



Fostering the uptake of labour-saving technologies

How to develop effective strategies to benefit rural women



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Dimitra Clubs in Gasseda (Niger) harvest onions on their collective plot equipped with irrigation technology

Summary

There is evidence that women provide a substantial contribution to the agricultural workforce yet their capacity to adopt innovative technologies and practices is still low due to constraints at household, service provision and policy level. This brief introduces key steps for policy makers and project implementation partners to address the labour constraints of smallholders (small-scale farmers, pastoralists, forest keepers and fishers who manage areas from less than one to ten hectares, FAO, 2012) through the introduction of technologies that are not only labour-saving but also women-friendly. Moreover, as introducing a labour-saving technology does not, in itself, ensure its adoption, the brief also identifies four factors of constraint in the enabling environment that often hinder technology uptake, and illustrates, through FAO examples, the strategies and actions that can be implemented to overcome them.

Key messages

1. Technologies and practices for production, processing and market access need to be evaluated for their labour-saving potential and on the basis of their capacity to support women's work.
2. To favour women's adoption of technologies and practices, policy makers and local implementation partners need to assess the enabling environment and promote:
 - A policy environment that supports gender-sensitive technology development and dissemination
 - Women's capacity and autonomy to decide about technology needs and use
 - Equal ownership and /or control over key productive assets
 - Gender-sensitive service provision for technology adoption
3. Targeted strategies and actions – which simultaneously address the technology adoption constraints that women face at household, service and policy level – prove to be successful. They can promote the discussion of technology needs within the household and favour women's control over key assets and inputs, while also ensuring that women receive essential services for technology use.

Introduction

In order to foster increased production and value chain development, FAO promotes innovations and technologies that can be adapted to different agro-ecological zones and climates and that can increase access to markets or reduce food losses. Moreover, the organization not only supports the formulation and implementation of gender-sensitive policies that may govern technology development and access, but it also fosters local governance structures that can introduce technologies for smallholders' uptake. In this way, findings emerging from global research, even simple solutions to local problems, are introduced through FAO supported private or public service providers such as extension, producer organizations or retailers.

Improved and integrated technologies and practices, however, are only likely to contribute to increased productivity and income generation if overall production priorities are matched against household and individual labour and time availability and if those who provide the labour are targeted and supported with adequate information, skills and financial resources. Unless this is addressed, and individual choices and needs are taken into consideration, there is a high risk that introduced technologies and practices are not adopted.



Ghana: a man and a woman grinding cassava in a village mill

Labour-saving and women-friendly technology evaluation

Notwithstanding regional variations, there is ample evidence that women provide a substantial contribution to the agricultural labour force as home carers, subsistence farmers, wage workers, or entrepreneurs. They therefore require access to technologies that can support their work. Much of their labour, however, is unpaid and culturally assimilated to "household work", creating a double bind: they suffer from time poverty and – at the same time – their needs are socially unrecognized and invisible to policy makers and project implementation partners. Women's work burden not

FIGURE 1
Factors that contribute to women's work burden



FIGURE 2
Definition and examples of labour-saving technologies

"Labour-saving technologies/practices address specific labour constraints and can reduce the time and effort needed in carrying out specific tasks."

Examples of labour-saving technologies

- Mechanization (shellers, drum seeders, weeders, jab planters; food processors)
- Inputs (drought resistant seeds; trees for woodlots)
- Infrastructure (milk coolers, rainwater harvesting reservoirs; biogas units; improved stoves; livestock pens)
- Transport (animal or energy-based: bicycles or carts)
- Mobile technology with apps for service provision (veterinary, weather, insurance)

Examples of labour-saving practices

- Integrated practices: agro-forestry; crop/livestock; rice-fish; fish-livestock – that support women's work with improved inputs and management processes (integrated pest management; watershed management; land management)

only affects their individual capacity to make choices, but it also has a broader impact on the nutritional status and prosperity of their families and communities.

Researchers and development partners have, for many years developed and tested innovative technologies. Some of these have the potential to reduce women's work burden. They typically address household tasks, by reducing the time it takes to cook, collect water and firewood or they can support women in tasks they carry out for the benefit of the entire community (community management tasks). Others target production and post-harvest activities, by easing demanding manual labour or providing means to better process, package, store and transport agricultural products. Similarly, there are some integrated practices such as rice-fish, rice-livestock and agro-forestry, which rely on the introduction of technologies and management processes that can also have an efficiency and labour-saving potential for women's work.

A key step when planning to introduce a technology lies in its evaluation, to verify whether it holds the potential to reduce women's work burden. This can be done by identifying women's most time consuming tasks, collecting information on the time it takes to carry them out and comparing it to the time saved by using it. The process is outlined below, and a mix of qualitative and quantitative data collection methods can be used to build the appropriate information base.



Improved goat farming and management practices in the Sahel

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How to promote women's adoption of labour-saving technologies and practices: possible pitfalls and manageable solutions

Research and case studies have shown that the identification and introduction of labour-saving technologies is not, in itself, sufficient. There are also external factors that influence women's capacity to adopt technologies; these lie at policy, service provision and household level and also regard the service provision and its capacity to respond to women's needs.

Policy makers and national project implementation partners should ask themselves questions about the enabling environment in order to plan for gender-sensitive solutions. Some examples are provided below:

- Is there a supportive and gender-sensitive policy environment for technology development and dissemination? Is there a coherence amongst key agricultural sector policies that deal with technology and are there action plans and strategies that target women and their needs?
- Do women have equal ownership and control over key assets? For instance, do they own livestock, land and other assets which allow them to plan for technology uptake, also in the form of collateral for credit; do they have clear rights over water resources which would encourage them to invest time and money into agricultural production and marketing;
- Are women empowered at household level, to influence decisions regarding the division of labour and choice over which technology to use? Are women supported in household tasks? Do women control part of the income so that they have the authority and capacity to invest in technology?

FIGURE 3

How to assess whether a technology is labour-saving and gender-sensitive



- Is local service provision gender-sensitive? Do women receive adequate access to financial products and ICTs that can simplify access to information? Can they access technical know-how to learn how to safely use a wide range of production, post-harvest and processing technologies? Are they represented in local institutions that act as entry points for services and are they targeted by local business hubs?

This section elaborates on four key factors in the enabling environment which need to be analysed from a gender perspective and illustrates, through FAO examples, possible strategies that were successful in overcoming constraints. It emerged that women benefit from the following:

Policy environment that supports gender-sensitive technology development and dissemination

Specific measures need to be in place at national and decentralized level to support women’s technology adoption. In this context, FAO contributes to advocate for women’s access to technologies and services and to integrate gender equality dimensions in related national policies and strategies. Internationally, the identification of the technology gap as a key gender-based constraint, positioned FAO to address the gender and technology nexus within the context of global frameworks and fora (eg: Sustainable Development Goals, the UN Framework Convention on Climate Change and the Commission on the Status of Women). It also contributed to the inclusion of the reduction of women’s work burden through labour-saving technologies as one out of five objectives of the FAO Gender Equality Policy. As for national policy and strategy development, FAO fosters policy dialogue by promoting exchanges amongst relevant stakeholders, by strengthening the capacities of policy makers to analyse labour and technology-related data (sex-disaggregated) and

by disseminating good practices for technology development and adoption. When relevant and possible, FAO also supports member countries to integrate gender priorities in sector and sub-sector policies and strategies which have a technology component (eg: policies governing farmer’s access to assets and services: agricultural mechanization, extension, input subsidy, cooperatives and telecommunication).

Women’s capacity and autonomy to decide about technology needs and use

Agricultural households can thrive when both women and men have the capacity and authority to test and adopt innovations and technologies that may be easier and less time-consuming to use, or that seem convenient to adopt from an economic or even environmental perspective. Unfortunately, in many rural settings, unequal household dynamics still dominate, and women, despite their work both at home and in agriculture, fisheries and forestry, are not free to take decisions and control their production needs, let alone control the spending of the income they generate. Challenging the cultural dimension of what is considered as “acceptable” for a woman, is difficult for both women and men: as a result, women often choose socially acceptable technologies, and men allow women to adopt technologies as long as their “power” is not fully challenged. There are gender-transformative interventions and approaches that tackle behavioural change and promote household and community dialogue, such as the Gender Action Learning system (GALS) promoted by Oxfam Novib or the DIMITRA club approach, developed by FAO. They have shown positive results in terms of achieving more joint-decision making and sharing of tasks but they need to be sustained over time. As they address deep-set cultural dynamics they can be used to complement a multitude of rural development objectives, aiming to grant smallholders with better access to employment, productive resources and technologies, and income.

Guatemala and Kenya: policy and strategy support for technology development and dissemination

FAO supports national level implementation of Article 14 of the Convention on the Elimination of all forms of Discrimination Against Women (CEDAW), which also calls for the development and dissemination of appropriate technologies to rural women. As a result, Guatemala finalized the implementation strategy of the MOA Gender equality policy and included a specific output on the provision of technologies and supportive services to address women’s work burden. Similarly, as Kenya was harmonizing its livestock breeding and feeding policies with the overarching National livestock policy (2017), FAO supported ministry staff to integrate gender related inputs (women’s access to feed and forage technologies, including knowledge about improved grazing management). Similar efforts are under way to support the formulation of the Burundi and Timor-Leste mechanization policies.

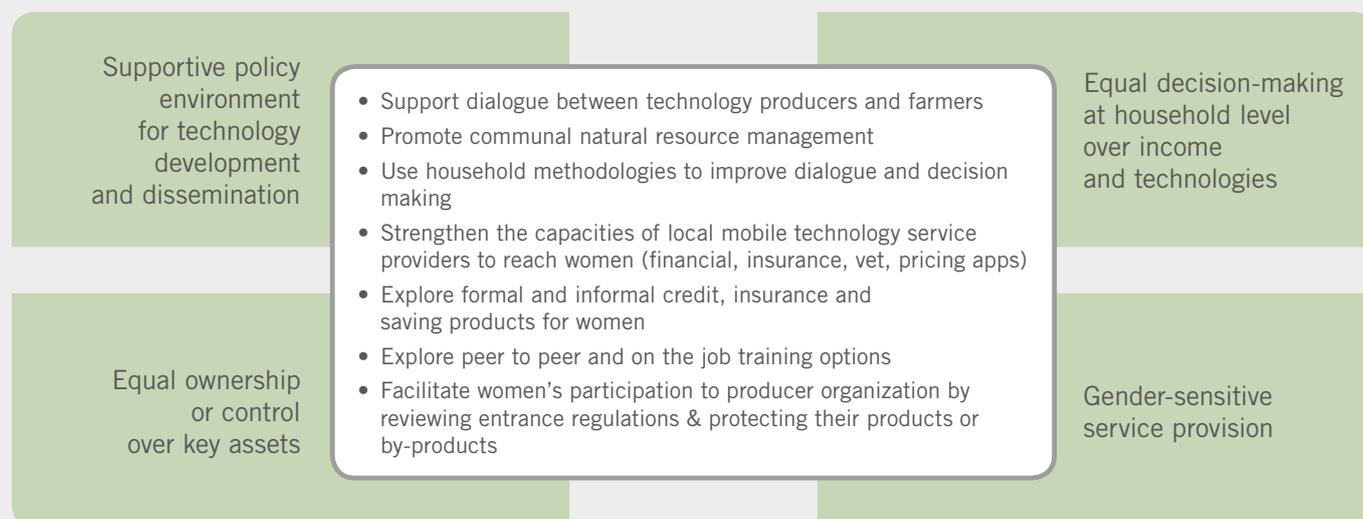


Women trained to use jab planters in Guatemala

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FIGURE 4

Options to address gender-based technology adoption constraints



Zimbabwe: using household methodologies to generate behavioural change (labour, income management and asset ownership)

In 2016–2017, in partnership with Oxfam, FAO followed a cascading training of trainer's model, where district-level service providers (extension and community animal health workers) were trained to train lead farmers, who then trained farmers. The methodology used, the Gender Action Learning System, (GALS) allowed FAO to reach 50,000 agricultural producers, and discuss household decision-making, time use and control over resources and income.

The gender-transformative approach of this programme, which implemented GALS to encourage behavioural change at household level, had an impact on women's participation and influenced their adoption of new practices and technologies not only in women-dominated value chains. As it was combined with the delivery of other services, both ICT-based (information, financial, veterinary and insurance) and market-related, women were empowered to take decisions and have their roles more recognized.

Stakeholders reported that deep shifts were generated in:

- **Ownership over assets** i) improvements in joint plot management are positively influencing the types of crops cultivated, and the control over inputs; ii) crop nomenclature by gender is changing (men/cash crops (tobacco and soya bean) to women/household crops (groundnuts, sweet potatoes, bambara nuts, cowpeas, sunflower); this has labour implications (men now offer their labour for both types of crops) and extended family are less likely to interfere in case of a spouses' death
- **The gender division of labour** – not only do women take over typically “male” tasks but men are now taking on care and household roles on a regular basis.

- **Resource and income management** – Joint resource and input management, inclusive of labour-saving subsidized technologies (shelters, water pumps, ripper tines, hermetic bags) improved productivity and affected yields (from one ton maize/ha to 3-5 tons/ha). Men are also handing over considerable parts of income to their wives to manage.
- **Gender-based violence** – Household dialogue had a deep impact on men's understanding and appreciation of women's needs and work: not only was the violence reduced, but men reported that they felt relieved to share more tasks and be able to make joint decisions about production and income management.



A lead farmer from Zimbabwe delivering GALS training to a community

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Equal ownership and /or control over key productive assets

The ownership and control over important assets such as land, water or livestock determines production choices, enables smallholders to invest in their activities and decide on the inputs and technologies they need. When asset ownership is unclear, competition amongst households and within households risks to affect production and investment in technologies. Fifty percent of forests in the world, for instance, have insecure tenure and governance rights, and this has led to food insecurity, environmental degradation and deforestation (USAID, 2016). Land ownership and/or tenure

Nepal: Leasehold forestry arrangements can promote women's adoption of labour-saving forestry and livestock practices

Women in the hills of Nepal are often landless and spend much time each day collecting water, animal fodder or fuel wood. Additional tasks fall on them when the men migrate in search of employment. FAO provided technical support and capacity building to a number of projects which promoted communal forestry leasehold through self-managed user groups. This provided women, in particular, with access to land where they could rear their goats and plant suitable grasses, legumes and fodder trees introduced by the Nepal Agricultural Research Council. In particular, women adopted a type of grass which was used for making brooms. As well as providing them with the income from the broom sales, the grass was used for forage of livestock, and the dried stems as stakes to support growing vegetables.

This example shows how a gender-sensitive strategy, focusing on access to land and livestock assets, mixed with training, can be successful for women's adoption of technologies. Women reported that the time they saved by using this land (from 10 to 3 h/day) looking for ground grasses (Shapiro, 2015, pp. 29-30), enabled them to initiate other income-earning activities at home, in their small fields near their houses, or by selling their labour.



Climate-smart forestry practices introduced in a Nepal farmer field school

Viet Nam: How the ownership of livestock assets empowers women to adopt technology

In Viet Nam, women contribute to local livelihoods by raising and managing small livestock. A case study published in 2017, shows that in two communities of the Mekong delta women contribute 67% and 75% to pig breeding. In a regional fisheries livelihood programme implemented in the same area, FAO promoted income diversification by supporting women to rear pigs and manage the waste they produced. Five piglets and two adult breeding sows were provided to women whose household income ranged between 20 and 100 USD/year. They were helped to construct a biogas unit which relied on the pig waste. The women were trained to process the waste, which in turn was used as a basis for methane gas for cooking, and as organic fertilizer. The targeting of women, combined with asset distribution, technology provision and training proved efficient in terms of income generation, environmental impact (less pollution from pig waste) and time saving (reduced firewood collection time).



A Vietnamese woman chops sweet potato leaves to feed her pigs

vary according to local legislation and customary rights, but land is frequently assigned to the head of household, who, in the majority of cases is the man. Women, therefore, often work on land owned by their husband and are less empowered to adopt technologies. Services also target the asset owner, so that women's training, information and technology needs are not taken into due consideration. It is, therefore, important to be aware of the dynamics in place between asset ownership, tenure rights and labour to make sure that women are in a position to adopt technologies.

Gender-sensitive service provision for technology adoption

Looking at the perspective of women as clients of service providers, their participation and membership in local associations and cooperatives is often a pre-requisite to technology adoption as these institutions provide smallholders with the social structure, means and skills to improve and diversify agricultural production. FAO therefore promotes women's membership and participation to producer organizations, saving and credit cooperatives (SACCO) and farmer field schools, so that – amongst other aspects – they can benefit from the credit schemes, mechanization or training they might offer. The services provided can enable women to experiment with new crop varieties, take more risks and achieve economies of scale in the storage, packaging, transportation, and marketing of their produce. If one looks at service providers, a variety of public and private ones operate in rural settings: amongst these there are extensions services, agricultural retailers, service hubs, local associations and cooperatives. Their services range from disseminating information, building farmer capacities, providing access to credit and technologies as well as linking smallholders to markets. Amongst the ways to disseminate services, a variety of information and telecommunication technologies (ICTs) prove to be powerful tools, also successful with women: radios have already been introduced to reach wide audiences, including illiterate smallholders; similarly, mobile phones can be instrumental as they can host an increasing range of applications designed to improve agricultural and market



A woman from Kyrgyzstan using carp culture technology in a fish production centre

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oriented services. At community level, FAO strengthens the capacities of these service providers so that the need of both men and women can be addressed. For over thirty years, the organization has promoted the establishment of Farmer Field Schools to build skills, test and validate new practices and technologies; similarly, FAO supports farmer's access to private service hubs or retailers who can introduce mechanization and also build local capacities for usage and maintenance of the implements they sell or rent.

China: a public/private partnership for extension provision supports the adoption of improved integrated rice & aquaculture practices at household level

In 2017, one of FAO's key Chinese partners, the Freshwater Fisheries Research Centre (FFRC), supported the adoption of improved aquaculture-agriculture practices amongst the Hani community.¹ Hani households practice traditional rice fish farming, and already rely on a complex irrigation system to transport fertilizers like forest litter and livestock manure from the mountains, thereby saving time and input costs.



A group of Hani women being trained in aquaculture technologies

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Women typically prepare the paddy, transplant the rice and transport it up the steep slopes, as well as contributing to fish stocking and management. In this case, the community was introduced to improved breeds and management practices: by adopting loach, these smallholders were able to harvest two to three fish crops a year, concurrent to one rice crop.

The integrated agriculture aquaculture practice (IAA) can contribute to reducing the time women spend weeding and applying pesticides as the fish feed on the weeds, reduce pests and simultaneously fertilize the rice. This is an example which highlights how women are able to gain the required technical knowledge and access to high quality fingerlings through a public private partnership: the government subsidizes the Yunnan Zhonghai Fishery Company, a privately owned hatchery, which acts as a service hub: it tests and breeds fingerlings which it disseminates amongst the Hani community. Moreover, it also enhances women's capacities and markets their crops. So far, there is evidence that this model supports the adoption of the innovative practice which allows households to increase their income by three to four times.

¹ The Hani are a hill tribe minority group whose rice terraces are a world heritage site as well as being part of the FAO recognized "Globally Important Agricultural Heritage Systems".

Burundi: women adopted innovative technologies & practices introduced by farmer fields' schools either at household, field school or cooperative level

Between 2015 and 2017, FAO supported the introduction of a number of integrated agro-forestry, aquaculture and farming technologies/practices within the framework of a project focusing on food security, diversification of production and watershed management. A labour and time-use assessment carried out at project level confirmed that women were in charge of most household, community and productive activities. Hence it was not surprising that close to 90% of Farmer Field School (FFS) participants were women. The result of a technology adoption assessment illustrated the following result: technologies were adopted at different levels, depending on the availability of land, credit, labour and management capacity. Community management of key assets – fields, ponds, livestock – showed main advantages: i) men understood the need to participate and took on physically demanding activities, such as building of fish ponds or the construction of stables; ii) new technologies were tested and vetted for household adoption (mushroom cultivation/raising small livestock); and iii) individual households managed to generate a surplus that could be sold. In particular, membership to cooperatives enabled women to adopt more commercially viable practices. Examples of technologies adopted at different levels are as follows:

- Household level: due to extremely small plots, kitchen gardens (herbs and vegetables), mushrooms and agro-forestry (to feed livestock and gain access to firewood close to the home

- FFS level: aquaculture, beans and corn, communal pigsties
- Cooperative level: livestock mineral blocks, used for goats and pigs – are produced mostly by women and bring in an income.

This example illustrates how gender-sensitive input provision and technical support (FFS), promoted at different levels within a community, can be a means for women's empowerment and their technology adoption.



Mushroom farming, introduced as an alternative livelihood source in Burundi

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