads to lower productivity of women experienced all over the continent as against their male counterparts. In their research, Palacios-Lopez and Lopez (2014) and Aguilar, *et al* (2014) reported that despite the high proportion of women in agriculture, productivity is even lower for female farmers compared to their male counterparts.

II. RESEARCH METHODOLOGY

The research was carried out in Kaduna State of Nigeria. Kaduna State has 24 Local Government Areas (LGA) and is located on the $10^0 20'$N, $7^0 45'$E and 10.333^0N, 7.750^0E coordinates. The State has estimated population of 8, 252, 366 people with an annual population growth rate of 2.47% (NBS, 2018). The main religions in Kaduna State are Christianity and Islam with Hausa as the major language. Kaduna State is the home of major educational institutions in the country like Ahmadu Bello University, Nigerian Institute of Transport Technology, Kaduna State University, Nigerian College of Aviation and Nigerian Defence Academy, Nigerian Military School and Nigerian Air Force College. The major agricultural crops planted in the state are tomato, ginger, garlic, pepper, beans and wheat.

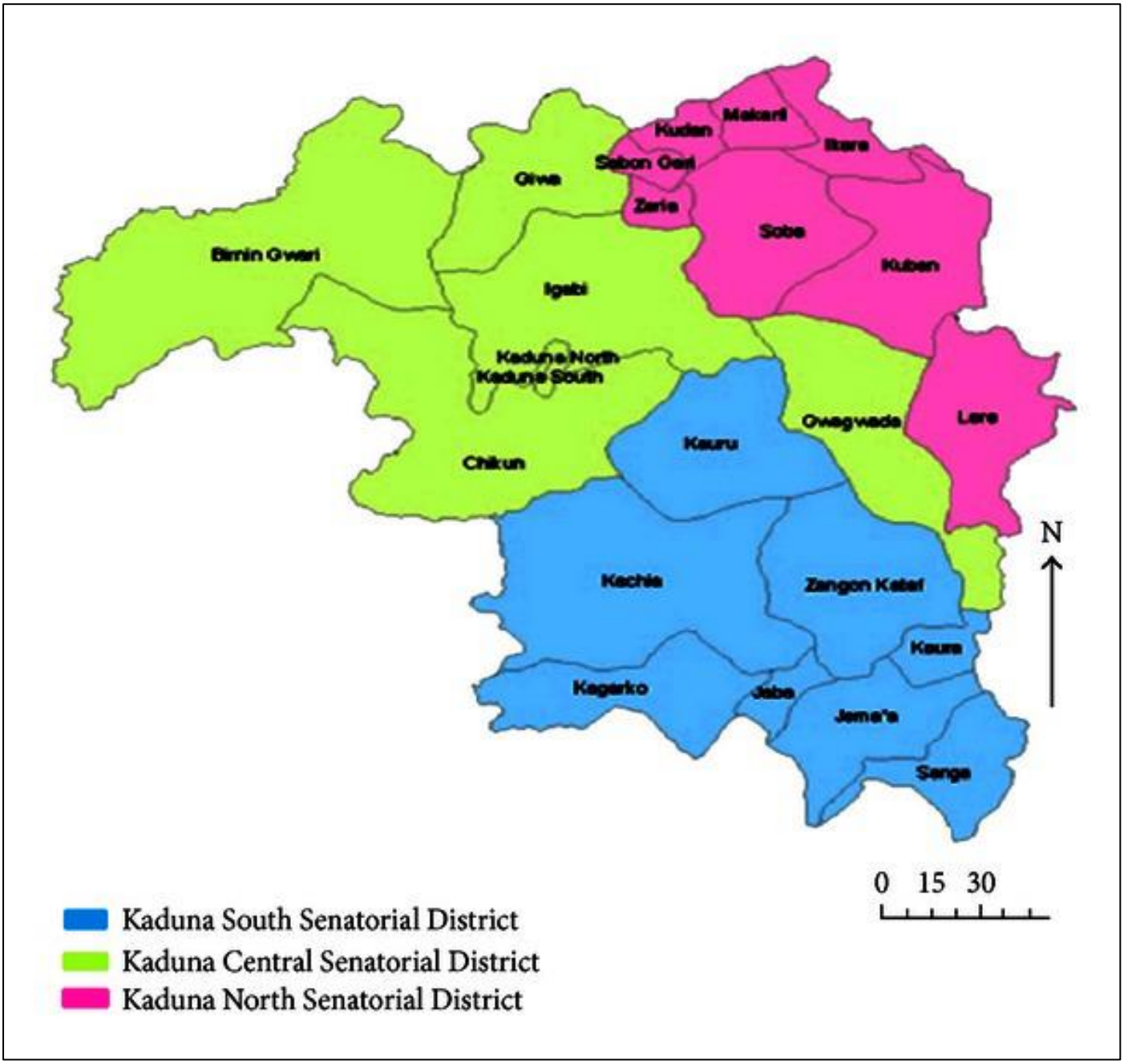

Fig 1 Map of Kaduna State Showing the Senatorial Zones

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24JUN1606

➢ *Sampling Techniques*

The respondents for the research were selected through multi stage sampling technique. In the first stage, the existing three senatorial zones was adopted. In the second stage, three Local Government Areas (LGAs) were randomly selected from each senatorial zone giving a total of 9 LGAs. The following LGAs were selected: Nortthern Senatorial Zone (Zaria, Soba and Makarfi), Central Senatorial Zone (Chikun, Igabi and Giwa) and Sourthern Senatorial Zone (Kachia, Zangon Kataf and Kagarko). In the third stage, 3 commercial villages were selected from each Local Government Area making up to 27 villages selected. The Following villages were selected from the LGAs: Zaria (Gwargwaje, Kofar Gaya and Kwangila), Soba (Maigana, Soba and Sabon Kudi), Makarfi (Dandamisa, Gazara and Makarfi), Chikun (Chikun, Sabon Tasha and Narayi), Igabi (Igabi, Jaji and Rigasa), Giwa (Shika, Gangara and Kundu), Kachia (Kachia, Sabon Sarki and Doka), Zangon Kataf (Madakya, Tudun Wada and Zangon Kataf) and Kagarko (Jere, Kurmin Dangana and Aribi). In the fourth stage list of registered farmers from each village was obtained from the LGA Headquarter. The list was stratified into two (male and female) to get the total number of farmers. The sample size was calculated from a finite population (4028) of male and female at a 95% confidence level and 5% of variability using the (Dillman, 2000) sampling model given by:

$$n = \frac{[(N*P*(1-P)]}{\left[(N-1*\left(\frac{B}{C}\right)^2+P*(1-P)\right]} \quad \text{.....1}$$

$$n = \frac{[(4028*0.5*(1-0.5)]}{\left[(4028-1*\left(\frac{0.05}{1.96}\right)^2+0.5*(1-0.5)\right]} \quad \text{.....2}$$

$$n = = \frac{[1007]}{[2.87]} = 350$$

From the above sample, the study distributed it proportionately to the two strata (Men and Women) whose populations were 2, 115 and 1, 913 respondents respectively. These samples are given as:

$$n_m \text{ (Men)} = \frac{2115}{4028} * 350 = 184$$

$$n_w \text{ (Women)} = \frac{1913}{4028} * 350 = 166$$

Where n is the computed sample size needed for the desired level of precision; N is the population size; p is the proportion of population expected to choose; B is acceptable amount of sampling error, or precision; and finally, C is Z statistic associated with the confidence level which is 1.96 that corresponds to the 95% level. B can be set at 0.1, 0.05, or 0.03, which are ± 10, 5, or 3% of the true population value, respectively. The acceptable amount of sampling error or precision is set at 0.05 or 5%. Confidence level of 1.96 corresponds to the 95% level. Using 0.05 will lead to a greater sample size than using 0.03; however, it always provides an adequate sample size for a smaller or greater population (Biemer and Lyberg, 2003).

➢ *Methods of Data Collection*

Primary Data for the research were collected with the administration well-structured questionnaire as the quantitative procedure. Furthermore, Focus Group Discussion (FGD) and Key Informant Interview (KII) were used to elicit information to collaborate information from the questionnaire.

III. METHODS OF DATA ANALYSIS

Primary data collected were subject to analysis with the use of descriptive statistics such as frequency and percentage and rank. Data were presented in bar chart and tables.

The Women Empowerment Index (WEI) was used to ascertain the extent of women empowerment. The Women's Empowerment Index (WEI) is a composite index that measures the level of women's empowerment across five dimensions: life and good health (two indicators); education, skill-building and knowledge (two indicators); labour and financial inclusion (two indicators), participation in decision making (three indicators); and freedom from violence (one indicator) (UN Women and UNDP, 2023). The index is measured between 0 and 1 with 0 indicating no empowerment and 1 indicates perfect empowerment. Higher index scores closer to one indicates high achievement in empowerment while lower index scores away from 1 indicates poor performance in empowerment.

➢ *Mathematically, WEI is Calculated as*

$$\text{WEI} = \left(I_{Health} * I_{Education} * I_{Inclusion} * I_{Decision\ Making} * I_{Violence\ Against\ Women}\right)^{\frac{1}{5}} \text{..3}$$

Most components are positive indicators—that is, higher values mean better achievement. However, three components—adolescent birth rate (ABR), female youth not in education, employment or training and intimate partner violence prevalence among ever-partnered women and girls (IPV) — are negative indicators — that is, higher values mean worse achievement.

➢ *The Positive and Negative Indicators are Normalized as Follows:*

$$\text{WEI}_{NPI} = \frac{Actual\ Value - Minimum\ Value}{Maximum\ Value - Minimum\ Value} \quad \text{.....4}$$

$$\text{WEI}_{NNI} = \frac{Minimum\ Value - Actual\ Value}{Maximum\ Value - Minimum\ Value} \quad \text{.....5}$$

Where,

NPI = Normalized positive scores

NNI = Normalized negative scores

The Global Gender Parity Index (GGPI) was used to examine the extent of parity or gap between male and female in empowerment. The Global Gender Parity Index (GGPI) is a composite index that assesses the relative

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24JUN1606

achievements between women and men in four dimensions: life and good health (one indicator); education, skill-building and knowledge (two indicators); labour and financial inclusion (two indicators); and participation in decision making (three indicators). (UN Women and UNDP, 2023). The measurement and interpretation of the index follows the same pattern as WEI.

➢ *GGPI is Represented Mathematically as thus:*

$$GGPI = \left[\left(\frac{I_{Health\ f}}{I_{Health\ m}}\right) * \left(\frac{I_{Education\ f}}{I_{Health\ m}}\right) * \left(\frac{I_{Inclusion\ f}}{I_{Inclusion\ m}}\right) * \left(\frac{I_{Decision\ Making\ f}}{I_{Decilon\ Making\ m}}\right)\right]^{½} \quad \ldots\ldots 6$$

Where

f = Female

m = Male

Gini Inequality Index is a summary statistic that measures how equitably a resource is distributed in a population (Farris, 2010). The Gini coefficient measures inequality on a scale from 0 to 1. Higher values indicate higher inequality. The index score of 0 indicates perfect equality while index score of 1 indicates perfect inequality. It is a single index that measures how equitably a resource is distributed in a population, the Gini index gives a simple, if blunt, tool for summarizing economic data. It allows us to illustrate how equity has changed in a given situation over time.

IV. RESULT AND DISCUSSIONS

➢ *Gender Gap in Access to Empowerment Programmes in Nigeria*

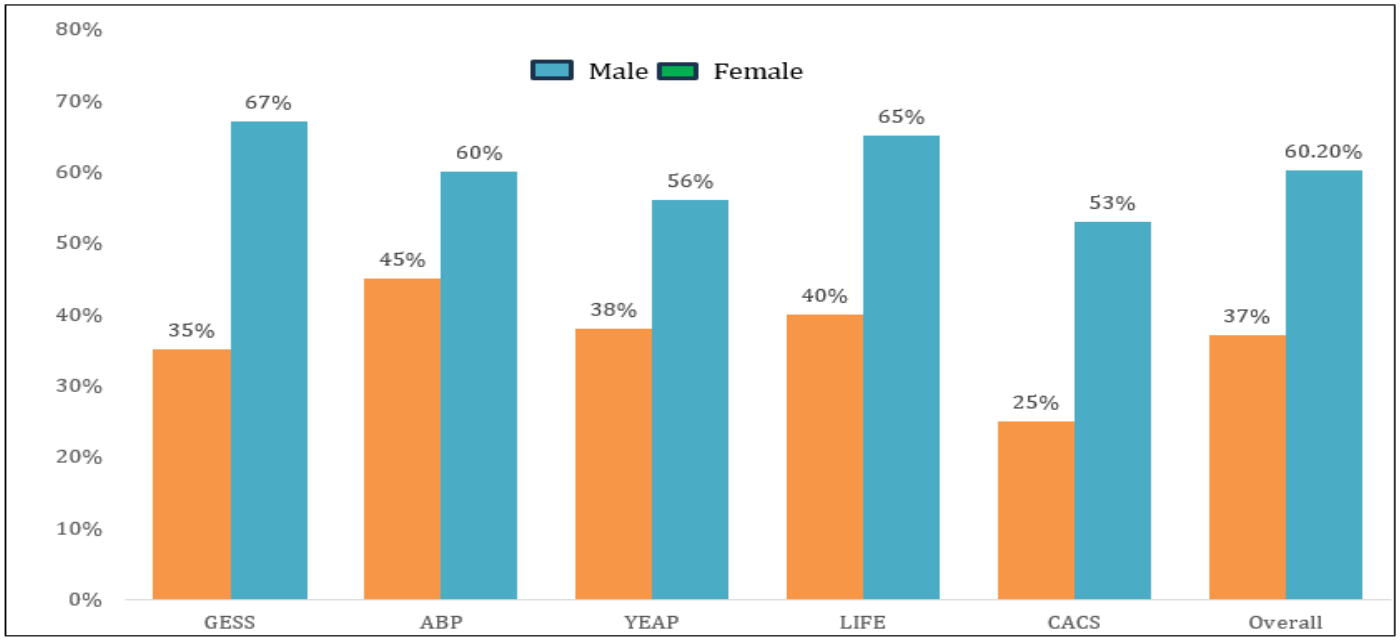

Fig 2 Gender Gaps in the Access to Empowerment Programmes

GESS: Growth Enhanced Support Scheme; ABP: Anchor Borrower Programme; YEAP: Youth Empowerment in Agricultural Programme; LIFE: Livelihood Improvement Family Enterprise Programme; CACS: Commercial Agriculture Credit Scheme.

The Federal Government Empowerment Programmes under the Agricultural Transformation Agenda (ATA) provides for various schemes meant to improve the lives of Nigerians especially farmers. Fig. 2 presents the various programmes and schemes of the Agricultural Transformation Agenda (ATA) and the gender gap in the access of the programmes in the study area. Fig. reveale that overall, 60.20% and 37% of men and women had access to the ATA programmes and schemes in the study area. The result further revealed that across the various programmes and schemes, men had greater access but women had substantial access to Anchor Browers Programme (45%) and Livelihood Improvement Family Enterprise Programme (40%). The Commercial Agriculture Credit Scheme (25%) had the lowest access by women. This implies that women in the scheme did not access credits and loans as much as men. This finding corroborates the report of Rockefeller Philanthropy Advisors (2022) that 98% of Nigerian women are left out of formal credit markets. The report further asserted that in 2021, men had about double the number of loans in the past 7 years than women (RFA, 2022).

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24JUN1606

Table 1 Women Empowerment Index (WEI)

Empowerment Variables		
Life and Good Heath	Modern Methods of Contraception Adolescent birth Rate	0.635
Education, Skill Building and Knowledge	Female Population with Completed Secondary Education or Higher Female Youths not in Education, Employment or Training	0.612
Labour and Financial Inclusion	Female Labour Force Participation Rate in Household Female Financial Account Owners	0.708
Participation in Decision Making	Share of Seats in Parliament Held by Women Share of Seats in Local Government Held by Women Share of Managerial Positions Held by Women	0.600
Freedom from Violence	Intimate Partner Violence against Women	0.811
Average		**0.6732**

According to Sushama (1998), women empowerment reflects a condition where women are given the opportunity to participate fully in social, political and economic spheres of life. This implies that enabling conditions should be created for men and women to perform at optimal levels their potentials and skills. Empowering woman entail creating an enabling environment in which women are allowed to implement government programmes and organizational policies that affect their lives (Chattopadhyay, 2005; Aspy and Sandhu, 1999; Patricia et al, 2003). The UN Women and UNDP (2023) identified five dimensions and indicators of women empowerment. These includes life and good health, education, skill building and knowledge, labour and financial inclusion, participation in decision making and freedom from violence. They advocated that for gender gap between men and women to be narrowed, women must be empowered in these five identified dimensions. Table 1 examined the empowerment of women along the identified dimensions in the study area using the prescribed criteria. Table 1 reveals that the overall index of performance in the empowerment of women was 0.6732. This indicates fairly average empowerment of women in the study area in the five empowerment dimensions. Among the empowerment dimensions, participation in decision making (0.600) was the least. This implies that women in the study area fairly participates in decision making ranging from share of seats in parliament held by women, share of seats in Local Government held by women and share of managerial positions held by women. The result is in line with the findings of Ette and Akpan-Obong (2023), who reported that in 2015, seven women won seats in the Senate and 20 were elected to the House of Representatives. Four years later, the number of women in the lower chamber dropped to 11. Overall, the national average for women's participation has hovered around 6% for elective and appointive offices, which is below the West African sub-regional average of 15%. In January 2021, Nigeria had a 10.3% representation of women in ministerial positions (three out of 29) and 5.8% among members of parliament, thus ranking 149th (out of 155 countries) on political empowerment on the 2021 World Economic Forum Global Gender Gap Report. Furthermore, Igbokwe (2013) reported that in Nigeria, while women are under-represented in political positions in higher levels of government, they would have clearly had more success at gaining access to local level decision making positions.

Table 2 Global Gender Parity Index (GGPI)

Empowerment Variables		**Male**	**Female**	**DF**
		Index	**Index**	**Index**
Life and Good Heath	Modern Methods of Contraception Adolescent birth Rate	0.521	0.635	**0.114**
Education, Skill Building and Knowledge	Female Population with Completed Secondary Education or Higher Female Youths not in Education, Employment or Training	0.824	0.612	**0.212**
Labour and Financial Inclusion	Female Labour Force Participation Rate in Household Female Financial Account Owners	0.871	0.708	**0.163**
Participation in Decision Making	Share of Seats in Parliament Held by Women Share of Seats in Local Government Held by Women Share of Managerial Positions Held by Women	0.883	0.600	**0.283**
Average		**0.775**	**0.638**	**0.193**

The Gender Global Parity Index identifies the gender parity and disparity in the empowerment dimensions identified. It is a composite index that assesses the relative achievements between women and men in four dimensions of the empowerment dimensions. The overall average empowerment score shows that men had 0.775 index score as against women 0.638 index score. These shows a gap or disparity in the empowerment index scores. This explains that men had better achievements in empowerment compared with the women who had fairly achievement. Notwithstanding the overall achievements by men shown by the index scores, women had better achievement over men in life and good health dimension. The index score (0.521) of men explains that women in the study area had better life and health related issues compared to men. This result corroborates the reports of NBS (2018) that in 2016, life

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24JUN1606

expectancy was 47 years for male, 51 years for female. Furthermore, O'Neill (2024) reported that in 2021, the mortality rate for women was at 366.11 per 1,000 female adults, while the mortality rate for men was at 386.45 per 1,000 male adults in Nigeria. This indicates that more adult males die compared to adult females.

Table 3 Measuring Inequality in Access to Agricultural Productive Resources using Gini Inequality Index (GII)

Formal Education	0.221	0.324
Agricultural Training	0.382	0.411
Access to Irrigation Facilities	0.267	0.423
Access to Farm Land	0.210	0.523
Access to Improved Seedlings	0.342	0.386
Access to Agro-chemicals	0.266	0.378
Access to Tractor	0.221	0.433
Access to New Technology	0.267	0.381
Access to Labour	0.344	0.358
Access to Credit Facilities	0.268	0.311
Access to non-formal Financial Services	0.281	0.391
Access to Agricultural Extension Service	0.285	0.352
Access to Ready Market	0.374	0.318
Men (Average)	**0.286**	**0.383**
Women (Average)		
Overall (Men and Women)	**0.335**	

Gini coefficient is a measure of inequality and comparison between variables. It is used in the research to ascertain the extent of inequality between men and women in the access to agricultural productive resources in the study area. Table 4 shows that the overall Gini coefficient score for both men and women was 0.335. This shows fairly good performance in achieving gender parity in the study area. This indicates that though there is gender parity in the access to agricultural productive resources between male and female, the disparity is not overwhelming.

Table 5 Factors that Encourage Gender Gap in Access to Empowerment and Agricultural Productive Resources

	%	**Rank**	**%**	**Rank**
Cultural barriers	85%	1st	82%	1st
Level of Education	80%	2nd	67%	5th
Religious interference	76%	3rd	78%	2nd
Land Ownership Structure	71%	4th	62%	6th
Socially accepted male dominance	68%	5t	73%	3rd
Women's socially assigned family and domestic responsibilities	54%	6th	70%	4th
Gender skewed government policies	43%	7th	55%	7th
Extent of social participation	40%	8th	42%	9th
Improper social orientation of the capabilities of women	35%	9th	50%	8th
Percentage Average	**61%**		**64%**	

Disparity and gender gaps have existed between men and women in every aspect of human endavours raging from family upbringing and responsibilities, corporate work, agriculture, politics, professional practice to entertainment. The gap is driven by certain factors depending on the dimension of interest. Table 5 indicates the driving factors to gender gap in the access to empowerment and agricultural productive resources. The table revealed that on the average, 61% and 64% of male and female agree that all the factors indicated drive gender gap. Specifically for men, cultural barriers, level of education and religious interference were the major causes of gender gap in the access to empowerment and agricultural productive resources. On the other hand, female believe that cultural barrier, religious interference and socially accepted male dominance are the major causes of gender gap.

V. CONCLUSION AND RECOMMENDATION

The study examined the extent of gender access to empowerment programmes and scheme of the Agricultural Transformation Agenda (ATA) and agricultural productive resources in Kaduna Nigeria. The study employed the use of Women Empowerment Index (WEI), Global Gender Parity Index (GGPI) and Gini Inequality Index (GII) to estimate and establish gender disparity and gap. The research concluded that there is gender disparity in the access to the programmes and schemes of ATA in the state. Also, there is gender gap in the access to agricultural productive resources in the study area. The major factors the drive gender gap are cultural barriers, level of education, religious interference and socially accepted male dominance.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24JUN1606

The study recommended that government should mainstream gender issues in executing programmes and project especially by infusing the peculiarities of women to ensure equity in access to the programmes for both male and female intending beneficiaries.

REFERENCES

[1]. Aguilar, A., Carranza, A., Goldstein, M., Kilic, T., Oseni, G. (2014): Decomposition of Gender Differentials in Agricultural Productivity in Ethiopia, *Policy Research Paper* 6764, World Bank

[2]. Aspy, C. B. and Sandhu, D. S. (1999). Empowering women for equity: A counseling approach. American Counseling Association, Alexandria, VA. 22304

[3]. Biemer, P. P. L. and Lyberg, K. (2003). *Introduction to survey quality*. New York: John Wiley.

[4]. Chattopadhyay, A. (2005). Women and entrepreneurship. *Yojana, a Monthly Journal of Ministry of Information and Broadcasting*, 5(1), 123-156

[5]. Dillman, D.A. (2000). Mail and internet surveys: the tailored design method. Brisbane: Wiley.

[6]. Dwomoh, D. and Agyabeng, K., Tufour, H. O., Tetteh, A., Godi, A. and Aryeetey, R. (2023). Modeling inequality in access to agricultural productive resources and socioeconomic determinants of household food security in Ghana: a cross-sectional study. *Agricultural and Food Economics*, 11:24 https://doi.org/10.1186/s40100-023-00267-6

[7]. Ette, M. and Akpan-Obong, P. (2023). Negotiating Access and Privilege: Politics of Female Participation and Representation in Nigeria. *Journal of Asian and African Studies*, 58 (7) 1291–1306

[8]. Farris, Frank A. (2010). The Gini Index and Measures of Inequality. *The American Mathematical Monthly*. P. 851 – 864

[9]. Nakai. J. (2018) Food and agriculture organization of the United Nations and the sustainable development goals. Sustain Dev 22:1–450

[10]. NBS (2018). Statistical Report on Women and Men in Nigeria.

[11]. O'Neill, A. (2024). Nigeria: Adult mortality rate from 2011 to 2021 (per 1,000 adults), by gender. Statista Repository. https://www.statista.com/statistics/974534/adult-mortality-rate-in-nigeriagender/#:~:text=In% 202021%2C%20the%20mortality%20rate%20for%20women%20was,at%20386.45%20per%201%2C000%20male%20adults%20in%20Nigeria. Accessed on 04/03/2024

[12]. Patricia, S. E. D. and Mulvaney, B. M. (2003). Women, power., & ethnicity – Working toward reciprocal empowerment. The Haworth Press, New York, London, Oxford

[13]. Palacios-Lopez, A., Lopez, R. (2014): Gender Differences in Agricultural Productivity: The Role of Market Imperfections. Department of Agricultural and Resources Economics WP 14-01, (Available at http://ageconsearch.umn.edu/bitstream/ 164061/2/14-01.pdf)

[14]. RPA (2022). Understanding Women's Access to Credit and Loans Overview and Gender-Disaggregated Data Analysis of the Nigerian Lending Market

[15]. Sushama, S. (1998). Women and Empowerment-Approach and Strategies, Discovery Publishing House, Delhi

[16]. UN Women and UNDP (2023). The Paths to Equal: Twins Indices on Women's Empowerment and Gender Equality