



GENNOVATE
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IN AGRICULTURAL AND
ENVIRONMENTAL INNOVATION

A resource for scientists and research teams

Photo courtesy of IITA.

Gender in Agricultural Mechanization: KEY GUIDING QUESTIONS

Mechanization refers to the agricultural process of replacing manual labour or use of draught animals with machinery. Labor-saving machines are increasingly available in rural areas but not affordable for all. To identify ways of expanding the benefits of mechanization to more people, a careful consideration of gendered needs and gender implications is required throughout the project cycle from design to impact assessment, and throughout the agricultural cycle, from land-preparation and cultivation to post-harvest and processing. Although your project may have already decided what to do, critical thinking about the

impact of mechanization on men and women is very important to ensure that both men and women will benefit and neither will be harmed.

GENNOVATE research¹ has shown that the beneficiaries of mechanization tend to be the wealthier rather than the poorer farmers and more often men than women. However, results also show that women have strong interest in mechanization as a way to improve their own circumstances. Without careful consideration of power relations existing in the community between men and women, interventions risk contributing to or exacerbating existing

socio-cultural and gender inequalities. At the same time, outcomes from labour saving technologies that benefit women can also contribute to other development outcomes; for example, the extra time made available for women can be used for self, infant and family care, and other agricultural activities for income generation or household consumption. Reduced labour burden can also contribute to improved health outcomes. The following section describes case studies of gender implications in mechanization in RTB crops, illustrating some positive and negative outcomes.



Case Story 1: Smoke-reducing Gari fryers in south-west Nigeria

Agricultural interventions have historically tended to overemphasise issues around efficiency and quality in mechanisation processes, without looking at the socio-economic and gendered contexts in which they are embedded. Gender studies undertaken as part of the *Cassava: Adding Value for Africa* project found that in Nigeria, men and women are often involved in different types of cassava value chains, which result in different sets of needs and priorities of women and men in terms of mechanization interventions in relation to their position and participation in those value chains.ⁱⁱ

In Nigeria, women are highly involved in cassava processing, particularly gari. Women typically process gari at a processing centre and pay fees for the use of a fryer and other services (e.g. press), as they do not have this equipment at their home. However, unfortunately, the frying equipment used in many locations exposes women to harmful smoke for many hours a day. Smoke-reducing gari fryers have been developed in the region to



Smoke-reducing gari fryers in Nigeria.
Photo: Adekola Felix Adegoke.

reduce women's exposure to smoke and possibly increase productivity. However, visits to cassava processing centres showed minimal uptake of the technology and limitations for women in access to the technology, which would have important health benefits for women. This was because owners of the processing facilities, usually male, appear to have little incentive to invest in new, smoke-reducing equipment for their clientele, as they did not perceive a direct benefit. Other facility owners and gari processors had limited awareness of the new fryers.

This example demonstrates the importance of understanding and identifying gender constraints, needs and priorities in local contexts and value chains for technological dissemination and uptake. Going forward, practical activities may consider targeting small-scale adaptations for processing mechanisation that are accessible for women independently, in order to reduce women's labour burden and exposure to health hazards.



Case Story 2: Sweet potato silage chopping machines in Ugandaⁱⁱⁱ

In Uganda, the silage chopper was introduced in order to make ensiling more efficient and to reduce drudgery associated with chopping vines using pangas (sickles). However, this research shows that mechanization which is not friendly for specific users or well adapted to local conditions may deter adoption or limit usage and usefulness of technology. For example, women were afraid to use the chopper because of safety concerns. This limited their ability to venture into silage making on their own since they had to depend on men to operate the



A: The pulley was not covered and thereby women were afraid that their children could be injured. The feeding tray was very short and when women farmers fed the vines, their fingers could touch the edge. Photo: VEDCO Uganda (<http://www.vedcouganda.org>).



B: An improved chopping machine with a protection cover. Photo: Jolly Kabirizi.

machine. Men pointed to the lack of durability and a constant demand for providing services as a major limitation to effective use of the chopper. Thus, there is need to ensure that choppers are safe to use and that farmers and local artisans are trained to repair the choppers. If the safety of the chopper is improved, the adoption rate could increase since women often expressed fear of operating it. Training a cohort of people in the community to provide services for

chopping vines also helps provide opportunities to link agriculture and other rural economies and provide off-farm employment.



Case Story 3: Potato drying equipment, Peru^{iv}

In Peru the popular traditional dish carapulcra is prepared with dried potatoes, meat and other ingredients. As the main ingredient for carapulcra the dried potatoes have a good market in both Andean and coastal cities such as Lima, and the product carries higher value than the fresh tuber. In the Andean highlands where most potato is produced, harvesting comes at the end of the rainy season. Women are mainly responsible for peeling and cooking the potatoes and then laying out and sun-drying the cooked pieces in the open air. Post-harvest researchers were interested to improve the productivity of the processing technique in order to increase income. Influenced by current research and development interest in drying technology for different processed food products and talking to local men, the researchers identified the installation of modern drying

equipment to accelerate the drying process as the best option for improving the efficiency of the overall system.

Evaluation of the drying boxes that researchers introduced showed, according to the findings, that “traditional methods dry the food products as quickly as the improved method”, despite its higher cost. The “improved” method was not adopted. If the researchers had talked to local women, who are the ones responsible for this processing activity, they would have learnt something different: the women were quite satisfied with sun-drying. What they urgently needed was improved



Women cutting potato for Papa Seca. Photo: Gordon Prain.

equipment for peeling the potatoes. This latter was deemed very time consuming and interfered with their other commitments.



Case Story 4: Potato grading equipment, Jacopampa in Bolivia^v



An important task in potato production for commercialization is potato grading by size. In order to reduce the time devoted to this task, there was an attempt to introduce equipment for mechanized potato grading (Photo A). The evaluations showed positive results but the equipment was not adopted by farmers. A subsequent analysis found that in the validation meetings more men than women had participated and they had gladly operated the equipment. However, within the families, it was still the women who carried out the grading. Women found the operation of the new technology difficult due to the height of the equipment and, the strength necessary to operate the cranks and lift the potato bags to feed the equipment. Once these conditions were understood, a different equipment was introduced (lower, without cranks, where the potatoes were fed by gravity and were pushed manually through sieves) (Photo B). This equipment reduced the time allocated to manual selection, as its simplicity, low bearing and lower physical strength requirement allowed women to adopt it.

This case shows that in addition to general social context factors, characteristics and conditions of key actors interact in favour or against the adoption of technologies, in this case the size of the operator and his/her physical strength. Taking the perspectives and special knowledge of key actors into account in technology design and development increases relevance of the equipment and likelihood of adoption.

Photo A: Source, <http://cipotato.org/wp-content/uploads/2013/08/005850.pdf>, p. 217.
Photo B: PROINPA Foundation – Bolivia.



Case Story 5: Cassava tractors, the Central Highlands in Vietnam^{vi}

In the Central Highlands in Vietnam, cassava is grown in remote hills. Men go to the field and carry cassava using two-wheel tractors, while women ask their husband to give them a ride. Those vehicles are integral parts of rural agriculture and they help men exercise power both physically and symbolically. In the matrilineal Ede community in the Central Highlands, for example, many men perceive that their decision-making power is higher than their wives because they can drive two-wheel tractors while their wives cannot. Tractors thus enable men not only to control some aspects of farming and increase their mobility but they also strengthen men's symbolic power. Agricultural machines have been mostly made by men and used by men. Until recently, little attention was paid to women's needs. As a direct result of men's migration to cities, there is a growing demand for agricultural machines that are usable for women (e.g. small, light and easy maintenance). Machines designed for women could help female farmers not only save labor and time but also increase their confidence and power.



Photo: Nguyen Thi Van Anh.



Guiding questions

The guiding questions below are presented to stimulate researchers to think about the gender implications of actual or possible interventions involving machinery or that may depend on existing machinery. Undertaking a needs assessment is strongly encouraged. This will not only mean that the proposed activities are more relevant to the needs of users (and thus, better take up and adoption), but also shows funders that there is evidence-based research for the proposed intervention.

Principal questions and follow-on questions

Are there any machines used for your targeted crops during the whole cycle from plowing to selling?	
<p>Yes: What are these machines? Who owns them? Who uses them? Who are the non-users and why? Are there men and/or women who earn income as manual laborers in the study/intervention areas and for which tasks?</p>	<p>No: Are there needs and/or challenges expressed by men and women?</p>
Does your intervention introduce new machines? (e.g. for cultivating, harvesting and processing)	
<p>Yes: What machine? Who are you targeting as users of the new machines and why? What may be possible barriers for some users and how best to mitigate these barriers? Who are the non-users and why?</p> <p>Are there any risks or unintended consequences you can think of? (e.g. creating envy among the community members; resulting in control of innovation by a small number of powerful members; landless women/men laborers lose their jobs) Are the machines usable for women in terms of the requirement of physical power and skills and knowledge needed for maintenance? Does your intervention create additional labor- and financial-burden for men and/or women farmers?</p>	<p>No: Please go to question 3.</p>
Does your intervention depend on access to particular machinery?	
<p>Yes: Who own the machinery (e.g. men, women)? Who can access the machinery and how? How does your intervention support those who don't have machines?</p>	<p>No: Does your intervention create additional labor for men and/or women farmers?</p>

How will you monitor and evaluate (M&E) visible and hidden impacts of mechanization?

Please critically consider how the new technology/intervention is likely to affect different people, for example:

- a) Are there changes in gender division of labor in other farming and non-farming activities?
- b) Are there differences in men and women's perceived benefits and positive / negative changes they face?
- c) What are impacts of the intervention on different socio-economic groups and their roles in the community?



In general, big and expensive machinery are developed by men and used by men. Photo: Nguyen Thi Van Anh.



Many women's tasks are still manual across the global South. Left: women peeling cassava in Benin. Photo: D. Dufour. Right: women working with an ox in Vietnam. Photo: Nguyen Thi Van Anh.



Small-scale simple machinery and equipment can significantly help women save their time and labor. Left: a cassava milling machine in Benin. Photo: D. Dufour. Right: a sweet potato vine cutting machine for animal feeding in Vietnam. Photo: Nguyen Thi Van Anh.



Photo: IITA.

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