



# SEE - Clean Cooking

## Thematic brief

### Gender and Social Inclusion in the Sahel: Implications for Biogas Market Development

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### Gender and Social Inclusion in the Sahel: Implications for Biodigester Market Development



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This thematic brief is the third in a series on gender and social inclusion in clean cooking developed by ENERGIA. The series is part of the Strengthening the Entrepreneurial Ecosystem for Clean Cooking (SEE – Clean Cooking) programme, which promotes affordable, sustainable and modern cooking solutions through a holistic, private-sector approach. Its three core pillars are business development support, supporting access to finance and encouraging an enabling environment. The programme focuses on clean cooking solutions such as biodigesters and higher-tier cookstoves, including e-cookers and advanced biomass stoves. The Netherlands Enterprise Agency (RVO) carries out the programme co-financed by the European Commission, the Netherlands Ministry of Foreign Affairs and the Danish International Development Agency. ENERGIA supports the integration of gender and social inclusion across all its activities and outcomes.

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## Key messages

- Women play a pivotal, multifaceted, role in the market for household biodigesters in Sub-Saharan Africa, acting not only as primary users but also increasingly as entrepreneurs and leaders in the biodigester and bioslurry fertiliser value chains. Biodigesters provide an important solution to gender-specific energy poverty, reducing the time rural women spend collecting fuel while creating opportunities for women's economic independence through bioslurry fertiliser management and sales.
- Involving women effectively in the biodigester market, as users and as entrepreneurs, improves agricultural outputs from women-managed land, a community's food and nutrition security and energy access; and enhances women's agri-businesses through increased agri-outputs and new income streams from biodigester-based business ventures.
- In the rural Sahel, women already occupy central roles in agricultural value chains, household energy use, soil management, agricultural marketing and community organisation. Where women participate actively in the biodigester and bioslurry fertiliser value chains, one observes better biodigester operation, increased local fertiliser production and higher value capture from biodigesters—clear evidence that gender considerations are not an add-on but a multiplier of effectiveness.
- While the biodigester sector is increasingly adopting gender-responsive approaches, the gender norms and social realities prevalent in the Sahel region—including early marriage, women's limited mobility, women's seclusion and public participation constraints, polygamy and women's lack of resources such as land and livestock—still constrain women's full participation in the biodigester sector.
- Robust gender analysis and stakeholder consultation can help biodigester market development programmes better understand how women in the Sahel navigate social and gender-related dynamics to access, benefit from and earn incomes from biodigesters. These insights can provide context-sensitive orientations to inform gender-responsive approaches that work within local social, religious and family frameworks to negotiate progressive change and locally accepted pathways towards greater inclusion.
- Biodigester programmes can, for instance, strategically support women who already possess foundational capacities—such as (digital) literacy, mobility, access to assets and (micro-) credit, supportive families and prior experience in community development initiatives—to act as role models in their communities.
- Engaging supportive men—such as spouses, local and religious leaders and business partners—as advocates can amplify development efforts to address gender gaps and change perceptions about women's roles in the biodigester sector.

- Opportunities for knowledge sharing, peer learning, agency building and the development of personal competencies and digital literacy help women acquire essential skills for participation in the biogas sector.
- As access to finance remains a critical barrier for women-led businesses, programmes can support financial institutions in designing locally adapted financing products, and support women in obtaining foundational business finance management skills.
- Applying a gender lens to national regulations, policies and strategies to identify gender-inclusive decisions helps to address prevalent gender and social dynamics and can create better conditions for women's participation in the biogas market.

## 1. Introduction

Women play a pivotal, multifaceted role in the market for household biodigesters in Sub-Saharan Africa, acting as primary users and decision-makers, and increasingly as entrepreneurs and leaders in the biodigester and bioslurry fertiliser value chains. Their participation in the biodigester market is critical for the adoption and sustained use of the technology, and to long-term market growth. However, women face social realities that limit their full participation in the biodigester sector as entrepreneurs, employees and consumers.

Building sustainable biodigester markets requires the intentional inclusion of social groups that are often overlooked in market development efforts. This means actively identifying and addressing the structural and social dynamics that contribute to their exclusion. The need for such an approach is particularly crucial in the Sahel region, where gender equality indicators lag behind those of other parts of Sub-Saharan Africa.

Advancing inclusive market development in this context requires a nuanced understanding of local gender norms and social relations, combined with adaptive and context-specific gender-responsive approaches. Approaches to gender and social inclusion in the Sahel are more likely to be effective and sustainable if they build on existing social, family and community frameworks, promote gradual and negotiated change that is socially legitimate and locally owned and highlight collective household and community benefits alongside individual empowerment.

This thematic brief presents lessons and recommendations from the SEE-Clean Cooking programme's efforts to integrate gender and social inclusion in its activities in the Sahel region, specifically in Burkina Faso, Mali and Niger. Drawing on case studies of individual women in the Sahel, and uncovering how gender norms and social relations have affected their access to and benefits from biodigesters, this brief offers practical orientations on what development programmes and policymakers can do to implement gender-responsive approaches in biodigester interventions in this region.

## 2. Women in the biodigester market in the Sahel

The African Development Bank's (AfDB) *Africa Gender Equality Index*<sup>1</sup> shows that the Sahel region has among the lowest gender equality scores—around 32%, compared to the continental average of 50%—highlighting the presence of significant inequalities between men and women.

In the Sahel, women are primarily responsible for cooking, agro-processing and household nutrition, undertaking the majority of these tasks and playing a central role in food preparation and distribution. Women continue to shoulder a disproportionate share of domestic and care work, spending

### AfDB's Africa Gender Equality Index

Comparison of the SEE-Clean Cooking programme's focus countries:

Country	Gender Index, 2023
Burkina Faso	0.421
Mali	0.426
Niger	0.366
Ethiopia	0.473
Kenya	0.590
Uganda	0.616

Source: AfDB. 2023

<sup>1</sup> The Africa Gender Equality Index measures gender equality across 54 African countries, scoring them between 0% and 100%, where 0% represents maximum inequality and 100% represents full parity between women and men.

significantly more time on these activities than men<sup>2</sup>. In many rural contexts, women spend several hours per day on domestic tasks, including cooking, highlighting enduring gender inequalities in time use and household responsibilities.

Biodigesters can reduce some of the burdens associated with cooking and agro-processing, while simultaneously addressing gender gaps in the Sahel. Involving women effectively in the biodigester market, as users and as entrepreneurs, improves agricultural outputs of women-managed land, a community's food and nutrition security and its energy access; and enhances women's agri-businesses through increased agri-outputs and new income streams from biodigester-based business ventures.

In the rural Sahel, women already occupy central roles in agricultural value chains, household energy use, soil management, agricultural marketing and community organisation. Where women participate actively in the biodigester and bioslurry fertiliser value chains, better biodigester operation, increased local fertiliser production and higher value capture from biodigesters is observed - clear evidence that gender considerations are not an add-on but a multiplier of effectiveness.

While the biodigester sector is increasingly adopting gender-responsive approaches, gender norms and social realities in the Sahel still constrain women's full participation in the biodigester sector. These dynamics often influence whether biodigesters are purchased, who decides to purchase them, and who benefits from them.

At the same time, these norms are embedded within broader systems of household cooperation, social cohesion and community identity. Effective biodigester interventions therefore require approaches that recognise existing social arrangements and engage with them effectively and in locally accepted ways to progressively expand opportunities for women's participation.

#### Which benefits do women stand to gain from a biodigester?

**Bioslurry** is a nutrient-rich organic fertiliser produced through the anaerobic digestion of organic materials such as animal manure, kitchen waste and crop residues that can contribute to improved agricultural output and food security of smallholder farmers. Additionally, bioslurry can be used as animal feed and as a pesticide and fungicide.

The anaerobic digestion process that provides bioslurry also generates biogas, a clean cooking fuel that can reduce the health impacts from using polluting wood and charcoal fuels, while also reducing firewood collecting tasks.

Locally produced and distributed bioslurry and biogas are potentially more accessible to women than other alternatives. The lower capital and technical requirements for producing bioslurry compared to chemical fertilisers mean that women can potentially earn incomes as bioslurry producers and suppliers, as well as suppliers of biodigester installation and training services in their local areas.

If women can be effectively involved in bioslurry production, use and trading, this can improve agricultural outputs of women-managed land, a community's food and nutrition security and its energy access, and enhance women's agri-business through increased agri-outputs and new income streams from biodigester-based business ventures.

<sup>2</sup> UN Women (2023) Progress on the Sustainable Development Goals: The gender snapshot 2023. New York: UN Women; World Bank (2023) Women, Business and the Law 2023. Washington, DC: World Bank.

### 3. Gender norms impact women's participation in the biodigester market in the Sahel

There are gender norms and socially embedded realities that are common in many countries in Sub-Saharan Africa, while others are unique to or more prevalent in the Sahel<sup>3</sup>. In many countries in Sub-Saharan Africa, women, compared to men, have lower incomes, less access to education and finance, and limited ownership of and decision-making power over high-value household assets. Women's mobility also tends to be more constrained than men's, although the extent of these constraints varies. These inequalities are particularly pronounced in Burkina Faso, Mali and Niger where they are amplified by the following factors:

**Early marriages:** Marriages before the age of 18 perpetuate decision-making imbalances and income gaps, especially because young girls are often married to older men. In Niger, Mali and Burkina Faso respectively, about 76%, 54% and 52% of girls are married before the age of 18<sup>4</sup>. This is very high compared to the other African countries where respectively, for instance, 40%, 34% and 23% of girls in Ethiopia, Uganda and Kenya are married before the age of 18<sup>5</sup>.

**Women's limited mobility:** Although many women in Sub-Saharan Africa have mobility constraints, these are more pronounced in the Sahel. In some areas, social norms and the cultural context, including religious beliefs, mean that women cannot leave their homes without a male relative. Mobility is also constrained by competing demands of domestic work and other community-based responsibilities that largely fall on women. Widespread insecurity and conflict in Burkina Faso, Mali and Niger further exacerbate women's vulnerability and limit their mobility due to safety concerns. This limits women's access to information that would, for instance, support decisions to purchase biodigesters and limits their opportunities to pursue biodigester-based business opportunities.

**Women's seclusion and public participation:** In some areas in the Sahel, gender norms require women's seclusion from, or severely limit their interactions with, men that are not family members. This can limit women's access to information and skill-building opportunities to manage biodigesters and engage in biodigester-based business activities, even when information providers would come to their home since agriculture extension workers and biodigester installers are predominantly men.

**Polygamous relationships:** The percentages of polygamous households in the Sahel countries remains high. An estimated 37%, 40% and 38% respectively of women in Burkina Faso<sup>6</sup>, Mali<sup>7</sup>, and Niger<sup>8</sup> are in polygamous marriages. In polygamous households, decision making to purchase technologies such as biodigesters may be complicated by a range of factors that may not be influential in monogamous relationships. Power dynamics between multiple wives and their households can dictate whether or not a biodigester is used and maintained, and who derives its benefits.

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<sup>3</sup> <https://www.alliance-sahel.org/actualites/egalite-genre-sahel/>

<sup>4</sup> United Nations Children's Fund, Child Marriage in Eastern and Southern Africa: A statistical overview and reflections on ending the practice, UNICEF, New York, 2022.

<sup>5</sup> United Nations Children's Fund, Child Marriage in the Sahel, UNICEF, New York, 2020.

<sup>6</sup> Enquête de l'Institut National de la Statistique et de la démographie (INSD) 2021

<sup>7</sup> RGPH5, Décembre 2024

<sup>8</sup> <https://www.stat-niger.org/wp-content/uploads/2020/05/Etat-matrimonial-et-de-la-nuptialite.pdf>

**Women's lack of land and livestock ownership:** Women's access to land ownership remains a significant issue in the Sahel. For instance, according to the Burkinabé Ministry of Women, only 10.5% of women own land individually in rural areas, compared to 45.5% of men<sup>9</sup>. Women's access to land is often mediated through male relatives, limiting women's ability to use land as collateral to access finance, such as capital for business investments, and increases their dependence on male relatives. Additionally, tradition in many Sahelian societies limits women's ownership and control of livestock, especially of high-value animals such as cows, that would provide the feedstock for biodigesters. Even if women do own cattle, they may still have to negotiate access to grazing land.

## 4. Case Studies: How gender norms in the Sahel affect women in the biodigester sector

This section presents the individual experiences of several women in the Sahel who are participating in the biodigester sector, as users and as entrepreneurs, and illustrates the gender and social inclusion dynamics that are common for women in the Sahel.

### Case study 1: A role model for other women



Becoming involved in biodigester entrepreneurship remains particularly challenging for women: gender norms, limited access to resources, lack of mobility and the overall power imbalance vis-à-vis men all create high barriers for women in becoming biodigester entrepreneurs. How to be strategic in choosing women to support as biodigester entrepreneurs can be a critical consideration for biodigester market development programmes. Identifying women with the foundational capacities and conducive circumstances can allow programmes to achieve meaningful change quickly, and can change the narrative around women entrepreneurship in this cultural context and support women to become role models in their communities.

Aminata Ouedraogo, a Burkinabé agronomist and engineer in sociology and rural economics, and a young mother, exemplifies the importance of such a strategic approach:

While Aminata has faced gender-related challenges throughout her professional career, she also experienced favourable conditions that allowed her to gradually develop as a biodigester entrepreneur. With her husband's support, Aminata established a biodigester-based business and now owns a biodigester and two oxen, producing biogas and bioslurry fertiliser for use in her household and for income generation. She uses her premises for training and demonstration events, creating new opportunities for other community members, while earning additional income. Her husband's support has been crucial in granting her land rights, freedom to travel and interact with clients, and has helped with childcare. This has enabled Aminata to become the first woman in her community to commercially operate a biodigester, creating benefits for her household and wider community through local fertiliser production, knowledge sharing and training. Aminata also

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<sup>9</sup> Enquête EDS du Burkina Faso, INSD 2015

uses social media to build her business's visibility, building a customer base for her bioslurry fertiliser and biodigester training courses. In addition to in-person training, she also conducts some virtual training. Online courses are especially useful for women whose mobility is limited whether due to cultural constraints or security concerns.

Aminata first faced challenges when she tried to take out a loan for the expansion and diversification of her business. Her goal was to build a water tank, a building annex for community training and a storage facility to stock large volumes of bioslurry fertiliser. She sought a bank loan and approached several financial institutions but failed to secure one as the financial institutions' eligibility criteria and conditions were not conducive, for example requiring repayments to start only one month after taking out a loan. This would not be enough time for Aminata to earn a return on her investments. Unable to secure funding within the formal banking sector, she mobilised her own financial resources from the training sessions she provided to other women, and from selling her bioslurry fertiliser. She was also able to acquire two grants, one from the Burkinabé National Biogas Program and one from the Belgian Agency for International Cooperation (ENABEL). Nevertheless, the lack of timely funding considerably hindered Aminata's business expansion plans and forced her to postpone projects, which were only completed several years later than planned.

Aminata continues to face barriers. Her income from selling bioslurry fertiliser could be further increased under appropriate regulatory conditions. However, as in many countries, chemical fertilisers in Burkina Faso are subsidised while organic fertilisers including Aminata's bioslurry are not. Chemical fertilisers also benefit from decades of government and private sector promotion without equivalent attention being given to organic fertilisers. Applying a gender lens to national regulations, policies and strategies to identify opportunities for gender-inclusive decisions could create better conditions for women's participation in the biodigester market.

#### Key learning points:

- Development programmes can strategically engage women with foundational capacities such as (digital) literacy, mobility, access to livestock and land, supportive families or prior experience in community development programmes to become role models in their communities.
- Programmes can engage supportive men as gender champions to advocate for closing gender gaps, and to showcase alternative gender narratives to other men.
- Access to finance remains a critical barrier for women, and programmes could help financial institutions design gender-responsive financing products, and support women in obtaining foundational business finance management skills.
- Regulatory gaps can present barriers to women's businesses. Applying a gender lens to national regulations, policies and strategies can create conducive conditions for women's participation in the biodigester market.

## Case study 2: Power dynamics between women

Gender aspects not only shape relationships between women and men but, in the case of polygamous relationships, also between women in the same household. In polygamous households, still common in the Sahel, power dynamics between women compliment the gendered cultural norms. These dynamics can create situations that are not conducive to the use of biodigesters unless they are anticipated and deliberately negotiated, as illustrated by the following examples:

In Tenkodogo, a village in the Natambé region of Burkina Faso, Salimata is the second wife in a two-wife household. Her husband purchased a biodigester to provide biogas for cooking and bioslurry fertiliser for the home garden. As first user of the kitchen, the first wife did not allow Salimata to use the biogas. The husband tried to resolve the matter by building a second kitchen. However, he did not consider that the biogas produced by his small biodigester could not sufficiently supply two kitchens. Salimata thus remains without access to clean cooking, and her case is not isolated, similar tensions were observed between wives in other villages.

In another household, in central Burkina Faso, one of the two wives did not receive training on the use of the biodigester. The other wife regularly attends training sessions and is responsible for much of the biodigester's operation and maintenance. She uses the bioslurry produced to raise insect larvae to feed chickens that she raises for income generation. The second wife, who has not attended training and does not invest time in operating the biodigester, does benefit from the biodigester, creating tension in the household.

### Key learning points:

- Intra-women power dynamics can create situations that are not conducive to the use of and fulfilling the potential impact of biodigesters if not consciously anticipated and negotiated.
- Biodigester programmes could consider how to engage with polygamous households and provide relevant information and advice, such as on the sizing and gas availability of different biodigester types, so that polygamous households can make informed purchase decisions.
- Development programmes can anticipate intra-relational challenges and seek locally appropriate pathways to mitigate them, for example by including all household members in biodigester training. This might have implications for programme budgets and time planning, and should therefore be factored in at the outset of a programme.

## 5. Lessons and recommendations for development programmes and policymakers in the Sahel

This section further discusses recommendations for development programmes and policymakers to support gender-responsive development of the biodigester sector with a particular focus on gender norms prevalent in the Sahel and on working within existing social structures to gradually expand women's participation in socially acceptable ways.

### **Understanding GESI challenges and pathways in the Sahel through robust gender analysis**

The gender and social norms that shape women's and men's roles in Burkina Faso, Mali and Niger strongly influence how biodigesters are accessed, used and maintained. Development programmes therefore need a grounded understanding not only of existing inequalities but also of how household and community relations function in practice, how they can be constructively leveraged, how decisions are negotiated, and which locally legitimate pathways can support more inclusive participation. Such an understanding can be developed through a thorough review of the existing literature on gender, complemented by consultations with stakeholders who possess relevant contextual experience. These insights should be systematically captured and articulated through a gender analysis.

Gender analysis involves examining the differences among women and men in terms of their access to, and control over, resources and opportunities, as well as the constraints they face. This extends beyond tangible assets, such as income, land and livestock, to include less visible dimensions, such as decision-making dynamics, social norms and intra-household arrangements. It is important to note that the process should be participatory and cooperate with the women and men who are affected in order to identify locally acceptable pathways to inclusion.

In the contexts of Burkina Faso, Mali and Niger, particular attention should be given to intra-household and community relations. These include dynamics between husbands and co-wives in polygamous households, as well as relationships between mothers-in-law and daughters-in-law. Socioeconomic differences among women and men should also be considered, as wealth and status can significantly shape access to resources and influence. Furthermore, the role of political, community and religious leaders in reinforcing or transforming gender norms should be carefully assessed. Where appropriate, programmes should explore opportunities to engage these influential actors as agents of change in promoting more equitable gender relations and community benefits.

### **Supporting Gender Champions to showcase women biodigester entrepreneurs**

Working within the biodigester supply chain in Burkina Faso, Mali, Niger and the wider Sahel region so that it becomes more inclusive of women is a complex process due to deeply rooted gender norms and socially embedded realities. The limited visibility of women in the sector further reinforces the perception among both women and men that biodigesters are not a suitable field for women.

Development programmes can, where appropriate, proactively identify and promote examples that demonstrate women's capabilities and successes within the biodigester sector. A practical entry point is to focus on women who already have the foundational skills

and enabling circumstances needed to become biodigester entrepreneurs. These may include women who are digitally literate, have prior experience in community development initiatives and benefit from family or financial support.

Engaging supportive men is equally valuable. In sociocultural contexts such as the Sahel, men's voices often carry greater social influence and can therefore play a decisive role in accelerating change. Programmes can identify male champions, such as spouses, community and religious leaders and business partners, to raise awareness of the barriers that women face and actively involve them in developing practical solutions. Constructively engaging supportive men can help create socially acceptable pathways for women's participation in biodigester-related activities, including access to land, livestock, mobility and market opportunities.

Supporting local women and men to become gender champions and role models can foster more inclusive perceptions and gradually normalise women's participation across the biodigester sector.

### **Supporting opportunities for knowledge sharing, peer learning, agency building and development of personal competencies**

Limited opportunities for knowledge exchange and peer learning with more experienced entrepreneurs represent a significant constraint on women biodigester entrepreneurs. Strengthening connections between businesses through structured training sessions, exchange visits and peer-to-peer learning is therefore essential to support sector development. However, in a still male-dominated sector, such opportunities are more readily available to men, who are also more accustomed to travelling for work and professional exchange.

Digital tools and social media can help address some of these barriers by increasing women entrepreneurs' visibility and market reach, even in contexts affected by insecurities, as is the case in many communities across the Sahel region. Social media platforms can support the development of customer networks for bioslurry fertiliser and biodigester training services. In addition, online training courses for knowledge sharing and peer learning can be particularly valuable for women with limited mobility, whether due to cultural expectations or security-related constraints.

In many Sahelian contexts, as in other regions, women tend to be more risk-averse than men. This is not solely a matter of entrepreneurial knowledge or technical skills, it is also closely linked to levels of self-confidence and broader personal competencies. For this reason, support to women entrepreneurs should go beyond technical business development and include efforts that strengthen agency and decision-making capacity. Mentoring and coaching initiatives for women business owners can play an important role in this.

### **Supporting the development of gender-responsive financing solutions**

Although microcredit can provide women with important opportunities to start or expand their businesses, high interest rates and unfavourable repayment conditions often present significant barriers. Across Africa, women-owned businesses face greater challenges in accessing finance than those owned by men. According to the African Development Bank, only around 10% of women-owned SMEs on the continent have adequate access to formal

financing. As a result of this, many women prefer alternative financing mechanisms, such as community-based savings groups, rather than engaging with formal financial institutions.

Addressing these disparities requires financial products that are better aligned with women's economic realities. This includes, for instance, developing financing solutions that do not depend on land ownership as collateral or a prior credit history. Gender-responsive financial mechanisms can play a key role in enabling women to obtain biodigesters or engage in biodigester-related enterprises, and development programmes can support financial institutions in developing locally adapted products. In addition, complementary support such as mentorship, coaching and training in financial and business management can further strengthen women entrepreneurs' ability to access financing.

### **Supporting women's mobile access to information and digital literacy**

Constraints on women's mobility and access to information can be partly addressed by leveraging digital technologies, including social media. However, internet use is still low in the Sahel with only 20-25% of people in Burkina Faso using the internet, 15-20% in Mali and, among the lowest globally, 5-10% in Niger. Further, women represent a minority of internet users, accounting for roughly 20-35% of internet users in many low-income Sahelian contexts, with Niger having the lowest female share<sup>10</sup>. Barriers to internet access include the high costs of mobile phones and data plans, as well as low levels of the digital skills necessary to take advantage of digital technologies and social media opportunities.

Development programmes can support women entrepreneurs with access to affordable mobile phones and strengthening their capacity to use them effectively for business purposes. ENERGIA and Solar Sister have demonstrated the effectiveness of this approach through their Women Energy Entrepreneurs (WEE) programme partnership.

Through this initiative, women energy entrepreneurs have been supported with smartphones at subsidised rates and enabled to pay for them through affordable payment plans. In addition, they received training on how to use mobile phones to strengthen and upscale their businesses. This enabled them to communicate more effectively with suppliers and customers, as well as to access relevant market and technical information.

Within the WEE programme, the participating women with access to smartphones reportedly earned around 80% more than those without, highlighting the potential economic benefits of combining digital inclusion with entrepreneurship support<sup>11</sup>.

### **Adequate budgeting to broaden the scope of inclusion**

Once a gender analysis has identified key dynamics, opportunities, stakeholders and locally adapted pathways, it is essential that a budget is dedicated to implementing the resulting gender-responsive activities. While gender-related activities are often integrated into broader project budgets, this approach can inadvertently limit effective gender mainstreaming. In practice, gender activities may be deprioritised during implementation when competing with other project components for limited resources.

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<sup>10</sup> ITU (2024), Measuring Digital Development: Facts and Figures; World Bank (2024), World Development Indicators – Individuals using the Internet (% of population); GSMA (2023–2024), The Mobile Gender Gap Report.

<sup>11</sup> Digitizing Women Entrepreneurs, Solar Sisters Learnings Report 2024

Ring-fenced funding for gender activities helps ensure that they are adequately resourced and can be implemented as intended. This approach reduces the risk of marginalisation within broader programmes and strengthens accountability for gender outcomes. To further enhance effectiveness, such funding should also be sufficiently flexible to allow timely adjustments in response to emerging gender-related dynamics and opportunities.

### **Supporting inclusion of biodigester market development in national policies and strategies**

Several countries in Africa, including in the Sahel region, are developing national biodigester programmes and sector coordination platforms to support the structured growth of the sector. To ensure these initiatives are inclusive, gender and social inclusion expertise should be systematically integrated into their design, implementation and monitoring frameworks. This will help ensure that structural inequalities, gender relations and social realities are identified early on and considered in a meaningful way, rather than treated as an add-on.

A key entry point is the integration of gender considerations into national energy access strategies, climate change commitments and agricultural development plans. Since biodigesters sit at the intersection of energy, agriculture, waste management and rural development, they offer a strong opportunity for cross-sectoral gender mainstreaming. Coherent policies across these sectors is therefore essential to avoid fragmented approaches that overlook women's roles.

In practical terms, this includes reviewing regulatory frameworks to ensure women's equal access to productive resources such as land, livestock and credit, incorporating gender-responsive targets and indicators into sector monitoring systems and ensuring that extension services and technical support mechanisms actively reach women farmers and entrepreneurs. It also involves strengthening institutional capacity within ministries and implementing agencies so that they are able to consistently apply gender analysis in planning and budgeting processes.

Dedicated public financing should be allocated within national and sub-national budgets to support gender-responsive biodigester development. This can include targeted subsidies for women entrepreneurs, results-based financing mechanisms that incentivise inclusion outcomes and public-private partnerships with explicit gender equity requirements.

## **6. Conclusions**

In the Sahel, socially embedded gender roles and household decision-making arrangements shape every stage of the biodigester value chain, from access to manure and finance to decisions around biodigester use and benefit sharing.

Advancing gender and social inclusion in the biodigester sector in the Sahel is not only a matter of equity, but a strategic imperative for achieving sustainable market development and broader development outcomes. Women are already central actors in household energy use, agriculture and local economies. If enabled to participate fully, as users, entrepreneurs and decision-makers, biodigesters can unlock multiple, reinforcing benefits: improved energy access, enhanced agricultural productivity, stronger food and nutrition security and increased economic resilience for households and communities.

Given the local social realities in the Sahel that constrain women's full engagement in the sector, this will require more than incremental adjustments. It calls for adaptive, context-specific and well-resourced gender-responsive approaches embedded across programme design, implementation and policy frameworks. It also requires a grounded understanding not only of existing inequalities, but also of how household and community relations function in practice, how they can be constructively leveraged, how decisions are negotiated and which locally legitimate pathways can support more inclusive participation.

Development programmes and policymakers have a critical role to play in negotiating this change. By grounding interventions in robust participatory gender analysis, investing in women's skills and agency, promoting role models and male advocates, supporting access to inclusive financing and leveraging digital tools, programmes can help change both opportunities and norms. At the same time, supporting the integration of gender considerations into national policies, regulatory frameworks and sector strategies will be essential in creating an enabling environment for sustained and scalable impact.

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