

EMPOWERING WOMEN IN COASTAL RICE -BASED PRODUCTION SYSTEMS IN THE MEKONG DELTA, VIETNAM

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ABSTRACT

Rice farming is the major source of livelihood in the Mekong Delta, Vietnam. Rach village of Thuan Hoa commune (Cau Ngang district, Tra Vinh province) and Phuoc Thanh village of Phuoc Long commune (Phuoc Long district, Bac Lieu province) are saline prone areas. Thus, only one crop of rice can be grown in a year. To improve farm income, farmers shifted to rice-shrimp system and rice together with trapped natural prawn and fish. Gender analysis revealed that in the rice-shrimp system, female participation was higher (70%) than their male counterparts (30%). In the rice with trapped natural prawn and fish system, men and women contributed equal labor inputs in all the operations. Women's Empowerment Indices (WEI's) revealed that women were more empowered than men in making specific decisions related to rice, shrimp and in natural prawn and fish trapping systems. They also showed domination in decisions related to selling animals, how much money to spend on farm inputs, on food and expenditure on children's education. However, women's decision-making authority in farming had not been translated in higher productivity due to persisting gender disparities in access to resources, technical knowledge through training programs and extension services. To reduce gender disparities in access to seeds and technical knowledge, the Cuu Long Delta Rice Research Institute (CLRRI) and the International Rice Research Institute (IRRI) involved men and women in participatory varietal selection, discussion of their preferred criteria. This approach provides women, opportunities to provide information on their criteria in varietal choice. Empowering women with technical knowledge, seeds, inputs and farm-managerial skills will increase productivity, ensure food security, improve income and family welfare.

Keywords: CLIRR, gender, Women's Empowerment Indices, rice farming, rice – shrimp system

INTRODUCTION

Mekong Delta has 4 million ha of natural land. Of which, the area affected by salinity in the coastal area is 0.7 million ha (occupied 18% of natural area). In this region, rainfed rice with one rice crop is cultivated or saline forestry is planted (CLRRI, 2008). Salinity effects on seedling growth, yield components of rice and yield reduction (Zeng and Shannon, 2000; Zeng *et al.*, 2003, Shereen *et al.*, 2005). Soil salinity and sodicity are environmental problems in the shrimp farming areas in Vietnam. Soil salinity was

quite serious in the dry season and highest soil salinity levels are found near the sea. Sodidity is mainly a phenomenon of topsoils and of soils near the sea. Both soil salinity and sodicity are regulated by seasonal rainfall patterns. They could together result in disastrous soil degradation (Tho, *et al.* 2008). According to Irrigation Research Institute for South Vietnam (2009), from March to April 2009, saline water with 1⁰/₀₀ - 4⁰/₀₀ infested the inland from 50km – 65km, and in May 70km in the Mekong Delta. In Tra Vinh province, the saline water is 3.7⁰/₀₀. In 2011, saline water intruded 70 km inland in Tra

Vinh province (The Dat, 2011). According to Department of Agriculture and Rural Development of Tra Vinh province, 12,000 ha of rice in dry season 2011 of the province is lost due to early intrusion of saline water. In Bac Lieu province, the level of salinity raise up to 30‰ in certain months. Thus, the original sluices have been closed from early 2009 to prevent further saline water infestation into inland. Aside from the sluice management, salinity rice tolerance is important to cope with yield reduction in the saline prone area. Men and women farmers plant rice with or without knowledge about salinity. They want to plant the rice varieties which are suitable to the conditions as extreme salinity in coastal area. Both men and women have their own criteria in rice variety selection. However, women farmer participatory in this task is often neglected. Thus, this paper presents women empowerment in selection of rice variety for integrating of women' preference rice traits in breeding goals, especially in saline prone area.

OBJECTIVES

- To assess women and men participation in farming in coastal villages,
- To know women empowerment in decision making in rice-shrimp system
- To explore men and women's preference in rice variety selection

DATA COLLECTION AND ANALYSIS

Key informant interview with knowledgeable farmers and leaders of Rach village, Thuan Hoa commune (Cau Ngang district, Tra Vinh province) and Phuoc Thanh village, Phuoc Long commune (Phuoc Long district, Bac Lieu province) as well as individual interview with 27 male-managed farms and 22 female-managed farms were conducted. To assess farmer participatory in varietal selection (PVS), farmers' preferences was conducted by focus group discussion. Both male and female

farmers were invited to discuss about their criteria in selection of a rice variety for their rice areas.

The qualitative data were quantified and summarized. T-test was used to compare the differences in women's decision indices between households with male-managed farms and female-managed farms.

RESULTS AND DISCUSSION

Farming condition

Farmers faced both problems of submergence and salinity. During saline water infestation, all area of the studied villages is infested with salinity. Thus farmers in Rach village plant only one rice crop per year. Aside from rice, men and women are raising brackish shrimp and catching natural sea prawn aside from male migration for non-farm work. Women are worked as on-farm hired labors in the villages. Women are main care takers in rice cultivation. Women's Association emphasized women roles in agriculture in monthly meetings.

In recent years, wet season starts from May and lasts until mid December. The rest of the months are dry season. In Tra Vinh site, rice crop is from mid June to mid December. During dry season from February to June, the out-migration occurs. More male than female members involved in out-migration the salinity period is from January to May, farmers can raise shrimp in this period. Farmers catch natural prawn or fish during middle of April and mid November. In rice production, transplanting is from late July to early August. Thus, the seedling stage is from middle of June to the time of transplanting. In Bac Lieu site, rice available in the field is from mid June to December. The rest of months are devoted for shrimp cultivation (Figure 1).

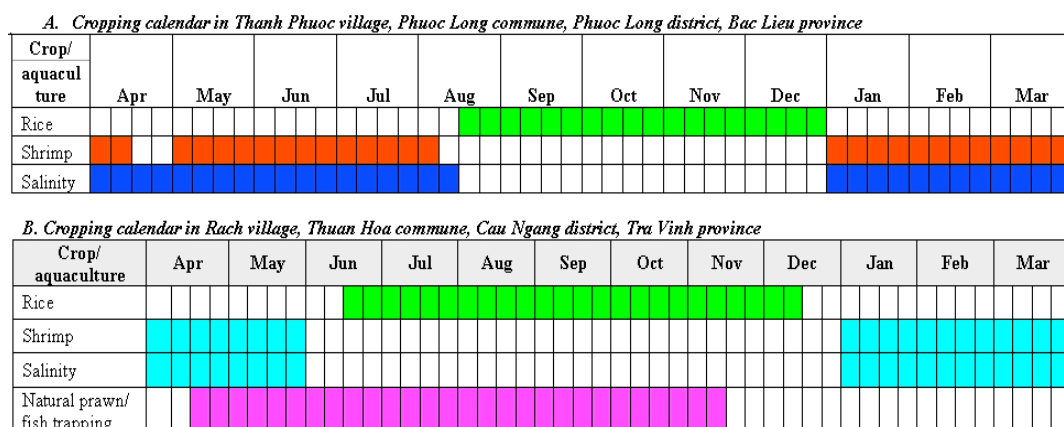


Figure 1. Calendars

The main farming system in Rach village (Tra Vinh province) is Rice- Shrimp system and Rice- Shrimp system with natural prawn/fish catching. People of Rach village make their living by rice farming, shrimp rising and prawn catching mainly. They have only one rice crop per year due to salinity affect in dry season. There are 6 months with fresh water (mainly from rains) and 6 months with saline water (sea water intrusion). Thus, they raise mainly the brackish shrimp. They catch the natural small prawn for additional income. Both male and female farmers participated in all farming system in the saline prone. In Rice- Shrimp system, female participation was higher (70%) than their male counterparts (30%). In Rice + trapping natural prawn/fish system, equal share of male and female farmer

labor was found. In Phuoc Long commune (Bac Lieu province) farmers have 2 shrimp seasons, followed by rice or rice plus fresh giant shrimp.

Gender Division of Labor

Regarding to specific task, woman activities were involved in seedbed preparation, transplanting, weeding, drying harvesting, removing off-types, storing seeds, purchase farm inputs and in livestock management than men. Men involved in activities as seedbed preparation and seed broadcasting. Men and women shared works in land preparation, pulling of seedlings, application of chemicals and storing seeds and selling large animals (Table 1).

Table 1. Gender Division of Labor

| Activities | On-Farm | | | Other farmer's fields (as hired labor) | | |
|--------------------------|--------------|----------------|-----------------------|---|----------------|------|
| | Male only | Female only | Both | Male only | Female only | Both |
| <i>Rice</i> | | | | | | |
| Seed selection | √ | | | | | |
| Seedbed preparation | | √ | | | √ | |
| Land preparation | | | √ | | | √ |
| Pulling of seedlings | | | √ | √ | | |
| Transplanting | | √ | | | √ | |
| Broadcasting | √ | | | √ | | |
| Weeding | | √ | | | √ | |
| Application of chemicals | | | √ (male > female) | √ | | |

| Activities | On-Farm | | | Other farmer's fields (as hired labor) | | |
|---|-----------|-------------|-------------------|---|-------------|------------------|
| | Male only | Female only | Both | Male only | Female only | Both |
| Harvesting | | | √ (female > male) | | | √ female > male) |
| Threshing by machine | | | √ (male > female) | | | |
| Drying | | √ | | | √ | |
| Removing off-types | | √ | | | | |
| Seed selection for next season | √ | | | | | |
| Storing seeds | | | √ | | | |
| Purchase of inputs | | √ | | | | |
| Selling of produce | √ | | | | | |
| Supervision of hired labor | | √ | | | | |
| Bringing food to the farm | | √ | | | | |
| Livestock management | | | | | | |
| Collecting farm yard manure | | √ | | | | |
| Cleaning the animal sheds | | √ | | | | |
| Collecting green fodder | √ | | | | | |
| Taking care of poultry | | √ | | | | |
| Selling large animals (cattle) | | | √ | | | |
| Selling of small animals (pig, poultry) | | √ | | | | |

Decision making

Regarding to decision making, women make decision more specific on “Who and number of farm labor to hire”, “What price to sell the output”, “What types of food to consume in times of crisis” and “Where to borrow money”. Men make decision more specific on “What crops to grow”, “What farm implements to purchase” and “Adoption of technology in rice production” because more male attended training, females do not know how to ride motorcycle to the training class

venue, and their low education. More women than men make decision on “Quantity of output to sell and consume” and “When and where to sell the harvested crop”. Both men and women join in making decision on “What rice variety to grow”, “Whether to sell or consume the harvested crop”, “Selling the animals”, “Children’s education”, “Participation in voting” and “Number of children to raise” (Table 2).

Table 2. Decision-making between husband and wife

| Decision item | Male Only | Female Only | Both |
|--|-----------|-------------|--------------------|
| 1. What crops to grow | √ | | |
| 2. What rice variety(ies) to grow | | | √ |
| 3. Who and number of farm labor to hire | | √ | |
| 4. Whether to sell or consume the harvested crop | | | √ |
| 5. Quantity of output to sell and consume | | | √ (female > male) |
| 6. When and where to sell the harvested crop | | | √ (female > male) |

| Decision item | Male Only | Female Only | Both |
|--|--|-------------|------|
| 7. What price to sell the output | | √ | |
| 8. What farm implements to purchase | √ | | |
| 9. Selling the animals | | | √ |
| 10. Adoption of technology in rice production | √ (because more male attended training, females do not know how to ride motorcycle to the training class venue, and their low education) | | |
| 12. What types of food to consume in times of crisis | | √ | |
| 13. Children's education | | | √ |
| 14. Where to borrow money | | √ | |
| 15. Participation in voting | | | √ |
| 16. Number of children to raise | | | √ |

Women empowerment: Women making. The women's empowerment index was expressed by women's empowerment index based on decision making. The women's empowerment index was constructed as followed:

Table 3. Construction of women's empowerment index based on decision making.

| Who makes decision | Value |
|------------------------------------|-------|
| Husband only | 1 |
| Husband dominates (husband > wife) | 2 |
| Jointly by husband and wife | 3 |
| Wife dominates (wife > husband) | 4 |
| Wife only | 5 |

Table 4. Women decision making index related to farming

| Activity | Women's empowerment index | | T-value |
|-----------------------------|---------------------------|-----------------------------|----------|
| | Male managed farms (n=27) | Female managed farms (n=22) | |
| Rice production | 1.90 | 2.90 | -7.528** |
| Shrimp production | 1.59 | 2.65 | -8.720** |
| Natural prawn/fish trapping | 2.13 | 3.00 | -3.075** |
| Other items | 2.93 | 3.70 | -4.823** |

In the households with female playing major role in farming, women decision making index related to rice farming were significantly higher than those in the households with male playing major role in farming. Similarly, women decision making index related to shrimp cultivation activities in the households with female playing major roles were higher than the households with

male playing major roles. This shows that women in the households with female mainly managed farm had more empowerment than women the households with male mainly managed farm. In natural prawn or fish trapping, women decision making index in the households with female major roles was significantly higher than the those in the households with male major roles on decision

of materials putting in the field to trap and when to harvest (putting trap, reducing water, pulling up trap and collect prawn/fish). Women in the households with female playing major roles had more empowerment in decision making related to other items as when to sell animals, how much money to spend on farm inputs, how much money to spend on food and expenditure on children's education.

Farmers' selection of rice varieties

Farmers in coastal area with salinity infestation planted traditional rice in the past based on their positive traits as good eating quality, soft, high volume after cooked, less fertilizer require, and resistant to brown plant hopper. In recent years, farmers planted modern rice varieties based on the traits of good eating quality, soft, aromatic, hard stem, short plant height, high tillering capacity, less fertilizer require, short duration, long grains, tolerant to saline condition and acid sulphate soil condition and resistant to brown plant hopper.

Male and female farmers' participatory varietal selection (PVS) is important in plant breeding. Male and female farmers' preference analysis aims to include farmers' preferred traits in rice breeding program. The most important trait preferred by both male and female farmer is high yield character. Aside from high yield, male farmers rank the trait of high tillering capacity as second important character, followed by tolerant to salinity and acid sulphate soil, insect pest resistant, and hard stems with lodging resistant. The second important trait by female farmer is insect pest resistant, followed by tolerant to salinity, acid sulphate soil, and short duration. Both male and female mentioned that at presence, they do not need good eating quality yet because they need high yield for the purpose of home consumption and for feeding animals. They are living in the poor villages, they need to fill the stomach first. Poverty rate at the studied site is 25%.

Table 5. Rice traits that farmers look for to plant in salinity prone areas

| Men' traits | Rank | Reasons for ranking |
|---|-------------|--|
| High yield | 1 | Need to have high yield to have benefit due to increasing cost of fertilizer and chemicals in the market. |
| High tillering capacity | 2 | To have high yield from more panicles |
| Tolerant to salinity and acid sulphate soil | 3 | This area has 6 months with saline water |
| Insect and disease resistance | 4 | Reduce expenditure for chemicals in rice production and reduce toxic for fish and shrimp in the field reared after rice season |
| Hard stem, no lodging | 5 | Afraid of lodging leading low yield, more unfilled grains, rotted grains. |

| Women' traits | Rank | Reasons for ranking |
|---|-------------|---|
| High yield | 1 | Need high yield to have benefit due to increasing cost of fertilizer in the market. |
| Insect and disease resistance | 2 | To lessen expenditure for chemicals |
| Tolerant to salinity & acid sulphate soil | 3 | This area is near to the sea, rice adapts with this soil will develop well |
| Short duration rice | 4 | Want to plant 2 rice crop seasons per year instead of 1 rice crop season to have more rice production in a year |

(1 is the most important and the highest rank is the least important)

The other rice traits mentioned by both male and female farmers were stiff stems (for resistant to lodging), long panicles and more panicles per hill and high rate of filled grains (for high yield).

Copping mechanism with salinity

- Practice shrimp-rice system based on technical staffs, neighbors and relatives.
- Change rice varieties for being tolerant to acidity and salinity and increasing rice yield. Farmers need rice varieties with good eating quality, no lodging and adaptable to changing of weather and water quality. Sources of information for changing rice varieties included extension/technical staffs, training, mass media (radio, T.V., book, newspaper), field demonstration with high effective, government recommend and launching variety change, commune staffs, friends and neighbors.
- To avoid the salinity at high level at young stage of rice plants by changing the date of sowing. Sources of information for changing date were from mass media, technical staffs, neighbors, relatives, and self experience.
- Washing salinity in soil is the most important mechanism. Farmers wait for heavy rains to reduce salinity, after that rice was planted. They open dike lids for fresh water going into field from the onset of raining season, close the dike lids at the end of

raining season to keep fresh water in the field. Sources of information to wash soil were from radio, newspaper, extension staff, local government, neighbors, parents and self experience.

- Government together with farmers has tried to reduce salinity and maintain the fresh water from crop cultivation. They together built sluice to prevent saline water by closing it, and to get fresh water by opening it when fresh water is ready to move in. Government also guide farmers how to prevent saline. They also visit farmers and remind them to keep fresh water to reduce saline.

Access to technical training

More male than female farmers attended training for rice production as fertilizer use, integrated pest management (IPM), three reductions and three gains. More than half of farmers were not trained on rice technologies because they were mostly not invited. The saline prone is the remote area and received the extension at lower extent as compared to the more intensive rice areas.

Half of farmers attended the training on shrimp production. The rests were not invited or not known the announcement. Both male and female farmers attended the training on shrimp production equally. They were trained on raising shrimp technologies, fingerling selection, fingerling releasing and feeding, reclamation pond, feeding material, prevent disease.

Table 6. Training participation

| Item | Male managed farms (n=27) | | Female managed farms (n=22) | | All | |
|---|---------------------------|----|-----------------------------|----|-----|----|
| | No. | % | No. | % | No. | % |
| Training for rice production (%) | | | | | | |
| Yes | 13 | 48 | 8 | 36 | 21 | 43 |
| No | 14 | 52 | 14 | 64 | 28 | 57 |
| If yes, specify the training course? (*) | | | | | | |
| Using fertilizer | 2 | 7 | 1 | 5 | 3 | 6 |
| IPM on rice | 6 | 22 | 4 | 18 | 10 | 20 |
| Three Reductions and three Gains | 2 | 7 | 1 | 5 | 3 | 6 |
| Weed control | - | - | 1 | 5 | 1 | 2 |
| Rice production technology | 4 | 15 | 2 | 9 | 6 | 12 |
| Sowing rice in time to avoid plant hopper | - | - | 1 | 5 | 1 | 2 |
| If No, why? | | | | | | |
| Was not invited | 4 | 15 | 9 | 41 | 13 | 27 |
| Busy, cannot attend training | 1 | 4 | - | - | 1 | 2 |
| Training for shrimp production (%) | | | | | | |
| Yes | 13 | 48 | 11 | 50 | 24 | 49 |
| No | 14 | 52 | 11 | 50 | 25 | 51 |
| If yes, specify the training course? | | | | | | |
| Training of raise shrimp | 4 | 15 | 4 | 18 | 8 | 16 |
| Training of shrimp releasing, feeding | - | - | 1 | 5 | 1 | 2 |
| Fingerling selection | 1 | 4 | - | - | 1 | 2 |
| Environment of water for raise shrimp | 1 | 4 | - | - | 1 | 2 |
| Technology of aquaculture | 1 | 4 | 2 | 9 | 3 | 6 |
| Technology of shrimp feeding | - | - | 1 | 5 | 1 | 2 |
| Technology of raising shrimp, reclamation of pond | 1 | 4 | 1 | 5 | 2 | 4 |
| Feeding material, prevent disease, digging pond | 1 | 4 | - | - | 1 | 2 |
| If No, why? | | | | | | |
| Not be invited yet | 4 | 15 | 4 | 2 | 8 | 16 |
| No body announce | 1 | 4 | - | - | 1 | 2 |
| Not organize | 1 | 4 | 1 | 2 | 2 | 4 |

Farmers' need

- Capital for rice, shrimp and natural prawn/fish catching
- To increase income and yield from rice production, farmers need good rice varieties which are resistant to insect pests and diseases, high yield and tolerant to acidity and salinity, training on rice technologies, capital, increasing rice price, more consider from government and good road for transportation,...
- To increase income and yield from shrimp production, farmers need good quality of fingerlings, training on shrimp raising, insurance in shrimp disease, high shrimp price...
- To have more natural prawns/fish by catching, farmers request no more people catching fish, prawn by

chemical because it destroys tiny prawn/fish. They need salinity of canal and operation sluice in time, reducing pollution.

Farmers' sources of technical knowledge and information

Regarding to sources of technical knowledge and information on rice production, most of male and female farmers acquire knowledge and information from neighbors, friends, other farmers, parents and self experience. Less than one-fourth of male and female farmers got technical knowledge and information from technical staffs, training and mass media. This indicates that the extension program for this saline prone is at low extent.

Among rice technologies, fertilizer management, sowing or planting management (as time for sowing and seedling age for transplanting) were known well by male and female farmers followed by weed management. Similarly, both male and female farmers obtained technical knowledge and information on shrimp production from neighbor, friends, other farmers, government/technical staff, television, radio, and self experience. Male farmers know well about feeding management as timing of feeding, followed by kinds of feed should be used. The other technologies that are known well as water management and selection of fingerling. Female farmers know well on nursery shrimp, followed by water management, feeding management as timing of feeding and interval lime and other chemical application.

CONCLUSION

The saline prone area is the remote area because it is coastal area and far from city. The people in saline areas are poor and less access to the extension program. Source of fresh water is from rains and wells. The salinity levels depend on distance of sea water intrusion, rainfalls, and flow of fresh water from the upper stream to the seas. 6 months with saline water intrusion at certain level each year depending on the intrusion. Farmers plant one rice crop per year. After rice

harvest, they raised brackish tiger shrimp either one or two seasons. Some farmers plant rice together with fresh giant shrimp to increase income. During rice crop period, they catch natural tiny prawn/fish for additional income. Raising brackish tiger shrimp by most of farmers is not industrial raising. Thus, they got low production, low income, even loss in some cases, especially in case of female farmers though both male and female equally attended the training. In saline prone, contribution of male and female farmers in rice production is not different though more male than female farmers were trained on rice technologies. Natural prawn/fish catching only obtained small income, sometimes lost. Thus, the farming income from saline prone is still tight to help farmers overcome the difficulty in daily life. Despite male or female playing main roles in farming, the gender division of labor in rice production activities is clearly shown. The heavy tasks are done more by male. The transplanting, gap filling, hand weeding, off-type cutting are traditionally done by female. However, in shrimp raising and natural prawn catching, more male participation in all tasks more than female. However, both male and female farmers contribute their labors in rice production, shrimp raising and natural prawn catching considerably. In the households with female playing important roles in farming, women are more empowerment in decision making than the women in the households with male playing important roles in farming in most of items related to rice and shrimp production. However, women have to consult the husbands in case of selling animals though they play main role in animal raising. In general, coping with salinity is done by upper level as government as construction of dikes, dams and sluices. These works are governed by government. Farmers contribute their labors in some portions of these tasks. The operation of the opening or closing the sluices are done by the government staffs. Farmers only have to open or close the lid of dam or dike in their field to get fresh water. The individual coping with salinity is not clearly seen. However, they know by experience themselves and other sources of information

to reduce salinity in the rice field by rain water. Saline prone is difficult area for rice cropping. Thus, shrimp – rice systems have been practicing. In rice production, salinity tolerant rice variety with good quality and high yield is very necessary. The state as well as local authority should pay more attention on exploiting the saline condition to have good income from the brackish tiger shrimp and natural prawn/fish products to improve life of the people in the area. To enhance women empowerment in varietal selection for saline prone, there should be noticed by the technical staffs as breeders, extension center and local authority. Government should have the policy in enhance the participatory of male and female farmers equally in technical training, field days, and breeding programs.

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TRAO QUYỀN PHỤ NỮ TRONG HỆ THỐNG CANH TÁC NỀN LÚA Ở VÙNG VEN BIỂN ĐỒNG BẰNG SÔNG CỬU LONG

Vùng ven biển huyện Cầu Ngang (Trà Vinh) và Phước Long (Bạc Liêu) được nam và nữ nông dân chuyên hoạt động sản xuất bằng hệ thống lúa –tôm thay vì chỉ trồng một vụ lúa trong năm. Cùng lúc với vụ lúa, nam nữ nông dân còn nuôi hoặc bắt tôm/cá tự nhiên từ biển vào ruộng để gia tăng thu nhập. Phân tích vai trò của giới cho thấy 70% nữ và 30% nam tham gia hoạt động trong hệ thống lúa- tôm. Sự đóng góp lao động của nam và nữ trong đánh bắt tôm/cá tự nhiên tương đương nhau. Phân tích chi số trao quyền phụ nữ cho thấy nữ trực tiếp quản lý sản xuất có quyền quyết định nhiều hơn nam trong các hoạt động sản xuất lúa, tôm và đánh bắt tôm cá tự nhiên cũng như bán các vật nuôi và bao nhiêu tiền cần đầu tư cho lúa. Tuy nhiên, do nữ nông dân vẫn chưa bình đẳng như nam giới trong việc tiếp cận với nguồn sản xuất và tham dự các lớp tập huấn kỹ thuật của hoạt động khuyến nông, Viện Lúa Đồng bằng sông Cửu Long và Viện Lúa Quốc tế (IRRI) đã mời cả hai nam và nữ nông dân tham gia thảo luận các tiêu chuẩn chọn giống nhằm tăng cường trao quyền phụ nữ tiếp cận với nguồn giống. Sự đánh giá giống có sự tham gia của nam và nữ nông dân còn để các nhà di truyền học kết hợp tiêu chuẩn giống của họ trong lai tạo nhằm đẩy mạnh sản xuất, bảo đảm an ninh lương thực, cải thiện kinh tế và đời sống nông hộ trong vùng bị nhiễm mặn.