Annex 11: Gender Analysis and Action Plan

1 Background:

UNDP prioritizes gender mainstreaming as its main strategy to achieve gender equality and women's empowerment. Gender mainstreaming is the process of assessing any planned action in all areas and levels to determine the implication for women and men. It is a strategy for making women's, as well as men's, concerns and experiences an integral dimension of the design, implementation, monitoring and evaluation of projects so that women benefit equally. Gender mainstreaming aims to transform unequal social and institutional structures in order to make them profoundly responsive to gender, and, when realized, it ensures that both women and men benefit equally from the development process. It involves much more than simply adding women's participation to existing strategies and programmes. Special attention and action is often required to compensate for the existing gaps and inequalities that women currently face.

The UNDP Gender Equality Strategy 2018-2021 is aligned with the 2030 Development Agenda and UNDP's Strategic Plan. The strategy recognizes gender equality as a human right as well as instrumental to the achievement of sustainable development. It considers women and men as active agents of change and development, not simply beneficiaries and vulnerable groups and it recognizes how working with men and boys is of critical importance to change gender norms and attitudes and achieve gender equality.

The GEF Council approved a new GEF Policy on Gender Equality[1], in November 2017. The policy outlines the need to address gender equality and promote women's empowerment across GEF operations, and, in particular, in its projects and programs. The policy requires gender-responsive actions, from design to implementation, monitoring and evaluation to ensure that GEF programs and projects are not only designed with a good understanding of relevant gender differences, roles and needs, but also actively pursue activities that contribute to equal access to and control over resources, decision-making, and empowers women and girls.

Both UNDP and the GEF require a gender responsive approach, an approach in which the particular needs, priorities, power structures, status and relationships between men and women are recognized and adequately addressed in the design, implementation and evaluation of activities. The approach seeks to ensure that women and men are given equal opportunities to participate in and benefit from an intervention and promotes targeted measures to address inequalities and promote the empowerment of women.

2 Context and gender situation in Nigeria:

Nigeria exhibits high overall levels of gender inequality, though country-level analysis masks much local and state-level heterogeneity. Nigeria's score on the Social Institutions and Gender Index (SIGI) is 46% (worst-ranked Yemen is 64% and best ranked Denmark is 10%),[2] but as can be seen from Figure 1 and Figure 2 (reproduced from Rettig et al., 2020) there is much sub-national variation in measures of gender equality and women's well-being. There are over 250 ethnic groups present in Nigeria, speaking over 500 languages including more than 1,000 dialects, and local gender norms and relations can exhibit a great deal of diversity.

[1] GEF/C.53/04 (http://www.thegef.org/sites/default/files/council-meeting-documents/EN_GEF.C.53.04_Gender_Policy.pdf)
[2] OECD Development Centre, "SIGI 2019 Results."

Figure 1 Maps of Historical Progression of Select Gender-Relevant Variables (1)[3]

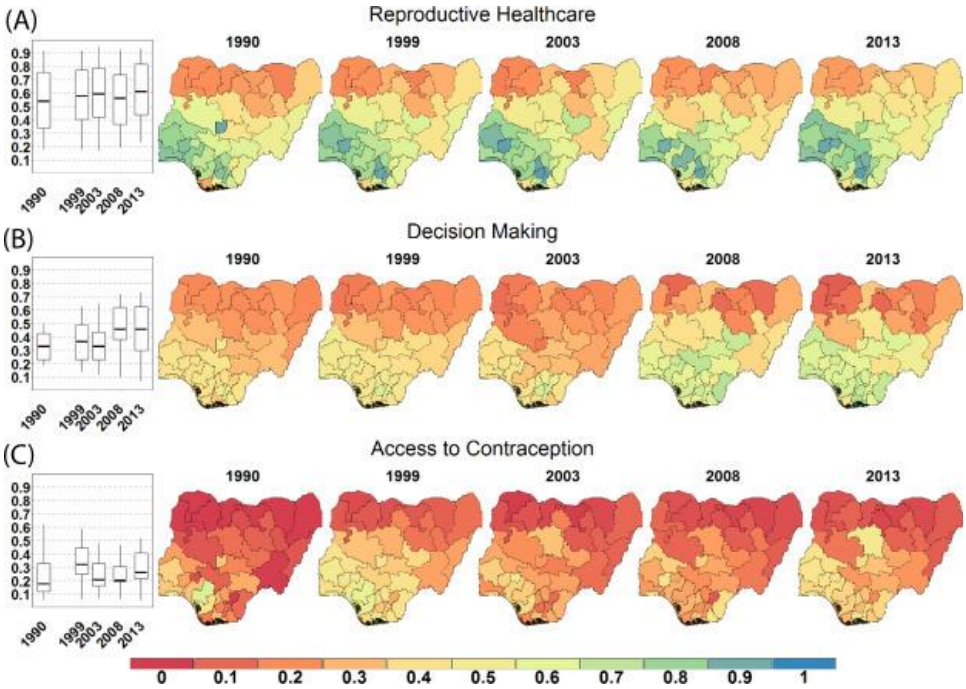
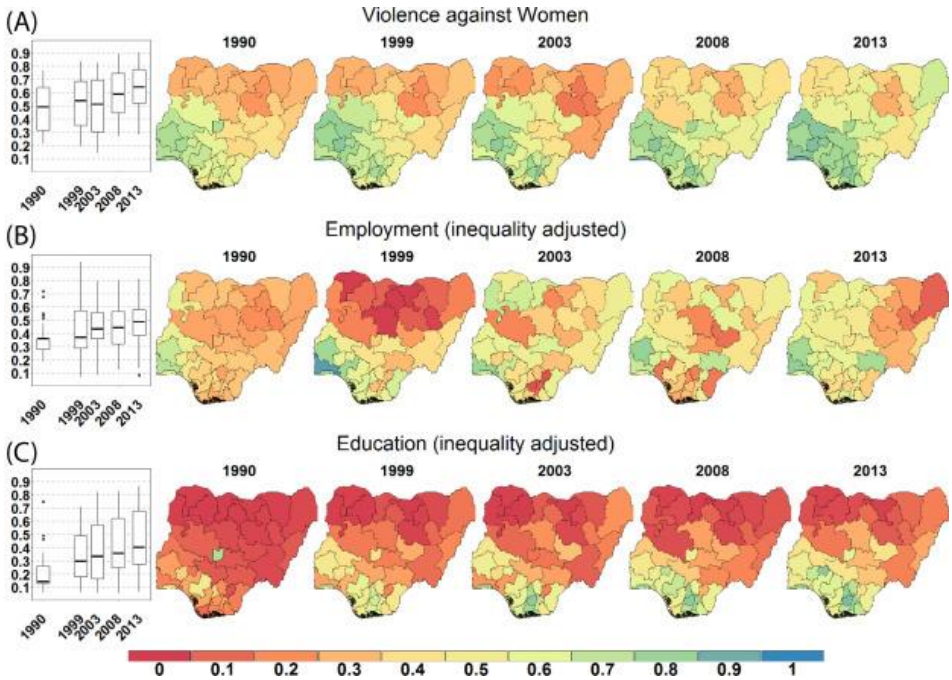


Figure 2 Maps of Historical Progression of Select Gender-Relevant Variables (2)[4]



In spite of many patriarchal systems and norms that can be observed today, Nigeria exhibits strong traditions of both pre- and post-colonial participation by women in public life. In pre-colonial times, it was not uncommon for women to rule over kingdoms[5] and also generally exert influence over public

[3] Rettig, Fick, and Hijmans, "The Female Empowerment Index (FEMI)."

[4] Rettig, Fick, and Hijmans.

[5] E.g., The legendary Queen Moremi Ajasoro of the Ile-Ife Kingdom, the warrior Queen Aminatu Mohamud of the Zazzau City-State (present-day Zaria), Queen Ebele Ejaunu, reputed founder of the Igala Kingdom, Queen Kambasa of Bonny, and more.

affairs, for example among the Igbos, Ibibios, Ijaws, Kalabari, Efik, Edo, Yoruba, and Itsekiri.[6] Even if in the pre-colonial period there was a gendered division of labour, women's labour (e.g., in food processing, mat weaving, pottery, cooking, etc.) was arguably accorded significant value; if women produced food and life's necessities, that made them the "breadwinners."[7] Among the Yoruba, women played key roles in long-distance trade, which afforded them considerable power and prestige.[8] Age, in addition, to gender, was also an organizing principle of many societies, meaning older women, especially those with children they could control as a negotiating bloc, could gain considerable influence.[9]

Gender roles in Nigeria could also be less strictly dichotomous, as famously explored in the case of a pre-colonial Igbo society in Ifi Amadiume's acclaimed 1987 ethnography entitled Male Daughters, Female Husbands. "The fact that biological sex did not always correspond to ideological gender meant that women could play roles usually monopolized by men, or be classified as 'males' in terms of power and authority over others," Amadiume wrote. "As such roles were not rigidly masculinized or feminized, no stigma was attached to breaking gender rules."[10] Even the Igbo language uses gender neutral pronouns.

A significant amount of gender discrimination in Nigeria is traced by researchers back to the colonial era. For example, the British administration: mostly preferred to deal with male chiefs, side lining female ones; worked with male farmers to orient the economy towards cash crop production, pushing women into subsistence farming; commercialized/privatized land ownership, which became concentrated among male owners who could buy with their cash; and excluded girl children from formal education, which opened the way for young men to monopolize new jobs created.[11]

Though colonialism left an undeniable imprint on gender norms and relations in Nigeria, it did not erase traditions of female empowerment and women's collective advocating for their rights. Throughout the entire colonial period, women organized to protest injustices. The most notable example of this was perhaps the 1929 Women's War, a women-led strategic revolt seeking redress for social, political and economic grievances; it forced the resignation of chiefs, destroyed a number of courts, and led to the colonial government appointing women to the courts. In post-colonial Nigeria, feminist and women-centric movements persisted and multiplied,[12] and even successfully tackled injustices in the energy sector on multiple occasions, forcing significant concessions from multinational oil companies.[13]

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[6] Soriola, "Top Facts about Nigerian Feminism Evolution."
[7] Ihejirika, "[Expletive] Your Gender Norms."
[8] Falola, "The Role of Nigerian Women."
[9] Falola.
[10] Amadiume, *Male Daughters, Female Husbands: Gender and Sex in African Society*.
[11] Falola, "The Role of Nigerian Women."
[12] Afolabi, "The Invisibility of Women's Organizations in Decision Making Process and Governance in Nigeria."
[13] Munir, "Gender Roles in Nigeria's Non-Violent Oil Resistance Movement."

2.1 Basic demographics

The percentage of women in Nigeria relative to total population has been in steady decline since at least 1960 and now stands at 49% (2019 estimate).[14] Male and female life expectancy has climbed to 53 and 55 years, respectively (2018 estimate) while the male-female birth ratio has remained close to 105:100,[15] which is considered within the "normal" or "natural" range of sex ratios, globally speaking. Some researchers, however, have documented the existence of a son preference in Nigeria based on characteristics such as birth order, birth intervals, and propensity to send and receive foster children of either sex, and they reason that this son preference negatively impacts women's health through maternal depletion (and associated morbidity/mortality) and also through adverse marital outcomes (i.e., subsequent polygyny, divorce, separation, life in a single parent household).[16]

The maternal mortality rate is 917 per 100,000 live births (2017 modelled estimate), which is the fourth highest in the world (compared to a SSA average of 534).[17] The WHO reports that 20% of global maternal deaths are in Nigeria,[18] where a woman's lifetime risk of maternal death is 4.9%.[19] This lifetime risk translates to roughly 1 in 20 women, or 145 women dying per day (one every 10 minutes) from childbirth complications. Adverse maternal outcomes in Nigeria are often exacerbated by poverty, low education, high levels of gender inequality, and specific cultural beliefs and practices related to female reproduction.[20] The average number of births per woman has been decreasing since 1980, but still stands above five (2018).[21] Electricity from minigrids could plausibly impact maternal health outcomes, not only through powering lighting and devices in clinics (which may also increase retention of skilled practitioners), but also by speeding the dissemination through radio and TV of evidence-based information about birth control and pre-natal, labour, and delivery care, especially regarding when to seek help for complications.

There are roughly 87 dependents, predominantly young, but some old, for ever 100 working age individuals in Nigeria (2019 estimate).[22] Forty-four percent of the population is under the age of 15.[23] As most caregiving responsibilities fall on women, a high dependency ratio often contributes to their time poverty and the burden of unremunerated work they do. High levels of caregiving work can compete with farm production activities, decrease the amount of time women can invest in their own micro- or small non-farm enterprises, as well as exhaust women's mental and physical energy reserves. Nigeria's dependency ratio does not greatly differ from that of SSA generally (84%) but is well above the global average (54%).[24] However, dependency ratios are higher in rural areas of Nigeria (1.1 dependents per adult, according to the LSMS[25]) than in urban ones. In some cases, it is posited that the arrival of

[14] World Bank, "World Bank Open Data."
[15] World Bank.
[16] Milazzo, *Son Preference, Fertility and Family Structure*.
[17] World Bank, "World Bank Open Data."
[18] "WHO | Maternal Health in Nigeria."
[19] World Bank, "World Bank Open Data."
[20] Piane, "Maternal Mortality in Nigeria."
[21] World Bank, "World Bank Open Data."
[22] World Bank.
[23] Nigeria National Bureau of Statistics, "LSMS Integrated Surveys on Agriculture: Nigeria General Household Survey Panel, Wave 4."
[24] World Bank, "World Bank Open Data."
[25] Nigeria National Bureau of Statistics, "LSMS Integrated Surveys on Agriculture: Nigeria General Household Survey Panel, Wave 4."

electricity and appropriate appliances can lessen certain care burdens primarily shouldered by women,[26] [27] but conversely it can also create new ones.[28] [29]

The human capital index is was .361 in 2020 (.366 for females, .355 for males),[30] meaning children's lack of schooling and poor health is expected to render them only 36% as productive as in a counterfactual without health and education constraints. While economic growth undoubtedly plays a role in increasing human capital, so do more targeted interventions that support parents, especially mothers, in caring for their children. Some of these interventions—such as freeing up women's and girls' time from manual foodstuff processing, powering health services, increasing the availability of clean water and irrigation, enabling communications, and more—could potentially be enhanced in the context of a well-planned and holistic roll out of minigrid infrastructure. Human capital development may also depend on *which* household members realize any income improvement linked to the existence of a minigrid. For example, in a landmark study, Duflo (2003) found the gender of South African pensioners receiving cash assistance influenced the degree of spending on female children's welfare within the household.[31]

On average, 19% of households in Nigeria are female-headed, though this obscures large regional variations (for example, only 6% of households are female headed in the North East, but 32% are in the South East).[32] While controlling for education or for economic activity, female-headed households on average experience less poverty than male-headed households (see Table 1 and Table 2),[33] but this must be interpreted with caution because women only rarely head the largest households, which are also on average the poorest (see Figure 3).[34] Using the existence of female-headed households as a proxy for identifying and targeting vulnerable women can be problematic unless other variables are also considered, such as income, marital status, household dependency ratios, and more. For example, in the northern parts of the country, generally, there are fewer female-headed households, but this does not necessarily mean there are fewer vulnerable women. Vulnerable women also live in male-headed households, especially large ones, either where the entire household may be poor or where family gender dynamics result in excess deprivation for certain female members. In rural areas of Nigeria, approximately a third of women are never married, a third are married in monogamous relationships, nearly a fourth are in polygamous marriages, roughly 10% are widowed, and very small percentages (around 1% each) are divorced and separated.[35] Minigrid programmes can perhaps better target vulnerable and/or excluded women by looking deeper beyond the dichotomy of male- and female-headed households.

Figure 3 Poverty Headcount By Household Size (2019)[36]

[26] de V. Cavalcanti and Tavares, "Assessing the 'Engines of Liberation.'"
[27] Dueso-Barroso, "Effects of Home Appliances on Female Labour Participation in South Africa."
[28] Bittman, Rice, and Wajcman, "Appliances and Their Impact: The Ownership of Domestic Technology and Time Spent on Household Work."
[29] Cowan, *More Work for Mother: The Ironies of Household Technology from the Open Hearth to the Microwave*.
[30] World Bank, "World Development Indicators | DataBank."
[31] Duflo, "Grandmothers and Granddaughters."
[32] Nigeria National Bureau of Statistics, "LSMS Integrated Surveys on Agriculture: Nigeria General Household Survey Panel, Wave 4."
[33] National Bureau of Statistics, "2019 Poverty and Inequality in Nigeria: Executive Summary."
[34] Mazzotta and Ng'weno, "The Enduring Gender Gap in Nigerian Household Headship."
[35] Nigeria National Bureau of Statistics, "LSMS Integrated Surveys on Agriculture: Nigeria General Household Survey Panel, Wave 4."
[36] National Bureau of Statistics, "2019 Poverty and Inequality in Nigeria: Executive Summary."

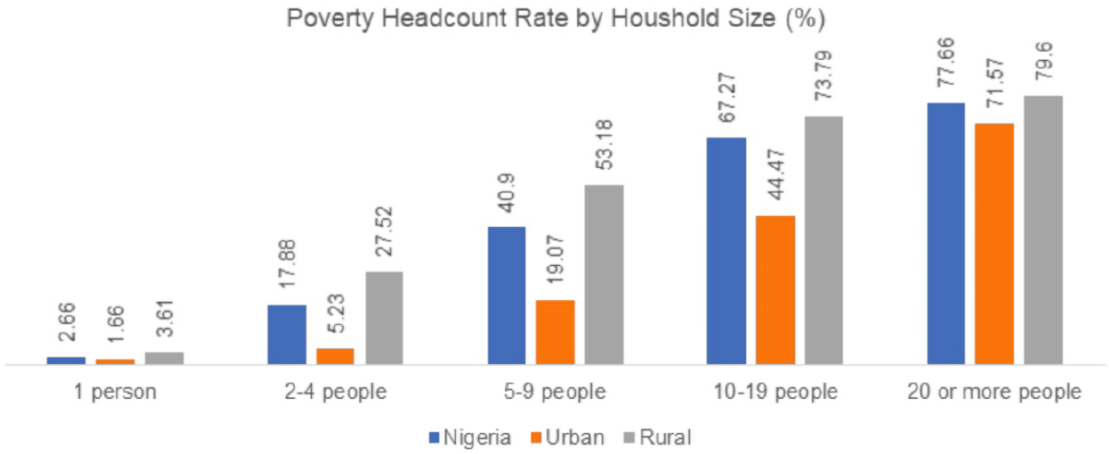


Table 1 Poverty Headcount Rate by Level of Education of Household Head (2019)[37]

State	No education/ less than primary education		Primary education		Secondary education		Post-secondary education	
	Male	Female	Male	Female	Male	Female	Male	Female
NIGERIA	66.17	34.72	41.25	26.93	25.00	14.08	18.13	5.66
Urban	43.14	24.66	19.16	19.35	12.97	11.20	8.86	3.42
Rural	70.82	39.17	50.33	32.74	35.87	18.96	31.20	10.15

Table 2 Poverty Headcount Rate by Economic Activity of Household Head (2019)[38]

State	Agriculture only		Nonfarm enterprise only		Wage work only		Diversified		Apprenticeship/ Not working	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
NIGERIA	58.76	37.75	25.45	19.45	17.53	13.99	46.90	31.54	34.24	24.13
Urban	30.11	27.96	15.22	18.12	11.87	11.38	23.92	24.99	18.60	11.00
Rural	63.20	39.02	41.68	22.48	28.72	21.14	53.25	33.79	47.14	34.81

2.2 Legal rights and framework

Though the 1999 Constitution prohibits discrimination on the basis of sex, gender rights in Nigeria are unevenly applied and enforced, often tangled up in legal interpretations of jurisdiction. This creates hurdles for some individual women who would seek redress and it fails to combat the persistence of societal discrimination with the full, uniform force of the law.

Nigeria is governed through a federal system of 36 states, plus the Federal Capital Territory (FCT), operating under a plural legal system, with the presence of common law (English-derived), Islamic law (in 12 northern states with their own individual codified Islamic penal codes), and customary law (which can vary significantly throughout the country). The 36 states do not have uniform legal regimes and their legislatures are responsible for drafting and enacting their own laws, which may or may not domesticate various federal provisions.

[37] National Bureau of Statistics.
[38] National Bureau of Statistics.

One illustration of the lack of legal harmonization can be found as relates to the issue of child marriage. The 1990 Marriage Act sets the legal age of marriage at 21, while the Child Rights Act (2003) stipulates 18 years. The Sexual Offences Bill (2015) refers to 18 as the age of consent, but then causes confusion by deriving its definition of "infant" from the Infant Relief Act, which covers all persons up to the age of 21.[39] As of 2020, a third (12) of Nigeria states (and 11 of the 19 Northern States) had still not adopted the 2003 federal Child Rights Act,[40] meaning some effectively sanction child marriage. According to some interpretations of Islamic law, more prevalent in the Muslim-majority Northern Sates, minors can be married at any time with their male guardians' permission (i.e., forced marriage), with marital sex able to commence once the child has attained puberty;[41] other reports, however, claim that the youngest legally permissible age of marriage in certain Nigerian states is 12.[42]

Perhaps the most significant legal divergences are found in matters regarding family law. The federal government has jurisdiction only over civil marriages. The federal-level Marriage Act (1990) and Matrimonial Causes Act (1970) govern civil marriage, granting women and men equal rights to consent to marriage and prohibiting polygamous unions. However, various customary and religious marriage regimes are common and exist in parallel with civil unions, sometimes with contradictory provisions, effectively limiting the rights of some women and complicating others' ability to assert the rights they do have.[43] For this reason, on a community-by-community and customer-by-customer basis, it will be important to understand which marriage regimes are in force in order ascertain what kinds of access, use, and ownership control over electricity and appliances women may have.

Generally speaking, statutory marriages offer women the greatest degree of legal protection as compared to customary and religious marriages**.** Though there are "as many customary laws in the country as there are communities," customary marriages often treat women as their husbands' property.[44] Islamic courts have jurisdiction—by virtue of section 262 of the Constitution—to settle matters of personal law for Muslims, but even these courts are not fully consistent/harmonized with one another.[45] In both Islamic and many customary marriages, women are not generally legally protected from polygamous practices, are legally considered subordinate to husbands, may be married early, and may be subject to spousal beating.[46] [47] Islamic law often tolerates the practice of *purdah* or secluding women from public view and activities, which can complicate and/or increase the cost of minigrid promotion if it means that duplicate work/operating premises must be secured, male-only and female-only versions of project activities must be held, and additional outreach may be necessary to convince women to participate.

The Violence Against Persons Prohibition (VAPP, 2015) offers legal protections useful to counter gender-based violence (GBV) and gender discrimination. For example, VAPP: prohibits female genital mutilation, expands the prior definition of rape found in the penal/criminal codes, tackles multiple dimensions of domestic violence, bans harmful widowhood practices, and more. As of February 2020, 19 states have adopted VAPP (plus it is automatically applicable in FCT).[48] In states that have not adopted VAPP, certain protections for women against GBV are notably weak or non-existent. For

[39] Robert, "NIGERIA: The Sexual Offences Bill 2015 and the Protection of Children."
[40] Girls Not Brides, "Child Marriage Around The World: Nigeria."
[41] Musawah, "Musawah Thematic Report on Article 16 & Muslim Family Law: NIGERIA."
[42] Girls Not Brides, "Child Marriage Around The World: Nigeria."
[43] OECD Development Centre, "Social Institutions and Gender Index: Nigeria."
[44] FAO, "Gender and Land Rights Database: Nigeria Country Profile, Customary Law."
[45] Musawah, "Musawah Thematic Report on Article 16 & Muslim Family Law: NIGERIA."
[46] FAO, "Gender and Land Rights Database: Nigeria Country Profile, Customary Law."
[47] Musawah, "Musawah Thematic Report on Article 16 & Muslim Family Law: NIGERIA"; FAO, "Gender and Land Rights Database: Nigeria Country Profile, Customary Law."
[48] Partners West Africa, "VAPP Tracker."

instance, some Islamic law permits the beating of female spouses (given certain principles such as cause and proportionality are respected)[49] and some existing non-Islamic penal codes also fail to criminalize spousal violence or recognize marital rape. In communities, for example, where attitudes towards wife-beating are permissive and this behaviour is not explicitly criminalized, a minigrid programme must take care that its individual level impacts improve, or at least do not exacerbate, gender-based violence. Some typical occurrences linked to electrification and alterations in patterns of GBV include changing: the way food is prepared, income levels, patterns of 'breadwinning,' amount of time spent away from home, amount of leisure time, amount of media consumption, and more.

With regards to property law, significant variation also exists among legal regimes (statutory, customary and Islamic). The 1978 Land Use Act and The Constitution extends to both women and men the right to own land and property. Additionally, Nigeria federal law does not automatically recognize men as default heads of household. However, in many customary regimes, women are only able to gain land use rights through a male relative,[50] leading to insecure tenure and lower asset levels, which could impede women's ability to benefit from minigrid enabled economic activities, particularly in the agricultural sector. Islamic law stipulates that daughters should inherit land and property from fathers, but only half the amount that sons do, though Muslims are able to opt into civil regime for the settlement of their estates if they so wish.[51]

In 2007, Nigeria adopted a National Gender Policy and accompanying strategic implementation plan covering the period 2008-2013. These documents sought to make gender analysis integral in all of the government's policy formulation/implementation/evaluation; effect a cultural shift towards equality and cooperation between women and men; and close gender gaps through policy and programs, if necessary including the use of affirmative action.[52] It has also adopted two National Action Plans in relation to U.N. Security Council Resolution 1325 on Women, Peace and Security for the periods 2013-2017 and 2017-2020, respectively.

A number of international treaties relevant for gender rights have been both signed and domesticated in Nigerian law making them applicable in the land. These include The African Charter on Human and People's Rights, The African Charter on the Rights and Welfare of the Child, and The Convention on the Rights of a Child.

2.3 Education

Nigeria has made significant progress in recent decades towards closing gender gaps in education. As can be seen in Table 3 and Table 4, the overall rate of enrolment is higher in the southern regions as compared to northern ones for both primary and secondary schools. (This can also be viewed in the bottom row of Figure 2.) Generally speaking, the urban-rural disparities in education are more pronounced than male-female ones. This suggests if minigrid programs attempt to influence educational outcomes in rural areas, [53] with even moderate mainstreaming efforts, it might result in a fairly balanced benefit for both boys and girls, though more so at the primary level than the secondary one.

Table 3 Percentage of primary school-age (7-12 years) population that is attending primary school[54]

[49] Musawah, "Musawah Thematic Report on Article 16 & Muslim Family Law: NIGERIA."
[50] FAO, "Gender and Land Rights Database: Nigeria Country Profile, Customary Law."
[51] Musawah, "Musawah Thematic Report on Article 16 & Muslim Family Law: NIGERIA."
[52] Federal Republic of Nigeria, "Nigeria National Gender Policy Strategic Framework (Implementation Plan) 2008-2013."
[53] E.g., by supplying electricity to schools, reducing children's house- and agricultural work, or extending the time available to study.
[54] Nigeria National Population Commission, "Nigeria Demographic and Health Survey, 2018."

	Male	Female	Total	Gender parity index
Residence				
Urban	72.8	70.2	71.5	0.96
Rural	55	51	53.1	0.93
Zone				
North Central	62.1	62.1	62.1	1.00
North East	46.4	44.5	45.5	0.96
North West	57.9	51.8	54.9	0.90
South East	83.7	81.2	82.4	0.97
South South	72.8	68	70.5	0.93
South West	73.6	71.9	72.7	0.98

Table 4 Percentage of secondary school-age (13-18 years) population that is attending secondary school[55]

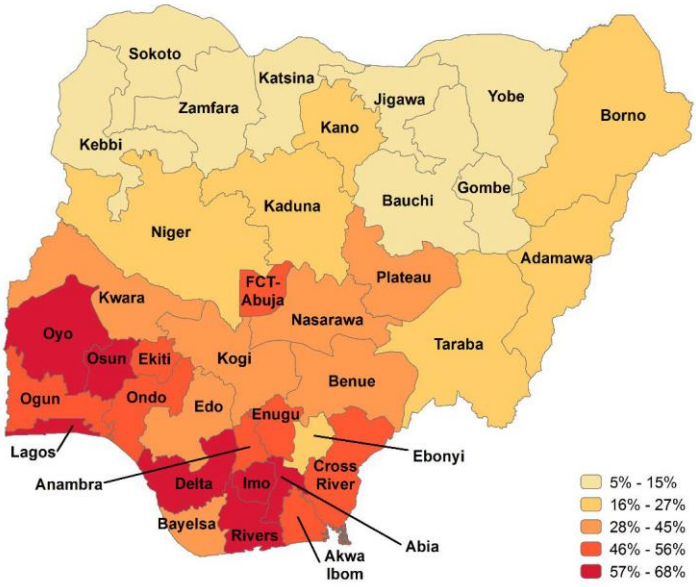
	Male	Female	Total	Gender parity index
Residence				
Urban	66.4	63	64.7	0.95
Rural	41.2	33.6	37.4	0.82
Zone				
North Central	54.4	49	51.7	0.90
North East	33.8	27.1	30.5	0.80
North West	41.8	32	36.8	0.77
South East	75.2	73.9	74.5	0.98
South South	72.7	69	70.9	0.95
South West	67.8	69.2	68.5	1.02

Figure 4 shows a clear South-North gradient pattern in terms of working age women having completed a secondary education. It is plausible that efforts seeking to boost women's involvement as technicians and service providers may be easier to accomplish in areas where there is a higher stock of female education combined with somewhat more relaxed gender norms. At least one study, however, found an inverse correlation with education and adoption of innovative, value-adding agro-processing technologies (likely because those with formal education had more non-farm employment options), though specific agricultural extension training was associated with enhanced technology uptake.[56]

Figure 4 Percentage of women age (15-49) with secondary education and higher

[55] Nigeria National Population Commission.

[56] Adeyemo and Okoruwa, "Value Addition and Productivity Differentials in the Nigerian Cassava System."



2.4 Work

Labour and time use surveys reveal women and men differ in both the types and amounts of work they perform, the conditions in which they work, and in their compensation. One line of thinking around Productive Uses of Electricity (PUE) is that electricity should help individuals, regardless of gender, do their existing, "gendered," work more effectively. Another line of thinking is that electricity provision—along with complementary supports like appliances, training, credit, etc.—can help reduce occupational segregation by making tasks less onerous or less demanding of physical strength. (For example, Annecke (2005) found that the presence of electric appliances correlated with more male participation in household chores in South Africa.)[57] Both gender mainstreaming approaches are appropriate in the context of a minigrid programme and require designing solutions with a range of work tasks and potential users in mind. Also important is the phenomenon of gendered technological appropriation, where one group comes to dominate or claim a valuable technology for itself to the exclusion of others, which is a risk that must be managed.

2.4.1 Agricultural work and food production

In the past, crop choices were often gendered within ethnic groups. Hausa and Fulani women, for example, often produced dairy products though men typically owned the animals, while among the Igbo and Yoruba and some other groups, yams were considered a considered a "prestigious male crop… closely associated with indigenous cosmologies" while cassava was more generally a female crop.[58]

Nigerian women today are involved in the production of both staple and cash crops, along with animal husbandry, but women's agricultural production is still far from being identical to men's. Men, on average, have access to more land, use more fertilizer, herbicide, and improved seeds, cultivate greater amounts of cash crops, and benefit more from household and hired labor.[59] Studies from around the Continent generally find gender output or productivity gaps in farming, but diverge as to the underlying reasons for these gaps, whether it has to do with the availability of specific inputs or with

[57] Annecke, "Whose Turn Is It to Cook Tonight?"
[58] Farnworth et al., "Unequal Partners."
[59] Ahmadu and Idisi, "Gendered Participation in Cassava Value Chain in Nigeria."

gender-based constraints (such as weakened negotiating power); study results in this respect appear to be highly sensitive to sampling and other methodological choices.

Research on the drivers of male-female agricultural productivity differentials has often been performed using the Oaxaca-Blinder (OB) decomposition method,[60] and some of these studies have specifically examined the case of Nigeria. In 2014, Oseni et al.[61] found women in the North of the country produce 28% less after controlling for farmer characteristics and farming inputs. Women's plots there are roughly as productive as men's on a per square meter basis, but those plots are around half the size of men's (i.e., smaller plots get farmed more intensively, and per-hectare productivity decreases with increasing farm size). The authors found that even if women in the North had the same amount of land and farming inputs as their male counterparts, however, the gender gap would persist. In the South, however, women were 24% less productive, but this gap disappeared entirely once controlling for observable variables like land and farming inputs. For a minigrid program, this suggests that differentiated approaches may be required depending on geography. Some women may just need additional resources (like training or access to credit) to succeed in agro-processing endeavors and realize returns on par with men, while in other cases, more comprehensive interventions might be needed to address a broader set of gender-unequal relationships, gender discrimination, and internalized bias. For example, Farnworth et al. (2020) found women's ability to benefit from the introduction of improved maize varieties was generally constrained by unequal gender norms, specifically low female agency;[62] unless this is addressed, development impact may remain limited.

However, care is needed before making sweeping generalizations about the causes of (and remedies for) gender gaps in agriculture. More recent studies, crop-specific, and locale-specific studies also using the OB (or similar) approach can be helpful. For example, Muricho et al. (2020) found a statistically significant difference in peanut yields per hectare in male- and female-headed households (721 kg versus 523 kg, respectively) in Northern Nigeria and traced the origin of this gap to male/female differences in endowments like land, labour, and other farming inputs, reasoning that women could be just as productive as men if they had comparable endowments.[63] However, others, like Olakojo (2017), found relatively minor gender productivity gaps in Nigeria for crops like guinea corn, beans, and millet, and only moderate ones in other crops like cassava, yam, and maize,[64] gaps largely attributed not to differences in endowments, but to the fact that women had to hire more/pay more for farm labour, reducing their net profitability.[65]

Gender productivity differentials in Nigeria has also been documented at the processing or value-addition stages as well. Adeyemo and Okoruwa (2018), for example, found that being male was significantly correlated with higher output among individual Nigerian farmers engaged in adding value to cassava harvests.[66] Men tend to dominate in commercial agricultural value chains where women lack access to transportation infrastructure and face cultural constraints on mobility (e.g., it is viewed as unacceptable for women to travel and/or it is difficult to balance travel with domestic care work), leading many women to mainly engage in local retail and petty trading activities.[67] A recent study of

[60] "The Blinder–Oaxaca decomposition is a statistical method that in this case attributes inter-group variation to (i) the portion due to observable differences in the factors of production (endowment effect) and (ii) the unexplained portion due to differences in returns to the same observed factors of production (structural effect).

[61] Oseni et al., "Explaining Gender Differentials in Agricultural Production in Nigeria."

[62] In contrast to men, women are limited to local markets, have to use significant time and energy to process the maize into low-profit margin products, spend any money they make on the household or give it to their husbands, etc.

[63] Muricho et al., "Estimating and Decomposing Groundnut Gender Yield Gap."

[64] Together, these six crops account for around four fifths of crops grown by Nigerian farmers.

[65] Olakojo, "Gender Gap in Agricultural Productivity in Nigeria."

[66] Adeyemo and Okoruwa, "Value Addition and Productivity Differentials in the Nigerian Cassava System."

[67] Ahmadu and Idisi, "Gendered Participation in Cassava Value Chain in Nigeria."

minigrid-enabled agricultural processing opportunities in Nigeria also confirms that men are over-represented in the mechanized steps of agricultural value chains, though it cautions against generalizing across locales, cultures and value chains.[68] Figure 5 is reproduced from this report, with grey shading denoting the 90% confidence interval. It shows men being relatively more involved in the capital intensive, electricity-enabled agricultural activities while women remain in more heat-intensive, traditional ones. Unfortunately, the male-dominated activities are the ones currently prioritized under the minigrid programme due to their techno-economic feasibility and near-commercial status. Thus, special measures are required to weaken the occupational segregation in these activities so women and men can benefit equally, particularly women who are currently engaged in manual crop processing, such as the example of cassava in **Box 1** below.

Box 1 Gender Importance of Cassava Sector in Nigeria

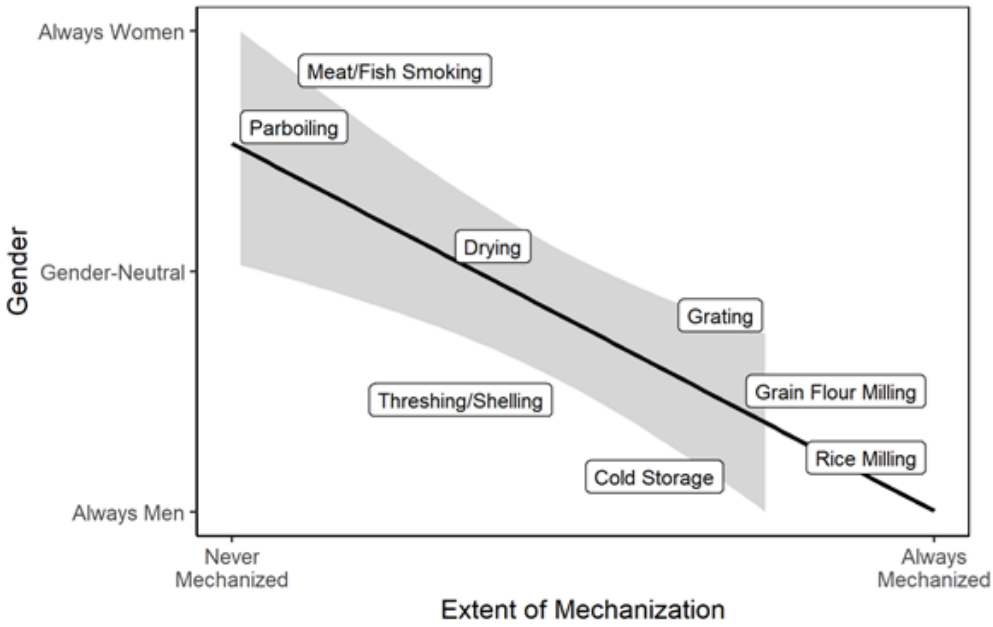
Excerpts from Ahmadu & Idisi (2014)[69]

- "[Cassava is] a major crop that accounts for between 40-50% of all calories consumed in Southern and Central Nigeria (Maziya-Dixon 2001)… Nigeria is the world's largest producer of cassava."
- "It is produced predominantly (99%) by small farmers with 1-5 ha of land intercropped with yams, maize, or legumes…"
- "It has been estimated that the number of small commercially oriented cassava producers within the [Niger Delta] region would be in the range of 70,000- 120,000 (out of the more than 1 million producers) and over 400-500 cooperatives and cottage industries, 800,000-950,000 traders, 46 small medium processing industries and 1 large processing industry in the region."
- "About 70% of cassava farmers in the Niger Delta region are women; also, women are almost entirely responsible for the processing and marketing of cassava … in most part[s] of the country."
- "In most cases, women buy agricultural produce from their husbands and other farmers, processed and market[ed it]."
- "Small-scale cassava processing is the domain of women, although most of the mechanized equipment (graters and grinders) are owned and operated by men (Toccoet al, 2012, Fries and Akin, 2011, Riisgaard, et al, 2008)."

Figure 5 Trends in Mechanization and Gender Representation in Value-Add Activities Included in Field Surveys as Reported by Local Processors and Community Champions

[68] Deloitte Consulting LLP, "Nigeria Power Sector Program -- Agricultural Productive Use Stimulation In Nigeria: Value Chain & Minigrid Feasibility Study."

[69] Ahmadu and Idisi, "Gendered Participation in Cassava Value Chain in Nigeria."



2.4.2 Unremunerated work

Women in Nigeria participate in the workforce at high rates and they also shoulder a majority of the care-giving/domestic/reproductive work of the country as well. In 2019, half of Nigerian women aged 15 and over participated in the labour force, compared to about 60% of men.[70] Nationally, household poverty correlates with the amount of unpaid work women in those households do (i.e., the poorer the household the more unremunerated care work is done by female members); and these circumstances also correlate with women contributing smaller proportional shares of the household cash revenue and having less bargaining power and decisional autonomy.[71] This pattern also appears in rural-urban comparisons, where women's time use can be markedly different (**Figure 7** is an illustration of this), with rural women devoting more time overall to housework and their own subsistence production and less time to paid employment.[72]

This suggests that any programme efforts must be cognizant of competing demands on women's time when promoting new agricultural and other income generating activities for women, especially those from low-income settings. This might be achieved, for instance, by mechanizing certain care work, time-shifting responsibilities, employing mutualized care strategies, or incentivizing men to perform more domestic and childcare chores. Minigrids can also support the outsourcing/commercialization of some domestic activities, such as baking bread, laundering and pressing clothes, and processing food staples, simultaneously creating income generating opportunities for some individuals and reducing the amount of work that must be performed in the home. Another way in which the programme must account for women's multiple roles and time obligations is to ensure that activities, such as consultations and training sessions are compatible with women's schedules.

However, men in Nigeria are also involved in care work, more so than in three other countries surveyed during an ActionAid program that involved time journaling and empowerment groups.[73]

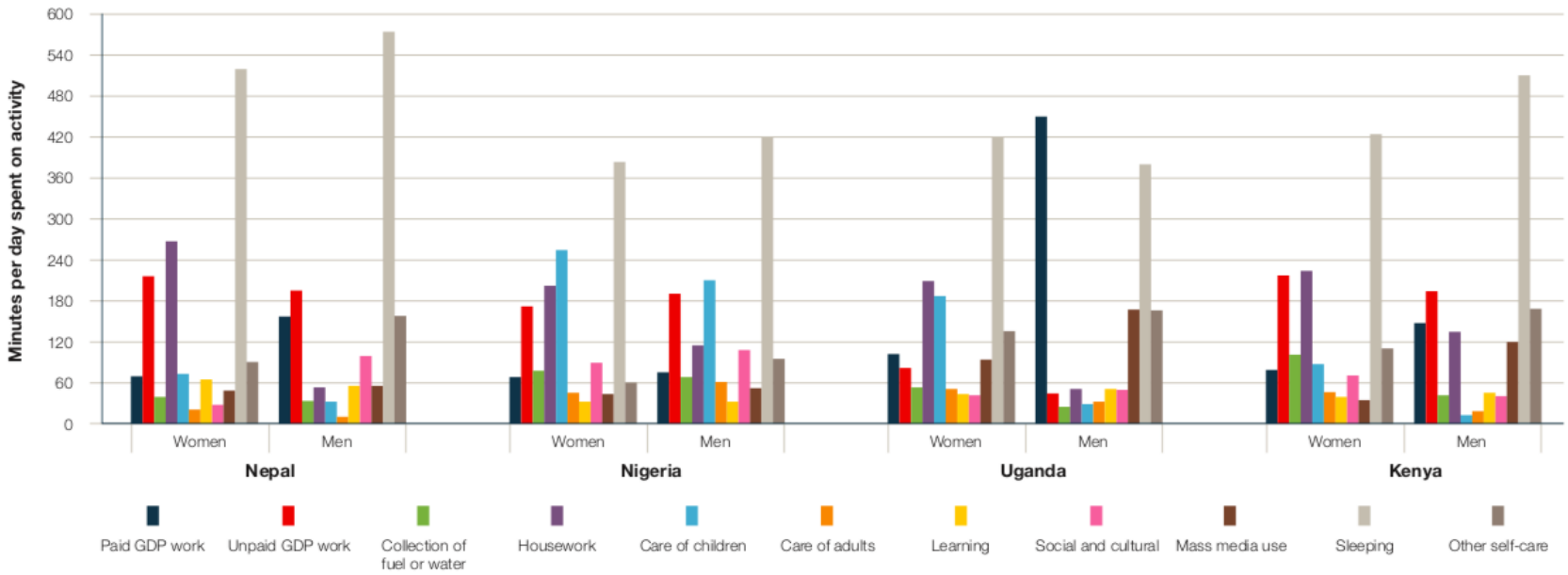
[70] World Bank, "World Bank Open Data."
[71] Angel-Urdinola and Wodon, "Income Generation and Intra-Household Decision Making: A Gender Analysis for Nigeria."
[72] Budlender and Moussié, "Making Care Visible: Women's Unpaid Care Work in Nepal, Nigeria, Uganda and Kenya."
[73] Budlender and Moussié.

Several things to note are that Nigerian men surveyed spent more time than women caring for adults and significant amounts of time on childcare. There was only a minor gender differential in fuel and water collection, consistent with national statistics that also confirm that, of men and women involved in collecting firewood and water, both genders spend roughly the same amount of time performing these tasks, though women are more likely to collect water.[74] ActionAid's surveys also revealed men and women spending fairly similar amounts of time on paid work and subsistence farming (denoted in

[74] Nigeria National Bureau of Statistics, "LSMS Integrated Surveys on Agriculture: Nigeria General Household Survey Panel, Wave 4."

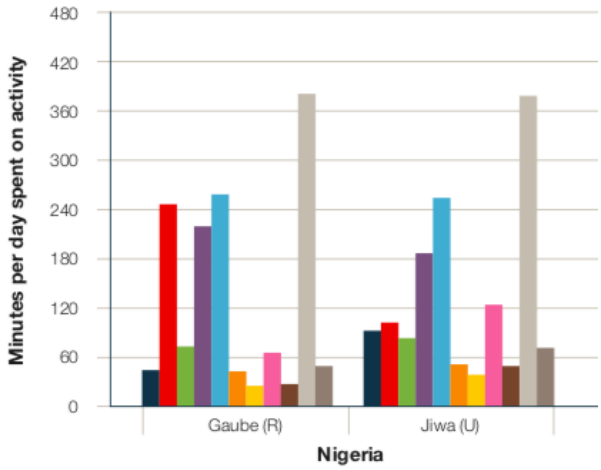
Figure **6** as “unpaid GDP work”). Women in the survey accounted for significantly more household work, but Nigerian male respondents spent more minutes per day on housework than the men surveyed in other countries. The minigrid programme should also ensure its interventions don’t lead men to reduce, relative to women, the time they dedicate to care work, thereby increasing gender inequality.

Figure 6 Time Use (Minutes/Day) by Women and Men Across Activities, 4-Country Comparison[75]



[75] Budlender and Moussié, "Making Care Visible: Women's Unpaid Care Work in Nepal, Nigeria, Uganda and Kenya."

Figure 7 Women's Time Use in an Urban (Jiwa) and Rural (Gaube) Setting in Nigeria[76]



2.4.3 Women in the Micro, Small, and Medium Enterprise (MSME) sector

A 2017 government survey counted over 41 Million MSMEs, but fewer than 2,000 of these were medium-sized, and fewer that 75,000 were small.[77] Close to 60% of households run a nonfarm enterprise, with electricity the most often reported constraint on business growth (23% of businesses reported).[78] According to the World Bank Enterprise Surveys, women in Nigeria tend to own and lead smaller firms than do men, on average.

But there is also sectoral segregation within MSMEs; while fifty-seven percent of individuals employed in the MSME sector are male, about 85% of agriculture sector MSMEs were male-owned.[79] A separate survey[80] of 400 women-owned SMEs in Nigeria detailed common barriers and recommended that women receive help in: registering their business and acquiring quality certifications; establishing formal banking relationships; instituting formal talent acquisition/development processes; readying their business for export activities; and continuing to push for flexible working environments that accommodate family obligations. These are all activities UNDP/GEF could consider to promote female (including cooperative) entrepreneurship in agro-processing activities, some of which may be able to take advantage of international trading opportunities, especially with the right certifications,[81] quality standards, finance and business linkages.

There are even MSME-energy linkages in Nigeria's National Renewable Energy and Energy Efficiency Policy (2014), which includes the following strategy: "Establishing micro-credit facilities for entrepreneurs, especially for women groups, for the establishment and operation of commercial solar energy facilities in remote and off-grid areas," which is relevant to the UNDP/GEF minigrid program, particularly its innovative financing component. Female minigrid developers face all the same challenges as their male colleagues, plus some additional ones. One interviewee mentioned the difficulty faced by women who are shut out of certain professional networks, partly because of the afterhours socializing sometimes necessary to sustain those networks, and as a result have fewer mentors and insider tips.

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[76] Budlender and Moussié.

[77] SMEDAN and National Bureau of Statistics, "National Survey of Micro, Small & Medium Enterprises (MSMES), 2017."

[78] Nigeria National Bureau of Statistics, "LSMS Integrated Surveys on Agriculture: Nigeria General Household Survey Panel, Wave 4."

[79] SMEDAN and National Bureau of Statistics, "National Survey of Micro, Small & Medium Enterprises (MSMES), 2017."

[80] International Trade Centre, "SheTrades: Promoting SME Competitiveness in Nigeria."

[81] E.g., women-owned, organic, fair-trade, etc.

Other times, women can face extra hurdles completing bureaucratic tasks, like clearing customs, getting bank letters, or registering for tax exemptions, again due to exclusion from some professional networks and sometimes due to gender-based discrimination or harassment. Some women expressed dismay at what they saw were "crumbs," donor-funded women's empowerment set-asides or prize money, when what they were really after were the large grants and financing packages that would enable their businesses to grow. UNDP/GEF's best strategy in this regard is to ensure that women-led developers can claim full seats at the table and have the same chances of succeeding as their male peers.

2.5 Gender and energy access

In Nigeria, 91% of total energy consumption occurs in conjunction with cooking,[82] a predominantly female activity, and wood and other biomass are the primary cooking fuels of 90% of rural households.[83] Additionally, air pollution is the 4th greatest risk factor for death in the country, with 49,000+ deaths attributable to outdoor $PM_{2.5}$ and 64,000+ deaths attributable to household air pollution annually.[84] Many historical electrification efforts have not addressed women's needs for sustainable and safe cooking options that protect them, their families and communities from household air pollution. Until recently, minigrids in particular, because of their per kWh cost structure, were not viewed as viable solutions for the cooking crisis. However, advances in electric pressure cookers and induction stove top technologies (falling prices and climbing efficiencies) are starting to change the equation. One study in Tanzania estimated the levelized cost per meal cooked with minigrid-powered induction cookers to be competitive with charcoal, even firewood.[85] While e-pressure cookers might be ill-suited to many Nigerian dishes that require stirring, the promotion of simple induction tops may soon be appropriate for support by technical and financial partners, though this will have load implications for the technical design of minigrid systems.

It is infeasible to expect efficient electric cooking to fully displace other technologies employed by rural cooks at this point in time, both because the technology is still maturing and because of cultural factors. Extensive Focus Group Discussions (FGD) in Benue State conducted around cooking practices revealed some of the reasons why.[86] For example, biomass smoke was often used to preserve meat; cooking for large families and event-type occasions required the use of cooking vessels too large to use in conjunction with electric stoves. On the other hand, there were other factors mentioned by FGD participants that could be advantageous to electric cooking in rural Nigeria, such as the hassle and price of trying to get dry fuelwood or kerosene in the rainy season and the medical costs of dealing with eye ailments associated with biomass cooking. As mentioned previously, and as can be seen in Table 5, both men and women are implicated in the collection of fuelwood at nearly comparable rates.

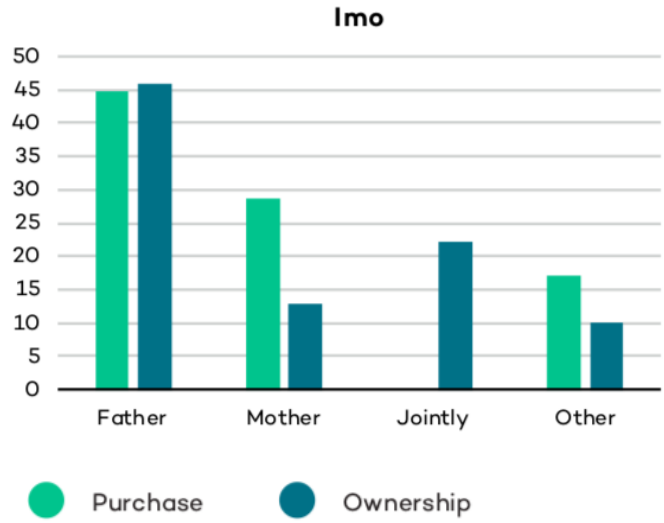
Table 5 Fuelwood Collection by Individuals in Rural Nigeria in 2015-2016[87]

Rural Nigeria	Female	Male
Percentage of Individuals Who Collected Fuelwood	47%	40%
Of those who collected, percentage that spent…		
…Less than 10 minutes	27%	25%
…Between 11 and 30 minutes	57%	61%
…Between 31 and 60 minutes	15%	12%
…More than 60 minutes	2%	2%

[82] Oyedepo, "On Energy for Sustainable Development in Nigeria."
[83] IISD, "Gender and Fossil Fuel Subsidy Reform in Nigeria: Findings and Recommendations."
[84] SOGA, "State of Global Air: Nigeria."
[85] Lombardi et al., "Enabling Combined Access to Electricity and Clean Cooking with PV-Microgrids."
[86] Jewitt, Atagher, and Clifford, "'We Cannot Stop Cooking.'"
[87] National Bureau of Statistics, "General Household Survey Panel, Wave 3 (2015)."

In addition to whether or not electricity can be used to address needs for cooking energy, there are other gender implications for electricity access, one of which is the gendered nature of appliances. In one survey of 500 rural households in the Uzoagba community (Imo State), Nigerian men were more likely to be the sole deciders and purchasers of appliances (about 45% of the time, see Figure 8),[88] which presumably could affect how those appliances are used and by whom. This survey also revealed that women's appliance ownership was significantly lower than their appliance purchases, suggesting perhaps that custody was voluntarily transferred so others (i.e., gifting), that it passed that way because of norms related to marital property regimes, or that it was transferred through expropriation.

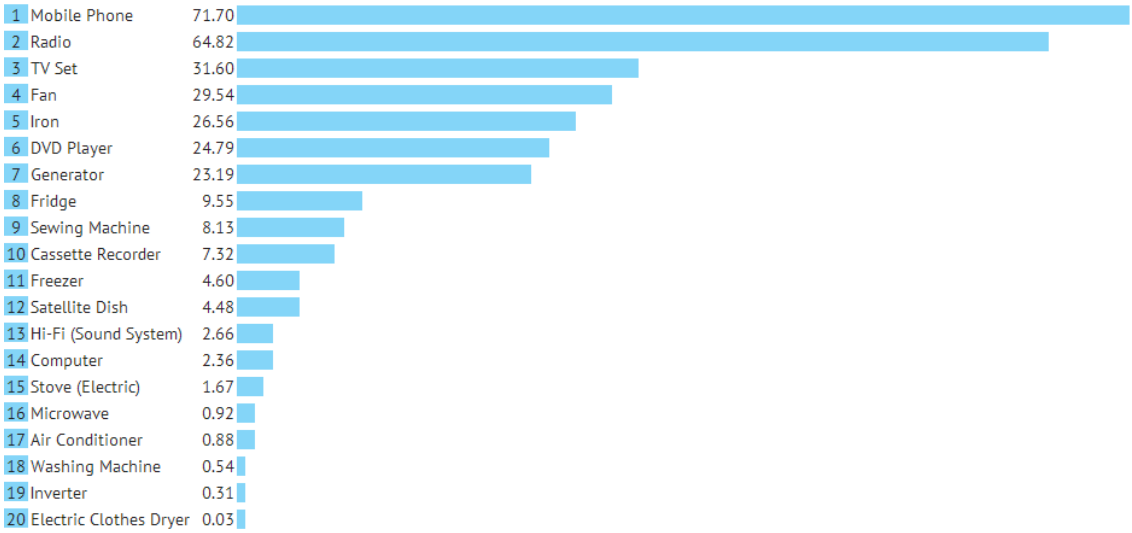
Figure 8 Purchase and Ownership of Electronic Appliances (%) (Survey of 500 Rural HH in Imo State)



Understanding the gender aspects of appliance decisions, purchase, ownership, and use, is necessary in order to contextualize a minigrid intervention. The most common appliances found in rural Nigerian households are listed in Figure 9. Closer work with target communities may be beneficial in order to understand those communities' relationships to appliances, whether they are considered "predominantly male," "predominantly female," or "neutral" in terms of their use and benefit patterns. For example, a radio might be considered "neutral" when used by multiple family members simultaneously for news and entertainment, but a washing machine might be labelled "pre-dominantly female" since it helps with a task mainly performed by women. Minigrid support programmes are not helpless in terms of trying to close appliance gender gaps. Community-based, participatory interventions to collectively map and assess individuals' energy needs, appliance demonstration and extension services targeting women, and making wholesale credit available to community finance institutions with large percentages of women in their client bases, have all been used before to increase women's agency in appliance purchase and use.

Figure 9 Rural Households' Reported Ownership of Appliances in Nigeria (%), 2015-2016[89]

[88] IISD, "Gender and Fossil Fuel Subsidy Reform in Nigeria: Findings and Recommendations." (pg 12)
[89] National Bureau of Statistics, "General Household Survey Panel, Wave 3 (2015)."



Some NGO/private sector operators have reported a measure of success in reaching female energy users through predominantly female sales and service channels. For example, Solar Sister employs a micro-consignment model centred around female agents and their social networks to sell pico energy systems into underserved rural markets. The Nigeria country manager, Olasmibo Sojinrin, emphasizes the importance of women's unique position to promote modern energy services at the household level based on their ability to directly relate to users' experiences and also to connect with users in settings where opposite-sex interactions are frowned upon. These lessons are also instructive for minigrid settings, particularly during connection drives and in the marketing of appropriate electric appliances. Nayo Tropical Technologies (NTT), Ltd., a Nigerian minigrid developer, often deploys mixed gender teams during load estimation surveys at the feasibility stage, finding that doing so greatly improves data quality. NTT's hypothesized reasons for this include: Female surveyors are better able to reach and establish rapport with female respondents to characterize their energy needs; having multiple respondents form a household (when possible) allows for better triangulation/cross-checks; and that many respondents will be more truthful when asked questions by a woman. The CEO of SOSAI, a renewable energy company active in the mini-grid space, finds that female customers are willing to open up and trust her once they see she is "one of them."

Digital connectivity and access to banking may become increasingly important mediating factors for minigrid access as developers move to pre-paid and smart metering technology. Communication and mobile banking may also be important general business tools that can partly support the uptake of PUE by micro- and small enterprises. Although 22% of Nigerian women have bank account, they are mostly in urban areas; and although 55% use mobile phones, the percentage of using it for financial transactions in rural areas is low (see Table 6).[90] Women's access to bank accounts, mobile phones, and mobile-enabled financial transactions is also considerably lower in the three Northern regions as compared to the Southern ones.

Table 6 Female Bank and Mobile Phone Use[91]

Female	Have and use a bank account (%)	Own a mobile phone (%)	Use mobile phones for

[90] Nigeria National Population Commission, "Nigeria Demographic and Health Survey, 2018."
[91] Nigeria National Population Commission.

			financial transactions (%)
Residence			
Urban	36.8	74.4	36.4
Rural	9.6	39.2	14.3
Region			
North central	17.8	54.2	18.1
North East	8.4	39.2	12.5
North west	6.9	34.7	12.4
South-east	36.5	74.6	35.2
South South	36.6	70.6	29.4
South West	44.1	82.3	46.2

There is also a significant gender gap in asset ownership (Table 7) that could plausibly affect men's and women's wealth building and returns on household electricity investments. With respect to houses, low female ownership (or joint ownership) suggests a risk that domestic minigrid connections might increase the value of men's property and that women, even if they helped to pay for the connections, might have weak ownership claims over them, which can be especially problematic in cases of marital dissolution. Also, land might be required for micro- and small-scale PUE applications, or even sometimes semi-private, female-only spaces in communities where *purdah* is practiced. If women lack access to needed land, their economic options could theoretically be limited to only those activities consistent with cottage-based production.

Table 7 Female/male differences in asset ownership[92]

	Male	Female
Own house (alone or jointly)	37	11
Own land (alone or jointly)	38	12

2.6 Programs and institutions of interest

Much institutional architecture for gender mainstreaming in the minigrid sector already exists in Nigeria. There is, for instance, a gender focal point in Ministry of Power who could serve a knowledge and networking resource for this programme. Nigeria has started the process of developing a national action plan for gender and energy access, consistent with its obligations under the ECOWAS regional policy on the topic,[93] as well as the ECOWAS Directive mandating gender assessments in energy projects.[94] REA has already developed a multi-pronged gender mainstreaming strategy and commissioned work on gender-informed assessments of minigrid projects and minigrid procurement processes. The 2013 National Energy Policy includes as one of its primary objectives to "promote gender sensitivity and draw special attention to rural needs," though women's needs are primarily defined within the household care economy. A list of other relevant policies is contained in Annex 13. The present programme can lend support to the Government of Nigeria where it has already taken the lead in energy sector gender initiatives.

Being a large and dynamic country, Nigeria is home to numerous initiatives, both public and NGO-led, focused on women's empowerment, women's entrepreneurship, inclusive rural development and improved agriculture, financial inclusion, and energy access and technology. Wherever the pilot projects end up being located, there is a fair probability that they will overlap with the footprint of other, tangentially related and complementary initiatives. In addition to being potential partners, these

[92] Nigeria National Population Commission.

[93] http://www.ecowrex.org/system/files/ecowas_policy_for_gender_mainstreaming_in_energy_access.pdf

[94] http://www.ecowrex.org/system/files/ecowas_directive_on_gender_assessments_in_energy_projects_0.pdf

other initiatives can help inform the minigrid programme based on their own track records and experiences. For example, the national Fadama development program (started in 1993, now in its 3rd phase) that fosters access to productive agricultural inputs to reduce poverty and increase food security—"fadama" being a Hausa name for land that can be irrigated—generated insights that are perhaps laterally transferable. A World Bank review found 41% of beneficiaries were female (ranging from 27% in the North West to 50% in the South East) and attributed this success to the project's community-driven, group-based mechanisms, though women's likelihood of participating was partly governed by their ties to male family members.[95] It is believed that men, due to the inter-dependent nature of farm production,[96] facilitated their female relatives' participation by helping them overcome information asymmetries and connect to power structures within the community—such as traditional and religious leaders and cooperatives—channels the program used to share information about benefits and application procedures.

3 Gender Action Plan

The proposed programme exhibits a high degree of gender risks unless concrete mitigation measures are pursued. For example, it involves supporting developers in a very male-dominated mini-grid sector as they try to pioneer new business models in the very male-dominated sub-sector of mechanized dry milling. In order to prevent the majority of project benefits from accruing to men (and perhaps exacerbating any gender power imbalances already exist, or even triggering a women's protest), the programme can either branch out to support other activities[97] or it must focus intently on weakening occupational gender segregation and reversing male technological appropriation. As the programme is already considerably complex, the latter is preferable to the former, though it won't be easy.

Furthermore, the exact locations of pilot projects are yet to be defined, but gender norms and legal rights likely to influence outcomes (such as marriage customs and property rights) can vary significantly from locale to locale further complicating the programme's desire to achieve a balanced and equitable impact. Because of this, ongoing and responsive gender analysis throughout the program is necessary and success markers/expectations for gender equitable outcomes will likely have to be tailored to individual project's circumstances. A "gender win" in a very traditional, Muslim-majority village in the North may look very different from on in a predominantly Christian small town in the South, for instance.

Tackling entrenched occupational segregation, and as a side effect promoting an evolution of certain gender norms, in a landscape as rich and varied as Nigeria is a tall order and may necessitate the deployment of an electricity and agriculture gender specialist as part of the core REA team.

Based on the results on the gender assessment, the following action plan in

[95] Porter and Zovighian, "Targeting Women in a Community- Driven Development Project."

[96] For example, women are often implicated in processing the crops that men help to grow and harvest.

[97] Perhaps such as e-cooking, female-dominated income generating activities, upgrading health centres since maternal mortality is so high, water pumping since women are more involved in water collection, etc.

Table 8 has been drafted to provide a “gender lens” over the project, ensuring equitable participation and benefit incidence among women and men across the various program components. While there are no dedicated, or “stand alone” gender activities, gender has been mainstreamed into each of the project sub-components, notably by:

- Ensuring minigrid project designs are appropriate for male and female users;
- Compensating for women’s lower starting agency and resource to ensure they are able to participate in minigrid development and productive use;
- Strengthening the government’s ability to analyse and respond to gender issues through enhanced planning;
- Moving towards increased collection of gender-relevant data that can inform sound decision-making for both the public and private sectors.

Table 8 Gender Action Plan

Objective	Gender Action	Indicator and Targets	Responsible / Institutions	Budget (USD)
Component 1: Policy and Regulation				
Output 1.1 **Pilots developed, including on productive use/innovative appliances and modular hardware/system design**	Ensure Calls for Proposals includes the following: - Ensure dedicated financing support to women entrepreneurs in the energy-agriculture value chains through at least 15% of total GEF investments. Women (and consortia including women) will be actively encouraged to bid on projects by tailoring language in Calls for Proposals and also by conducting aggressive outreach through professional networks; - All project proposals mandated to incorporate gender considerations in technical design,[98] PUE and other applications, operations and management, project activities like training; - Provide pre-bid support and guidance to applicants, including detailed pre-submission reviews[99] Ensure integration of women, or women's organizations, within the business delivery models. To the extent possible, include a gender variable overlay on the remote monitoring data.	**Baseline:** 0 **Indicators:** - Number female-led applicant teams and successful bidders - Number of applicant teams and successful bidders with 1/3 or more female team members/partners - % of GEF investments deemed "gender transformative" **Target:** - 40% Female-led applicant teams and 1/3 female-led winners - 40% gender diverse applicant teams and 1/3 gender diverse winners - At least 15% of GEF investments	REA	464,917 (INV) 15,000 (TA)

[98] For example, this includes: that the hopper heights of mills be either adjustable or low enough to be comfortably filled by most women; that noise levels be reduced to the point where ear protection is not required and women can hear and respond to children; that moving parts (like belts and drive shafts) posing a danger to children being carried or playing nearby be enclosed; that moving parts that could catch on any loose-fitting women's clothing also be enclosed; that machinery can be started and stopped frequently and includes an emergency shut-off; that various sizes of equipment, including options appropriate for home-based production, be eligible for funding; etc.

[99] This helps compensate for women's lower experience with responding to and winning tenders, as well as the fact that they have access to fewer professional networks and contacts within REA to receive tips on properly completing their applications.

Objective	Gender Action	Indicator and Targets	Responsible / Institutions	Budget (USD)
Output 1.2 **Standardized online REF Calls for Proposals for enhanced transparency in developers bidding process**	Conduct a gender review of any online, Odyssey-based, bidding platform by collecting and analysing user feedback experience from both men and women.[100] Use insights from the review to iterate and improve on the platform/process design.	**Baseline:** 0 **Indicators:** - Gender review conducted, Y/N - Gender data collection step added for applicants, Y/N - M/F attrition rates by process step (%) **Target:** - Gender review conducted - Gender data collection step added for applicants - Gender parity in attrition rates by process step	REA	5,000
Output 1.3 **Capacity of potential tender bidders (private sector developers) strengthened to consider innovative business models and cost-reduction levers**	Deploy mixed gender pairs of mentors/coaches to assist both male and female sponsors with business plan strengthening, introduction to agricultural value chain actors, and financial facilitation and reporting. Connect female minigrid developers with others in 3rd countries for peer support and collaborative problem-solving exercises. The technical cohorts of the Regional Project Community of Practice can be a starting point to foster South-South cooperation.	**Baseline:** 0 **Indicator:** - Number of female-led companies supported by programme for business plan development and financial reporting - Client/sponsor satisfaction with business development services (sex-disaggregated) - M/F companies successfully securing REF (and/or other) financing **Target:** - 40% of companies receiving services are female-led - At least 80% satisfaction rate for both M/F - No M/F differential in client satisfaction	REA, UNDP	44,144

[100] For example: ensure male and female applicants have similar internet access, internet reliability, and internet literacy; perform gender-disaggregated A/B testing of features and wording of instructions; canvas applicants to assess whether in the case of difficulties with the application, men and women receive comparable levels of phone/in-person assistance, both formal and informal, etc.

Objective	Gender Action	Indicator and Targets	Responsible / Institutions	Budget (USD)
Output 1.4 **Capacity of winning tender bidders (private sector developers) strengthened**	Minigrid developers linked with women's cooperative enterprises, financing organizations, self-help groups, in order to support electricity uptake in agro-processing.	**Baseline:** 0 **Indicators:** - Number of women's cooperatives, financing organizations, self-help groups, etc. incorporated into minigrid-enabled value chain **Targets:** - Financial/material involvement of at least one women's group per developer supported, e.g., in a leasing scheme or as a key project partner	REA	35,308
Output 1.5 **Capacity building provided to public officials specifically to design procurement/tender processes**	Provide equal opportunity for male and female officials to attend all trainings provided. Conduct gender review of bidding document language and requirements.[101] Provide training on gender issues salient in mini-grids and in agricultural value chains. While conducting the long-term analysis of power markets to ensure on-grid/off-grid equity in tariff structure, also consider the gender aspects of any connection subsidies, including implicit/indirect ones, which could predominantly accrue to male house owners.	**Baseline:** 0 **Indicators:** - M/F attendance at trainings compared to overall departmental gender diversity - Gender review of bidding documents completed, Y/N - # Staff training on gender issues and % demonstrating competence in skills - Gender review of connection subsidies and pricing complete, Y/N **Targets:** - Training attendance rates identical or better than women's departmental representation - Gender review complete - 100% of staff overseeing bids and tenders (launch, processing and assessing) trained and demonstrating competence on practical exercises	REA, UNDP	56,980

[101] For example, to assess if any requirements deter female applicants and could, in fact, be waived without jeopardizing project success. Also to uncover and alter any male-as-norm assumptions or language in the documents themselves.

Objective	Gender Action	Indicator and Targets	Responsible / Institutions	Budget (USD)
		- Gender review of connection costs and benefits complete		
Output 1.6 **Scaled up support for upstream renewable energy manufacturers and suppliers**	When promoting local assembly and manufacturing, adapt commercially available, international designs to be gender inclusive and appropriate for a variety of a Nigerian contexts, leveraging feedback form local female users and engaging in a user-centred, co-design process. Include in roadmap development a strategy for bringing more women into the design, manufacture, and uptake of agro-processing equipment.	**Baseline:** 0 **Indicators:** - # of equipment designs deemed to have been gender mainstreaming - Women's involvement in supply and uptake clearly delineated in roadmap, Y/N **Targets:** - At least 2/3 of equipment assessed and subjected to gender-inclusive reconfiguration - Presence of gender mainstreaming section in each technology roadmap	REA	27,952
Output 2: Innovative Financing				
Output 2.1 **Financial advisory committee (FAC) established and operational**	Ensure gender balance in the composition and leadership of the Financial Advisory Committee.	**Baseline:** 0 **Indicators:** - # M/F in committee - Gender of chair and co-chair **Targets:** - 50% women on committee - Chair and co-chair are opposite gender	REA, UNDP	No additional budget
Output 2.2 **Innovative financing solutions for minigrid development are identified and implemented through the REF**	Design financing solutions with female minigrid sponsors and agricultural users in mind,[102] and design of financing activities to be paired with cultivation of agency/empowerment mindsets among women.[103]	**Baseline:** 0 **Indicators:** - % Financing mechanisms/proposals screened for unintentional bias and in which gender considerations have been mainstreamed.	REA	28,240

[102] For example: use of collective/social capital lending methodologies; replacement of deposit or real property collateral requirements with life insurance products or partial credit guarantees; adoption of flexible payment modalities/forbearance options appropriate for when women must pause then resume business activities due to childbirth or unforeseen care-giving obligations; simplified application procedures; relaxed equity requirements; etc.

[103] I.e., helping women connect with one another to build confidence, refine their personal visions, confront internalized discrimination, and build back missing soft skills.

Objective	Gender Action	Indicator and Targets	Responsible / Institutions	Budget (USD)
	Aggressive outreach to and recruitment of female potential borrowers/investees utilizing professional and social networks.	- M/F recipients of piloted financing - Value of piloted financing flowing to M/F recipients **Targets:** - 75% of financing mechanisms/proposals gender mainstreamed - 40% at least of recipients are female - 40% at least of financing value goes to female recipients		
Output 2.3 **General market intelligence study on minigrids prepared and disseminated amongst public officials and finance community**	Append available gender data to agro-ecological, energy needs, and demographic GIS sets.[104]	**Baseline:** 0 **Indicator:** - # of gender variables cross-indexed with GIS data sets and made available to developers **Target:** - At least three relevant, granular-level gender variables included in market intelligence materials	REA	33,560
Output 2.4 **Feasibility study support provided to minigrid developers, creating a pipeline of investible assets**	Site-specific feasibility support should carefully account for both male- and female- energy needs and potential uses, including potentially efficient electric cooking (induction or pressure) and community uses in addition to agricultural uses. Support should benefit both male- and female-led developer companies.	**Baseline:** 0 **Indicators:** - # of feasibility studies that include detailed M/F customer segmentation - # M/F-led companies benefitting from the provision of feasibility study support **Targets:** - 100% of feasibility studies include meaningful M/F customer segmentation	REA	127,872

[104] For example, add a census layer about M/F household composition to mapped assets, cross-reference presence of women's agricultural cooperatives, include what is known about M/F participation in certain crop cultivation and processing to allow REA to estimate the likely gender benefit incidence of its minigrid portfolio.

Objective	Gender Action	Indicator and Targets	Responsible / Institutions	Budget (USD)
		- 1/3 of studies benefit female-led development companies		
Output 2.5 **Capacity building provided to minigrid developers and investors on measuring and reporting on impact indicators, building credibility in impact investment as an asset class**	Insist that financial institutions nominate equal numbers of men and women to attend any trainings. Foster dialog and experience sharing[105] between meso-level commercial lenders/investors and micro-financiers when both will be participating in complementary transactions within a single energy-agricultural value chain.	**Baseline:** 0 **Indicators:** - # of M/F from financial institutions attending training sessions - # M/F attendees at dialog/experience sharing events **Targets:** - 50-50 gender balance at training sessions - At least 50 attendees at dialog events, or 50 program-relevant introductions brokered between individuals operating at different levels of the financial services industry	REA	20,402
Component 3: Knowledge Management and Scale up Strategy				
All Outputs **3.1: Inception workshop** **3.2: Project monitoring** **3.3: Project evaluations** **3.4: Lessons learned captured and disseminated at the national level** **3.5: Replication plan (including investment plan) for scaling up rural energy access developed**	Continue to mainstream gender in all project management activities; use gender indicators listed above in this table for adaptive program management; develop, capture and disseminate gender insights from sector; continue to innovate and adapt processes and offerings to include more women in all aspects of energy supply, demand and enabling environments; select the most meaningful gender indicators[106] and actively work to narrow identified gender gaps; conduct regular open-ended discussions with	**Baseline:** 0 **Indicators:** - # program management documents that include at least some discussion of gender issues - # of project indicators which are sex-disaggregated - # of project indicators which directly seek to measure gender outcomes (beyond simple disaggregation)[107]	REA, UNDP	(15% of the total budget for Outcome 3) 134,635

[105] The goal is for meso-lenders/investors to gain confidence in the strength of micro-level transactions that may ultimately underpin their underwriting; to appreciate the financial value of MFI's "non-financial" empowerment activities; to appreciate the social impact metrics and reporting conventions common to many MFIs; and for both sides to develop "hand-off" strategies for clients graduating from one level to the next.

[106] Most likely, women heading up or employed by agro-processors and women heading up or employed by minigrid development companies.

[107] For example, this could include surveys that attempt to qualify the degree of attitudinal change among men and women pre- and post-intervention.

Objective	Gender Action	Indicator and Targets	Responsible / Institutions	Budget (USD)
3.6: Renewable Energy and minigrid Development Associations supported and strengthened to promote minigrid development **3.7: Quality Assurance Framework augmented and independent verification process in place for measuring, reporting and verification of the sustainable develop impacts of minigrids, including GHG emission reductions**	female stakeholders to capture and record unanticipated barriers and outcomes.	- # knowledge products and scale-up strategies including gender analysis - # knowledge products and scale-up strategies having gender as a main theme **<u>Targets:</u>** - 80% of program documents include at least some discussion of gender dynamics and program responses - Gender disaggregation of indicators as far as practicable - Tracking and reporting on at least 2 gender-specific indicators, one on the demand side and one on the supply side - 80% of knowledge products and replication strategies include gender analyses - At least one knowledge product or replication strategy with gender as a main theme		

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