

Local biopesticide production hubs and the empowerment of rural women in Tamil Nadu, India

Farmers who are faced with plant health problems can visit plant clinics staffed by plant doctors, who provide diagnoses and recommendations. In India, plant clinics have been referring farmers to local biopesticide production hubs, some of which are established and operated solely by women. These hubs provide environmentally friendly plant pest solutions. And they have empowered the women running them, as a very recent study demonstrates.

By Mariam Kadzamira, Malvika Chaudhary, Ramasami Rajkumar and Frances Williams

Cottage industries feature home-based systems of manufacturing on a small scale. In most cases, these industries make use of locally available raw materials, and they often benefit from indigenous skills and knowledge. Cottage industries play an important role in the Global South, especially in Asia and Latin America. Whilst economic development is the most attractive gain of cottage industries, studies have found that other social goals are achieved, including independence, decision-making opportunities and poverty reduction.

Against this background, cottage industries are also of considerable importance for women. They have helped women in parts of the developing world to improve their ability to define and act on goals, make decisions that matter to them, and participate in the economy and public life. In Tamil Nadu, India, several women's cottage industries producing biopesticides have been established, with the support of the MS Swaminathan Research Foundation (MSSRF). Most are linked to local plant clinics (see Box) that refer farmers to them when plant pests and diseases have been detected in their fields.

Women's economic empowerment put to the test

In Tamil Nadu, the first plant clinics were established in 2011, and became fully operational in 2014. Women's cottage industries existed during this time, but were not commercially viable. It was however observed that as the plant clinics became operational, there was a positive and increasing trend in the number of clients visiting cottage industries for their products. This was because they were referred to the women's cottage industries by the plant doctors. It was further observed that the women who were members of these local cottage industries became more confident and were better able to articulate themselves and engage in other spheres of the community.

The concept of plant clinics

Plant clinics provide plant healthcare advice through diagnosis and recommendation to farmers who are faced with pest concerns. They are staffed by trained plant health extension officers who are called "plant doctors" and are set up in different places – such as in local markets, community centres and/ or farmer cooperative centres. Farmers take samples of their sick crops to the plant doctors for free diagnosis and recommendations on how to manage the problem. Plant clinics, the introduction of which was promoted by the Centre for Agriculture and Bioscience International (CABI), have been in place since 2003, and current-

To find out what the source of this 'confidence' was, and to determine how other women's groups could learn from them, we conducted a survey in the Tamil Nadu area during the months of July and August 2021. A total of thirty-four women who are members of several cottage industries producing eco-friendly agricultural products including biopesticides were randomly selected and interviewed. We assessed empowerment by analysing four indicators: decision-making, productive capital ownership, access to and control of credit and finance, and leadership as evidenced by group membership.

Household decision-making. Evidence from various studies suggests that when women participate significantly in household decision-making processes, the overall well-being of the family improves. We therefore analysed women's involvement in their households' decision-making processes. With a share of 97 per cent, the majority of the women whom we interviewed are from households headed by men. In most of the households, the male spouse mainly makes the farming decisions pertaining to food crops (62 %) and cash crops (59 %). Women are much more equally involved in decision-making processes concerning livestock

ly there are over 5,000 in 34 countries across Africa, Asia and the Americas. Currently, 144 plant clinics are operating in India, eleven of which are active in Tamil Nadu. In 2021, a network of 40 e-plant clinics were set up and launched in Jammu Province, India.

Several studies have demonstrated that plant clinic users are better able to identify and manage pests and diseases and their users have higher crop productivity than non-users of plant clinics. In addition, plant clinics have been found to encourage the adoption of various Integrated Pest Management (IPM) techniques, including more rational and appropriate use of pesticides and increasing the use of cultural and biological control methods.

production (35 %; men: 32 %) and, as stated by nearly 97 per cent of all surveyed women, are fully in control of the decisions pertaining to non-farm activities, including their involvement in the cottage industry.

Most women surveyed are engaged to some extent in making decisions in their households about how income from cash crops (82 %), food crops (68 %) and livestock production (69 %) is utilised. Utilisation of income from non-farm activities, including that from the cottage industry, is controlled by the women themselves in the majority of surveyed households (94 %).

Access to productive capital. Asset ownership is one measure of economic empowerment. Access to productive capital, such as land, livestock, farm implements and households' assets, has a significant role in enhancing the livelihood outcomes of rural households. Productive assets help rural households to manage natural and economic shocks and risks, smooth consumption and manage income. We analysed access to 14 productive assets. The women we interviewed are from households with access to a wide variety of productive capital with all the women saying that in their households they have agricultural land, a house

or other building structure and large consumer durable assets.

With most large assets, women we interviewed were less likely to have sole ownership (see upper Table). For example, we found that amongst the surveyed women, a very small proportion had sole ownership of agricultural land, large livestock like cattle or mechanised farm equipment such as tractors or water pumps. On the other hand, non-agricultural land for a residential or commercial building and means of transport such as motorbikes or push bicycles were more likely to be solely owned by a woman. Amongst the women we interviewed, we found that in each case, just over half had sole ownership of non-agricultural land and means of transport.

In almost all the surveyed women's households, women have sole ownership of a mobile phone. With mobile phones, information pertaining to various developmental issues, including agricultural and health services, can be delivered, and they can help access credit and finance and be useful in many other ways. Therefore, mobile phone ownership has been found to be empowering for rural women across the globe.



Access to credit. Access to finance, especially micro-credit, is seen by some development experts as a cure-all for rural women's empowerment. Others however argue that, especially on its own, without other social benefits, outside the broader poverty reduction sphere, access to credit is insufficient for women's empowerment and can result in undesired outcomes. For example, studies from Bangladesh found that microfinance led to increased levels of debt amongst already poor households and worsened economic, social and environmental vulnerabilities. A study from Ghana, on the other hand, states that the benefits of microfinance were linked to conflicts amongst spouses and the neglect of perceived female domestic responsibilities due to women's devotion to their enterprises.

However, credit remains one of the necessary ingredients for increasing and accelerating rural women's empowerment. On this basis, we therefore analysed access to as well as control over finance and credit services of the surveyed women. All of them have various sources of credit and finance in their communities, and from each category of credit, there are women who are eligible to borrow. At 53 per cent, over half of the women interviewed stated that their households were eligible to borrow from formal lenders. Just under a third of the sur-

Ownership of assets		
Type of asset	Sole ownership by women (%)	Shared ownership by women and other household member (%)
Agricultural land	24 %	77 %
Large livestock	24 %	76 %
Fish pond/ fishing equipment	-	-
Small livestock	17 %	83 %
Chickens, ducks, turkeys, pigeons	33 %	67 %
Non-mechanised farm equipment	8 %	92 %
Mechanised farm equipment	14 %	86 %
Non-farm business equipment	40 %	60 %
House or other structures	3 %	97 %
Large consumer durables	12 %	88 %
Small consumer durables	33 %	67 %
Mobile phone	97 %	3 %
Other land not used for agriculture	54 %	46 %
Means of transportation	58 %	42 %

Note: 'Other household member' is actually almost always the 'male spouse'. But this could also be another person - for example for female headed households or widows this could be their older children or another relative.

Access to credit							
Type of credit source	Interviewed women are eligible to apply for loan	Somebody in household of interviewed woman has borrowed from source	Person who made decision to borrow		Person who decided how to utilise borrowed funds		
			Woman	Male Spouse	Woman	Male Spouse	Other non-household member
NGO	✓	✓	100 %	-	100 %	-	-
Formal lenders	✓	✓	61 %	39 %	58 %	42 %	-
Informal lenders	✓	✓	50 %	50 %	50 %	50 %	-
Friends/ relatives	✓	✓	30 %	70 %	70 %	20 %	10 %
Group micro-finance	✓	✓	75 %	25 %	63 %	25 %	12.5 %
Informal credit/savings groups	✓	✓	100 %	-	100 %	-	-

 Mostly the woman makes decisions and controls income use
  Mostly the man makes decisions and controls income use

veyed women also say that their households are able to borrow from friends and relatives, and just over 20 per cent maintain that their household is able to borrow from group micro-financing schemes. Amongst those reporting that they are eligible to borrow, somebody from their household has borrowed from the available source of funding. This implies that those who are able to borrow (i.e. are eligible) always do so when credit is available. The decision by the surveyed women to get credit from a particular source is mostly in their

hands for most sources, except for borrowing from friends and relatives or from informal lenders (see lower Table).

It should be noted that in cases in which credit facilities are via groups (i. e. NGO-based schemes, group microfinance schemes and informal credit and loan groups), it is the woman who has control in terms of the decision to borrow from that source or not. This can be attributed to most groups being gender-segregated, with women staying in their



Women preparing biopesticides at a cottage industry.

Photo: MSSRF, Tamil Nadu, India

own groups, as with the case of the cottage industries under study. We can further see from the Table that all women who borrow from NGOs and informal credit and savings groups have full control in decisions on how the funds are utilised. This can be attributed to the fact that before funds are dispersed by an NGO or savings and credit groups, the women must provide a “business case” – albeit informal – stating what they intend to use the funds for and how they will repay the loan. For all other sources of credit, the spouse or other individuals from outside the household contribute to decisions on how borrowed funds should be utilised. These findings imply that community groups, especially those that are gender-segregated are key for women’s access to and control over credit. Whether access to credit produces unintended/ undesired outcomes, as discussed briefly above, is beyond the scope of this study, but is an area that should be considered prior to the establishment of any development programme that wishes to use credit and finance schemes as a means of contributing towards rural women’s empowerment.

Group membership. From our findings above, we see that women’s participation in community groups can be empowering as it allows them to access and control credit and finance. We find that on average, at 80 per cent, a large proportion of surveyed women who live in a community where a community group exists are active in such a group. This includes agricultural producer groups, microfinance groups, mutual help or insurance groups, trade and business association groups

and other types of women-only groups. This is an important finding as many other studies have demonstrated that rural women participating in community groups tend to be more empowered than women not doing so. One leader of a cottage industry stated: “I had the confidence to join several groups in my community, after seeing the benefits of being part of my cottage industry.” Field practitioners and policy-makers should therefore continue to provide support for the establishment of community groups as a means to reach women and as a tool for increasing women’s empowerment. The type of participation that the women have in the groups and the benefits that accrue from different groups for the women and their families or household are beyond the scope of this study, but represent an area that should be considered for future research.

Summing up ...

Women in India’s Tamil Nadu who are engaged in cottage industries have increased their empowerment via the operation of local production hubs for biopesticides that are linked to a network of plant clinics. We have seen evidence of empowerment in several aspects:

- Women have control over their participation in and income from cottage industries. This means that supporting cottage industries has potential to increase the empowerment of women who participate.

- Most productive capital and assets are jointly owned within a household by women and the male spouse. However women have sole ownership of mobile phones. This has many positive implications, including the delivery of agriculture, health and finance services via mobile-based applications.
- Women participate in household decision-making processes, and they have control in decision making related to accessing and utilising credit and finance from group-based lending. These findings imply that community groups, especially those that are gender-segregated, are key for women’s access to and control over credit.
- Participation in community groups amongst interviewed women is very high, implying that community groups are held in high esteem and should be promoted and supported as a vehicle for increasing women’s empowerment.

There is need for both public and private promoters to continue supporting the development of women’s cottage industries as participation in these industries can contribute to women’s empowerment. Our study also shows that links between key industry players and cottage industries which the women are operating can catalyse the operations of the cottage industries, leading towards economic viability. This is the case with the plant clinics in Tamil Nadu, which acted as a business catalyst for the local biopesticide hubs operated by the women’s cottage industries.

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