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Rice–rice and rice–shrimp production

A gender perspective on labour, time use and access
to technologies and services in southern Viet Nam

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Flavia Grassi, Thelma R. Paris, Truong Thi Ngoc Chi

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Abbreviations and acronyms

BRAC	“Three Reductions, Three Gains” farming practice
BCR	Benefit–cost Ratio
CLRRI	Cuu Long Delta Rice Research Institute
DARD	Department of Agricultural Rural Development
FAO	Food and Agriculture Organization of the United Nations
FFS	Farmer Field Schools
IPM	Integrated Pest Management
ILRI	International Livestock Research Institute
IRRI	International Rice Research Institute
MARD	Ministry of Agriculture and Rural Development
PVS	Participatory Varietal Selection
ROI	Return on Investment
US\$	United States Dollars (currency)
VietGAHP	Vietnamese Good Animal and Husbandry practices
VND	Viet Nam Dong (currency)

Glossary of terms

The following terms relevant to gender and labour are used in this case study. Some terms are defined in FAO documents and can be accessed from the FAO term portal. Where FAO definitions are not available, those of other sources are provided¹.

Agricultural holding when used for statistical purposes, refers to the economic unit of agricultural production under single management, comprising all livestock kept and all land used wholly or partly for agricultural production purposes, without regard to title, legal form or size.^a

Agricultural household refers to a household whose largest source of income consists of income derived from agricultural production.^a

De facto FHH is a household in which an adult male partner is working away from the household, but remains involved through remittances and other economic and social ties.^a

De jure FHH is a household which has no male partner, such as women who are widowed, divorced or never married.^a

Exchange Labour is a form of voluntary unpaid labour. It refers to activities performed willingly and without pay to produce goods or provide services for others outside the volunteer's household or family. Persons in volunteer work are defined as all those of working age who during a short reference period, performed any unpaid, non-compulsory activity to produce goods or provide services for others;

that is for economic units outside the volunteer's household or family.^b

Female-headed household (FHH) is a household in which adult males either are not present (owing to divorce, separation, migration, non-marriage, widowhood) or do not contribute to the household income (owing to illness, alcoholism, drug addiction and so forth).^a

Feminization of agriculture refers to the increased concentration of agricultural tasks in the hands of rural women in developing countries.^a

Gender refers to socially constructed differences in attributes and opportunities associated with being female or male and to the social interactions and relations between women and men. Gender determines what is expected, allowed and valued in a woman or a man in a given context. In most societies, there are differences and inequalities between women and men in roles and responsibilities assigned, activities undertaken and access to and control over resources, as well as in decision-making opportunities. These differences and inequalities between the sexes are shaped by the history of social relations and change over time and across cultures.^c

Gender analysis is the study of the different roles of women and men in order to understand what they do, what resources they have, and what their needs and priorities are in a specific context.^a

¹ For additional terminology on "naming women's work" see UNIFEM, 2000 <http://www.unwomen.org/en/digital-library/publications/2000/1/progress-of-the-world-s-women-2000#view>.

Gender division of Labour refers to the allocation of different jobs or types of work to men and women, usually by tradition and custom. The activities, tasks and responsibilities that are perceived and ascribed to male and female, creating tendencies of what is performed by them.^a

Gender dynamics is related to “intra-household gender relations”, defined as relations, including power relations, which take place within the household and are affected by existing gender inequalities.^a

Gender equality is the state in which women and men enjoy equal rights, opportunities and entitlements in civil and political life.^a

Gender norms refer to beliefs about women and men, boys and girls that are passed from generation to generation through the process of socialization. They change over time, in different cultures and populations. Gender norms lead to inequality if they reinforce: a) mistreatment of one group or sex over the other; b) differences in power and opportunities.^a

Gender roles are social and behavioural norms that, within a specific culture, are widely considered to be socially appropriate for individuals of a specific sex. These often determine differences in the responsibilities and tasks assigned to women, men, girls and boys within and outside the private sphere of their household.^c

Household is a basic unit for socio-cultural and economic analysis. It includes all persons, kin and non-kin, who live in the same dwelling and share income, expenses and daily subsistence tasks.^a

Intra-household (for example, relations/labour/decision-making/allocation of resources/inequality/dynamics) refers to relations, including power relations, roles and processes, that take place within the household and are affected by existing gender inequalities.^a

Labour costs. For the purpose of labour cost statistics, labour cost is the cost incurred by the employer in the employment of labour.^e

Productive role refer to the activities carried out by men and women in order to produce goods and services either for sale, exchange, or to meet the subsistence needs of the family (Women and men play multiple roles in society such as productive, household (or reproductive) and community roles. Men tend to focus on productive (remunerative) and community roles, typically fulfilling their multiple roles in a sequence. Women, in contrast, often undertake reproductive, productive and community roles simultaneously).^a

Reproductive role encompasses childbearing/rearing responsibilities and domestic tasks. It includes not only biological reproduction, but also the care and maintenance of children and the elderly.^a

Sex-disaggregated data are data separated by sex in order to allow differential impacts on men and women to be measured. Sex-disaggregated data is quantitative statistical information on differences and inequalities between women and men.^a

Unpaid work can be understood to comprise all productive activities outside the official labour market done by individuals for their own households or for others. These activities are productive in the sense that they use scarce resources to satisfy human wants. Housework, care for children and for sick and old people, do-it-yourself jobs and voluntary community work or work in political or societal organizations, subsistence agriculture, help in family businesses, building the family house, maintenance work, transport services etc have one thing in common: they could, at least in theory, be replaced by market goods and paid services. If it is true that unpaid work is work that, in principle, also could be done in the context of an alternative ‘mode of provision’ by a paid worker, then, by implication the monetary value of unpaid work can be imputed.^d

Unpaid care work refers to all unpaid services provided within a household for its members, including care of persons, housework and voluntary community work (UNIFEM, 2000). These activities are considered work, because theoretically one could pay a third person to perform them.

Unpaid = the individual performing this activity is not remunerated

- Care = the activity provides what is necessary for the health, well-being, maintenance, and protection of someone or something
- Work = the activity involves mental or physical effort and is costly in terms of time and resources.^e

Unpaid family worker refers to persons who live with the proprietor of the unit and work regularly for the unit, but do not have a contract of service and do not receive a fixed sum for the work they perform. This is limited to those persons who are not included on the payroll of another unit as their principal occupation. For the Labour Force Survey the following definition is used: Family workers are persons who help another member of the family to run an agricultural holding or other business, provided they are not considered as employees.^a

Women's economic empowerment. Women's capacity to participate in, contribute to and benefit from growth processes in ways that recognize the value of their contributions, respect their dignity and make it possible to negotiate a fairer distribution of the benefits of growth.^a

Sources:

^a FAO Term Portal.

^b ILO Global Statistics and Data Bases.

^c UNStats. Gender Statistics Manual.

^d UN DESA, 1999.

^e OECD 2014.

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Executive summary

Viet Nam is one of the major rice exporters in the world. As a result of the Green Revolution, the country was able to meet the increased demand of rice for domestic consumption and for export because of the widespread adoption of high-yielding, short-duration rice varieties, more intensive use of inputs (fertilizers and insecticides) and increased investment in irrigation. Since then, however, the coastal areas of South Viet Nam, which are also heavily affected by saline intrusion, also introduced aquaculture, a farming practice fuelled by technical innovations and a high local and export price of tiger shrimp. Farmers thus converted to shrimp culture during the summer season after harvesting rice.

This case study analyses and compares the role of women and men in two production systems dominated by rice–rice (double cropping) and rice–shrimp. It assesses the gender division of labour, time use and work burden, and reviews the access to and adoption of labour-saving technologies and services. The research draws attention to the importance of making women’s labour contribution visible as this affects many of the production constraints they face.

The two villages selected for this study are located in the Soc Trang province of southern Viet Nam (see Figure1): Vien An (Tran De district) for rice–rice production and Hoa Tua1 (My Xuyen district) for rice–shrimp. The field work was conducted from 14 to 24 October, 2015 and relied on the support of the FAO country office and the assistance of a staff member from the province’s Department of Agriculture and Rural Development (DARD). Secondary data was provided by DARD.

The following are some of the key findings emerging from this study:

- Of the two production systems, rice–shrimp places a greater demand on households for financial and labour inputs, but it also brings significant social and economic benefits;
- Unpaid family and exchange labour are central to sustaining production in both systems, and play an especially important role in shrimp farming. Traditional labour arrangements should not be dismissed as mere “coping mechanisms”. Rather, their socio-economic relevance to the smallholder context should be given serious consideration and study;
- Households in the rice–shrimp system have more diversified sources of on-farm income compared to those in the rice–rice system and they also earn a significantly higher net income;
- Benefits from rice–shrimp production may foster improvements in economic and social equality. Hoa Tua1 has a much smaller proportion of poor households compared to Vien An, and women in Hoa Tua1 also fare better than their counterparts in a number of ways;
- The large investment required for rice–shrimp production makes it a risky enterprise particularly for vulnerable categories (i.e. poor and female-headed households), but if risks are managed it can result in economic growth for the community;

- Women's contribution to both productive systems is essential: in addition to being solely responsible for all reproductive work (see "Glossary" section for definitions), women make important labour contributions to farming activities traditionally viewed as "male" while also generating significant income from undervalued "female" activities such as vegetable and small livestock production;
- Cultural norms and expectations about gender roles prevail over changes in the division of labour and create constraints for women. These include:
 - An insufficient recognition of their productive labour;
 - An excessive work burden and limited time for engaging in other activities;
 - An insufficient access to technology, services, agricultural training and credit;
 - Unequal participation in the decision making process surrounding farm-related activities.



1. Introduction

Viet Nam's economic growth over the last decades is strongly linked to its agricultural sector: since the 1980s, the intensification of rice production in the Mekong Delta enabled the country not only to achieve food security but also to produce a large surplus for export. Increased investments in irrigation and in high-yielding rice varieties, combined with a more intensive use of fertilizers and technology, allowed farmers to shift from single cropping to double or triple cropping systems. However, limited opportunities to further expand farmland in the Mekong River Delta rice area and strong economic perspectives linked to the high local and export price of tiger shrimp, encouraged the government to support aquaculture as an alternative farming practice. In 2001, the original policy promoting rice production was, therefore, revised to accommodate shrimp cultivation.

These transformations in the productive system have brought about changes in the social organization of farming and led to shifts in the traditional division of labour. There are a number of factors driving these changes, and affecting women in particular, such as seasonal male out-migration², youth moving to the cities to look for non-farm employment opportunities, and the introduction of mechanization to support rice and shrimp production. From a social perspective, these changes can offer opportunities for income generation and empowerment but they can also entail risks if social norms and behaviour do not adapt to change. This is the case, for instance, when traditional ideas about gender roles persist and men continue to be viewed

as “farmers” and decision-makers while women's contribution remains to be viewed as “housework”.

Within the framework of supporting sustainable production in a context of rural transformation, this study focuses on smallholder farms³ in Soc Trang, southern Viet Nam. Its purpose is to highlight and compare women and men's contributions to two integrated, rice-based farming systems and explore how gender norms affect labour and access to productive inputs, technologies and services: the first is a more traditional production system, centred on double rice cropping, while the second adopted an innovative practice by integrating rice and aquaculture (shrimp farming).

The research focuses on the entire livelihood system: the analysis, therefore, covers both household and farm work, in order to make competing time demands more visible; moreover, it does not only cover primary productive activities, rice and shrimp, but also illustrates the relevance of women and men's engagement in complementary income-generating tasks linked to livestock and vegetable farming.

In order to also highlight the value of unpaid labour to the two farming systems, a traditional gender analysis, which explores roles and responsibilities, decision-making about productive inputs and membership to institutions (as a key entry point for local services), was combined with an economic analysis that included labour costs. As a result, the study provides an insight into the influence of

² Male out migration can lead to the “feminization of agriculture”, see Glossary of Terms.

³ 2010 Viet Nam household living standards data indicated that 67.38 percent of the households in Viet Nam have production areas of less than 0.5 hectare (Dao T.A. et al., 2015).

gender dynamics on agricultural productivity. In doing so, it contributes to FAO's work under Strategic Objective 2: "Make agriculture, forestry and fisheries more productive and sustainable". It also supports two FAO regional initiatives: the Asia and Pacific Blue Growth Initiative and the Regional Rice Initiative.

It is worth noting that because this study explores a number of themes that exist at the intersection between labour and gender dynamics, it makes frequent use of concepts and terminologies from both of these fields, some of which may partially overlap with each other. For example, despite the fact that they have slightly different connotations, terms such as household, reproductive, and unpaid care work are all used more or less interchangeably throughout the study to denote a specific array of tasks that women in both villages are uniquely responsible for, and which tend not to be recognised as work. The first two terms bring into focus the importance of gender roles in determining the dynamics of labour force participation and recognition. The term "unpaid care work", on the other hand, places these activities within the larger context of unpaid family and exchange labour in order to highlight the ways in which both productive and reproductive contributions are indispensable to the functioning of the smallholder economy (See "Glossary" section for definitions).

This introduction is followed by a description of the research methodology (section 2), and an overview of the research area (section 3). Section 4 constitutes the main body of the case study: it presents and analyzes the results and compares the two villages and their production systems. The conclusion (section 5) discusses the study's key findings and provides recommendations to address the main constraints that were identified.

2. Methodology

Within the framework of its analysis of the overall rice and rice shrimp production systems, this study focuses on the following gender-related themes:

- The division of labour and time-use by gender for primary (rice–rice, rice–shrimp) and complementary productive activities (livestock and vegetables);
- The economic value of women and men’s labour within the productive system;
- Women and men’s daily work burden, based on an analysis of the share of time dedicated to four categories of activities: productive work, household work, leisure, sleep and personal care;
- Access to resources and agricultural services by gender;
- Access to labour-saving technologies and practices by gender;
- Degree of women’s influence with regard to production-related decisions.

Selection of research sites

Based on the overall aim of the study, a preparatory visit was conducted to discuss the research sites with officials of the Soc Trang province Department of Agriculture and Rural Development (DARD). A local social scientist and staff from DARD visited potential research sites (district and communes) and conducted informal interviews with key stakeholders. In order to be able to compare a rice–rice system with a rice–shrimp system, the team identified sites where the traditional rice–rice production system was in use, as well as sites where a change in farming practices had occurred in recent years. Other considerations included distance to Soc Trang and town proper, and the willingness of the leaders and farmers to cooperate in the interviews. The final selection fell upon Vien An in the Tran De district (rice–rice), and Hoa Tua1 of My Xuyen district (rice–shrimp).

Data collection

Fieldwork was conducted from 14 to 24 October, 2015 by two social scientists with expertise in gender, supported by a staff member of DARD in the Soc Trang province. DARD provided secondary data regarding the province and districts, while village/community information and farm-household level data were collected by using participatory rural appraisal (PRA) tools and through focus group meetings. The researchers mapped different data sets against each other so as to verify the accuracy of the information they collected. Both villages are composed of smallholder farmers (maximum of 1.5 ha of land) but amongst these there are relevant differences in wealth group. Wealth group characteristics were identified based on government criteria (poor households are assessed by income/capita/year while middle and better off households are assessed on income/capita/year as well as rice area).

The total number of interviewees was 85 (58 in Vien An and 27 in Hoa Tua1). Key village informants included leaders of different associations/cooperatives (women, farmers and youth), a representative of the military veterans group, and key female and male farmers. This group provided the overview of the different socio-economic groups living in the community, their key productive activities and assets, and their income sources. They also provided inputs on the main organizations and cooperatives active in the communities and their membership. Separate groups of male and female farmers provided the farm/household information (9–12 informants in each focus group).

It was observed that the production system in both villages did not rely on family members alone but

engaged different types of labourers (“household” men and/or women; hired men/women; female/male exchange labourers⁴).

In order to assess the diversity of workforce, labour data was collected based on a representative plot size by crop (by converting the local unit of measurement – the big cong – into hectares)⁵. By doing this, it became possible to systematically compare different labour inputs to the rice–rice and rice–shrimp systems. For the rice–rice system in Vien An, the plot size identified was 0.65 ha (= 5 big cong) for the wet season and 0.26 ha (2 big cong) for the dry season. For the rice–shrimp system in Hoa Tua1 the plot size identified was 1.3 ha for the wet season 0.2 ha for the dry season⁶. For each season, all crop/aquaculture/livestock operations were identified and information was collected for the number and type of labourers contributing to each operation, as well as the total hours worked per day.

The same principle was used for the collection of livestock data. In order to allow for comparison between the two villages, respondents were asked to identify an average number of livestock owned per household and the feed-back for Vien An was based on three cows and five pigs, while for Hoa Tua1 it was based on two pigs and two cows. The data was weighted accordingly (on a “per hectare” and “per unit of livestock” basis).

Collateral crops, such as upland vegetables, are important for food security in the dry season and are exclusively farmed by family members (mostly women). The data collection was therefore exclusively based on family labour. The plot sizes under consideration were considerably smaller: 0.05 ha for onion leaves, 0.14 ha for squash and 0.1 ha for beans.

Finally, in order to estimate the value of unpaid family labour and the returns to labour, the equivalent of men and women’s daily labour cost was incorporated in the analysis. Hourly labour inputs were converted to workday equivalents per plot per season. The labour days were then multiplied by estimated labour costs (these sometimes differ by gender⁷ and are based on the sum of different wages assigned by task, or lump sums per day).

4 Labour exchange is a form of unpaid labour, where farmers form a work team that performs tasks (planting, weeding or harvesting) on different farms in succession. In Hoa Tua1, the work team is composed of neighbours, close friends or relatives who have good social relationships/trust with one another.

5 See agricultural holding in the glossary of terms.

6 Crop plots vary in size by season depending on environmental conditions (land drainage), irrigation capacity/water availability. For rice and shrimp, the rice plot converted into shrimp is reduced due to the making of ridges and canals.

7 Women’s agricultural labour is, in most cases, paid less than men.

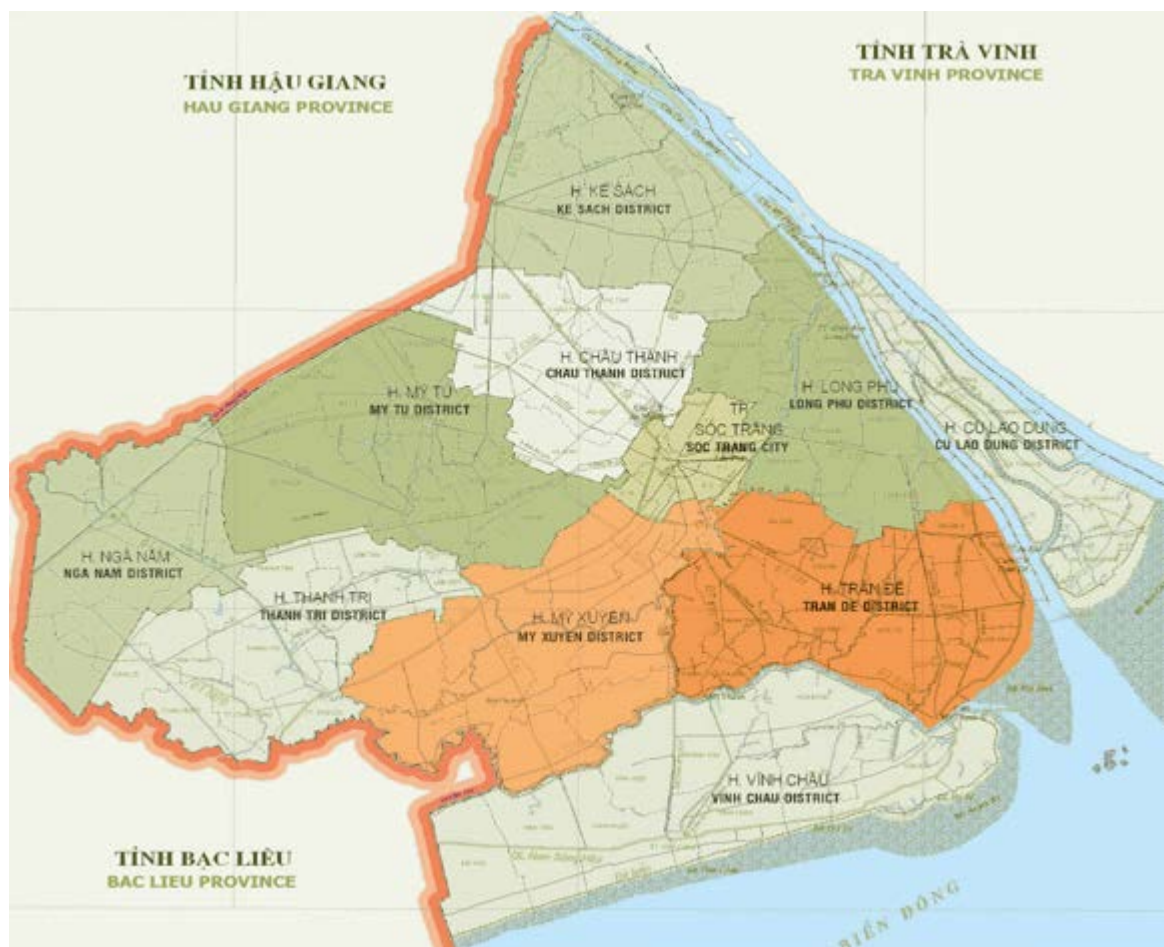
3. The research area

The Mekong Delta is the most important rice production area in Viet Nam (1.7 million ha dedicated to rice farming). In 2014, its rice yield was 25.2 million tonnes (average of 5.94 tonnes per ha), of which 5.85 million tonnes of milled rice were exported (General Statistics Office of Viet Nam, 2014). Rice is grown on 0.7 million ha in the coastal zones of the delta and most of this area is affected adversely by salt stress. As in other coastal areas, salinity is normally high during the dry season and then decreases progressively with the onset of monsoon rains that wash the salt from

the soil. Unless properly managed, high salt stress can cause problems for dry season crops (including lower rice yields) and wet season rice (during crop establishment). Salt water also travels inland due to lower freshwater levels during the dry season in the Mekong River and its tributaries at the mouth of the delta. This is particularly evident in February–May, with the peak during April–May, when salt intrusion can reach close to 60 km inland.

The rice–shrimp system was developed at the beginning of 1980s in response to the economic

Figure 1. Map of Soc Trang province with My Xuyen and Tran De districts



opportunities offered by high shrimp prices and support for production diversification from the government through favourable policies. In 1991, 230 000 ha were covered by shrimp production (yielding 56 000 tonnes). By 2013, the shrimp area had expanded to 652 613 ha with a total production of 475 854 tonnes. Shrimp hatcheries, processing plants and feed factories were developed, and water management skills and land ownership allowed farmers to modify their ponds according to the needs of the production systems (World Aquaculture 2015).

Soc Trang province (Figure 1) is one of the provinces located in the Mekong Delta. The whole area is veined by channels of the Mekong River, including one of its larger tributaries, the Bassac River, which runs across the province's north-eastern border. The Bassac River empties into the South China Sea, which is the south-eastern border of the province. The meeting of these two large bodies of water makes this part of the delta ripe for saline intrusion. As most of the land is located in salinity and drought-prone zones near the river, canals and sea, this environment affects rice yields (in 2012, the rice area of Soc Trang province was 147 127 ha with an average yield of 6.2 tonnes/ha) but offers the opportunity for shrimp farming.

Of the two villages selected for this study, Vien An (rice-rice) continues to mostly farm rice: 89.4 percent of its total land area (2 416 of 2 703 ha) is devoted to agriculture, of which 80.7 percent (1 959 ha) is cultivated with rice. The village has a population of 10 606 of which 54 percent are females (Ministry of Agriculture and Rural Development 2013). The second village, Hoa Tua¹, is larger than Vien An and has a more diversified economy: out of its total area of 3 186 ha, 51.1 percent is devoted to agriculture (1 628 ha). Its rice-shrimp area occupies 2 400 ha (75 percent) of the agricultural area (DARD 2015).

4. Insights from the villages

4.1. Local context

This section gives an overview of the socio-economic context in which farming households in the two villages operate.

Table 1 shows that the proportion of poor households is much higher in Vien An than in Hoa Tua1 (where more than half of the households belong to the middle income group⁸). Both villages have an average of 20 percent of female-headed households, which are concentrated amongst the poorest households. In both villages, poorer families have an average of four household

members, which is consistent with the national average household size of 4.2 members in the Mekong Rice Delta (FAO & SIDA, 2010). In both villages there is an adult gender gap in access to education. Except for the better off households in Hoa Tua1, women consistently have fewer years of schooling than men in the same income category and they often have not completed elementary school. Data was not collected for children's school attendance, but it was observed that the education gap seems to have diminished as a result of a government policy for better education of young children and youth from the rural areas: all children now attend school.

Table 1. Socio-economic characteristics of farming households (hhlds)

Village	Vien An (rice-rice)			Hoa Tua1 (rice-shrimp)		
	Poor	Middle income	Better off	Poor	Middle income	Better off
Average size of households	4	4	6	4	5	6
Number of households (% of households)	1 020 (41 %)	1 027 (41 %)	440 (18 %)	300 (13 %)	1 241 (52 %)	823 (35 %)
% Male headed hhlds	75	85	90	70	85	80
% Female headed hhlds	25	15	10	30	15	20
Adult men (yrs in school)	5	8	9	5	9	12
Adult women (yrs in school)	3	6	7	4	6	12
Income/capita/year (US\$)	284	284 to 1 091	≥ 1 091	284	284 to 1 636	≥ 1 636
Size of land holding(ha)	0.25	0.75	1.50	0.10	0.80	1.50
Distance from house to farm (m)	0-500	1-500	0-200	0	0	0-200

Source: Small group discussions with key community leaders from each village.

8 This includes the *de jure* (widows, divorced) and the *de facto* heads (married women whose husbands are away for long periods of time due to migration or who are engaged in non-farm employment).

Economic status and income

Poverty is strongly related to farm size. Poor income households in the two villages own small units of land (0.10 to 0.25 ha) which means that they can only rely on limited subsistence production which needs to be integrated with agricultural wage work (their yearly income per capita is US\$284). In both villages, the middle income group owns an average of 0.8 ha while the better off households own 1.5 ha each.

Income data was collected for an economic analysis of the production system (data in Table 1). Information was obtained about the sources of income from the sale of rice, vegetables, shrimp and livestock (cattle, pigs, poultry), as well as agricultural labour and non-farm income, including remittances (see Figures 2a and 2b). Table 2 shows that the income per capita per year of the poor households is similar for both villages. However, the middle and better off households in Hoa Tua1 earn more than those in Vien An village.

In terms of an analysis of different income sources, in Vien An, rice sales comprise the highest share of total income among the middle and better off groups (60 percent). In contrast, poor households consume almost all of the rice they grow and derive

most of their income from working as agricultural labourers on other farms (45 percent), and other non-farm income, including remittances and seasonal work in the city (30 percent).

The share of milk sales to total income is substantial for the middle income groups, and provides cash flow for the daily expenditures required in between rice planting and harvesting. In contrast, the poor and better off households have fewer milk-producing cows and earn more income from other types of animals, such as pigs and poultry. Migrant male family members leave the village after harvesting rice and come back in January, so they send remittances back to their families. This increases women’s work burden as they have to take over the agricultural work in addition to household chores and childcare responsibilities.

In Hoa Tua1, households have more diversified sources of livelihoods. In contrast to Vien An, poor households only rely on agricultural labour and other non-farm activities for half of their income. For the poor and middle income groups, rice, vegetables, shrimp and livestock sales are of close to equal importance. Shrimp production is the major income source of better off households. In this village, members of households from the

Figure 2a. Vien An: Income distribution by wealth group



Figure 2b. Hoa Tua1: Income distribution by wealth group



middle and better off income group are not engaged in off-farm work. A few better off farmers who own machinery earn non-farm income by providing rental services to other farmers (Figure 2b).

4.2 The production systems

Both Vien An and Hoa Tua1 have adopted a mixed farming system based primarily on rice or rice–shrimp integrated with vegetables and livestock breeding. The degree of market orientation of farming households in both villages is high, despite small farm sizes. This study focuses on the production side, but it would also be relevant to carry out an in-depth study on market access and income generation (Appendix Tables 1 and 2 provide additional information by village on percent of households farming rice and shrimp, growing vegetables and breeding livestock by wealth group. The tables include information on yields as well as amounts kept for consumption and production).

Rice–rice

Rice–rice (i.e. two crops of rice per year) is the major farming practice adopted in Vien An. Before 1984, farmers grew only one rice crop per year with traditional rice varieties. In 1983, rice production collectives were established and by 1988, rice–rice was spreading gradually. This shift can be attributed to government directives to improve the irrigation canals. Farmers contributed with their labour while the government paid for the machinery to dig the canals. By 2000, all rice farming households had adopted the rice–rice system, which involves growing rice during both the wet season (July to October) and dry season (October to January). During the wet season, farmers prepare the land in late June, sow seeds in early July, weed the fields in early August, harvest and thresh in late October. For the dry season, they start preparing the land in October and harvest in January. Farmers use short-duration varieties developed and introduced by the Department of Agriculture in Soc Trang province and the Cuu Long Delta Rice Research Institute (CLRRI). Average rice yields are higher (7 tonnes/ha) during the dry season than in the wet season (6 tonnes/ha).

Rice–shrimp

Rice–shrimp is the dominant farming practice in Hoa Tua1. During the wet season, farmers grow rice in September and harvest in December. In order to farm shrimp, the traditional rice fields are redesigned with a trench and dike around the periphery of the field. Even though the available area for rice production is reduced, trenches have the benefit of providing a refuge for shrimp away from the more extreme environmental conditions of flooded rice fields (Brennan and Preston 2002). A flap gate is used to manage tidal influx of water. At the start of the shrimp season, when the water in the local canal system has become saline, the trenches are filled and the entire field is flooded with saline water. At the beginning of the wet season, rainfalls as well as fresh water from the river are used to flush the fields of residual salinity, before planting the new rice crop.

After the December rice harvest, farmers convert the field for shrimp farming by removing the rice stubbles and dumping the soft mud on the bunds. They drain and dry the fields twice, to control the bacteria left on the soil. They also apply lime to reduce soil acidity. Then, in April, farmers release the shrimp larvae and feed them three to four times per day. They measure the soil pH, apply lime at ten to fifteen day intervals, and operate the ventilator at night starting at 8 p.m. and during the day at two hour intervals. The duration of shrimp production depends on the breed. It takes four to five months to raise “Tom Su” (common tiger prawn). Harvesting and selling takes place in July when shrimp produced on the farm are sold to traders.

Vegetables

Aside from rice and shrimp production, most farming households grow vegetables on the uplands or upper bunds for food consumption and/or income generation. This activity is especially concentrated among middle-income and poor households in both villages (50 to 60 percent of middle income households and 30 percent of poor households are engaged in vegetable production). In Vien An, the main production is onion leaves, while in Hoa Tua1 it is green beans and squash. All the green beans produced are kept for home consumption and

provide an important source of nutrition for the family, while onion leaves and squash are mainly grown for sale. In Vien An, the upper bunds are also used to grow fodder for livestock.



Example of trenches created in-between farmland

Livestock

Livestock farming is prominent in both villages, with some differences between villages and income groups. Overall, it is more common among households in Hoa Tua1 than in Vien An, especially for poultry and duck production. In Vien An, however, individual households own more cattle, as these are raised for milk production⁹, while in Hoa Tua1 they are raised for fattening¹⁰. The percentage of households involved in livestock production tends to be higher in the middle-income group than in the poor and better off groups, with the exception of poultry production in Hoa Tua1, which involves 100 percent of households across all income groups. In both villages, pigs are raised mainly for fattening, while chickens and ducks are partially kept for consumption and partially sold.



Farmer tending to cattle

9 One household can sell 12 kg milk/day to the Milking Cow Cooperatives.

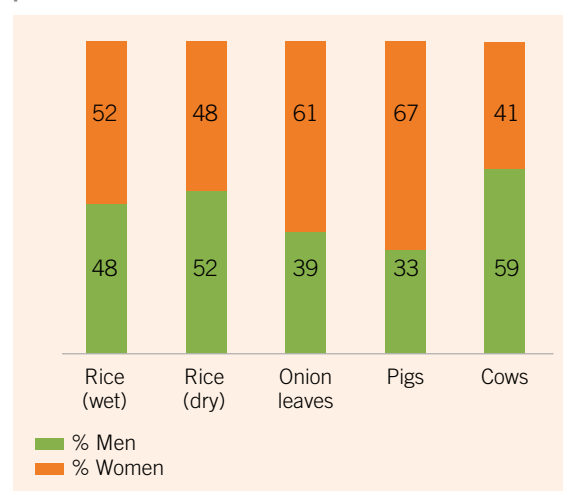
4.3 Gender division of labour and economic returns to labour

The data presented below illustrate the sex-disaggregated distribution of labour across the entire spectrum of productive activities in the two villages (Figures 3a and 3b). This summarized information is followed by two sections focusing specifically on the main productive activities (rice–rice and rice–shrimp) and on livestock as a complementary activity which has relevant implications from the labour and economic point of view. Labour inputs to vegetable production are not elaborated as a separate section but all the summary labour data can be found in Appendix Table 3.

The importance of unpaid family labour (through the attribution and analysis of workforce members' estimated costs of labour by day/hectare) is also highlighted through the presentation of an economic analysis (cost and benefit) and comparison of the two production systems.

As shown in Figure 3a, women's labour inputs in agriculture in Vien An are substantial. In fact, women's contribution to rice production is slightly higher (52 percent) than men's during the wet season, and their contribution to onion leaves production

Figure 3a. Vien An: Division of labour by productive activities

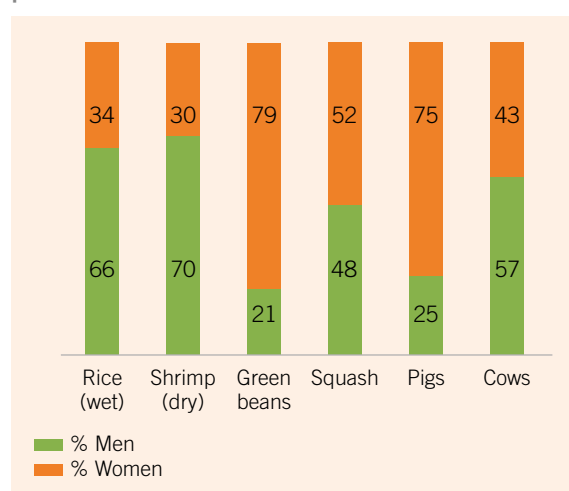


10 One cow costs between US\$909 to 1 270 and it can produce up to two calves in two years (this is locally considered as a good investment). A farmer usually sells one calf at US\$909 and keeps the second calf to breed.

and pig farming is significantly higher (61 percent and 67 percent). They also have a key role in cattle farming (41 percent), even though this activity is culturally perceived as being male-dominated.

In Hoa Tua1 village (Figure 3b), disparities in the division of labour are more pronounced. Men's labour inputs are dominant in both rice and shrimp production (66 percent and 70 percent respectively). However, women's contribution is still relevant and despite having a stronger focus on subsistence crops, such as squash (52 percent) and beans (79 percent), they were also reported as contributing to household income by engaging in market sales of rice and shrimp. Similarly to Vien An, women also make significant contributions to cattle (43 percent) and pig farming (75 percent).

Figure 3b. Hoa Tua1: Division of labour by productive activities



4.3.1 Division of labour in primary productive activities (rice and shrimp)

The findings introduced in this section refer to labour and time use data collected by season, as variations linked to temperature and rainfall affect soil conditions and farming practices. The detailed sex-disaggregated data presented below highlight the fact that despite the importance of traditionally assigned roles among men and women (men assigned to “heavy tasks” which they carry out with the help of mechanization and women mostly assigned to time consuming and manual tasks), the gender division of labour is changing and adapting to external factors linked to male migration, technology

introduction or, more broadly, household economic need. For instance, the data showed that women now contribute to tasks which were once exclusively attributed to men, such as spraying pesticides on rice, or weighing and mixing shrimp feed, while men have begun to share women's work on hand weeding and gap filling as a result of the introduction of the gap-filling tool. Despite these changes, cultural perceptions remain aligned with traditional gender roles, in which men are seen as performing “heavy” tasks (see sub-sections below for examples) and managing farms, while women are understood as housewives who perform “light” tasks. Because of some of these perceptions, women's unpaid labour inputs are often officially invisible and they are under-represented in agricultural training and agricultural extension programmes. As a result of this, women's labour inputs are valued less than men's and their wages are lower: women receive VND100 000/day (US\$4.55) for gap-filling¹¹, weeding and harvesting while men are paid VND120 000/day (US\$5.45/day) for field work such as spraying chemicals, rice hauling, etc. Other work is not paid by activity but rather through lump sum contracts.

Vien An village: Rice production (wet season)

Of the total labour inputs (number of person days per hectare), the percentage contribution of female labour is slightly higher (52 percent) than that of men (48 percent). An analysis of the person days/hours spent per hectare shows that the sequence in rice operations during the wet and dry season is similar, but several operations (land preparation and weeding) require much more time overall (98 days compared to 42). In terms of division of labour, men exclusively prepare the land, broadcast the seeds, irrigate with a water pump, drain the fields, and harvest/thresh the rice with the use of the combine. Women fully share some of the “heavy” tasks, such as cleaning the fields, preparing the bunds, making internal field ditches, and take their share at spraying pesticides, broadcasting fertilizer and regularly visiting the fields to check for pests and diseases. They have full responsibility for the more manually demanding and tiring jobs

¹¹ “Gap filling” refers to filling the areas where seeds have not germinated within 7 to 10 days after transplanting.

such as hand weeding, which is repetitive, time-consuming and difficult to describe as “light”. The introduction of farming technologies for a given task tends to lead to men taking over that task: traditionally, gap filling was also exclusively a women’s job, but according to the women, when they invented the gap-filling tool, men began to be involved in this activity. Manual harvesting is still relegated to women but the introduction of the combine (harvester-thresher) has exclusively shifted the mechanised activity to men.

Vien An village: Rice production (dry season)

Of the total labour inputs in rice production per hectare, women provide 48 percent, which is almost equal to their male counterparts (52 percent). Land preparation, making internal ditches, bund preparation, levelling the field, spraying pesticides, and irrigating the fields remain exclusively men’s jobs. However, there have been changes in the gender division of labour in some of

the rice operations. Cleaning the field, broadcasting seeds and broadcasting fertilizer are activities that used to be exclusively done by men and are now equally divided among men and women. Although harvesting in this village is commonly done by a combine, rice stalks have a higher propensity to lodge during the dry season, and therefore require manual work by sickle, a task relegated mainly to women (as is hand weeding). Gap filling, which used to be exclusively done by women, is now equally done by both men and women as a result of the introduction of the gap-filling tool.

Hoa Tua1 village: Rice production (wet season)

Under the rice–shrimp farming system, women’s overall contribution to rice production is smaller compared to men’s (34 percent vs 66 percent). Farmers in Hoa Tua1 grow rice after harvesting shrimp during the dry season. As shown in Figure 4c the entire preparatory work, from washing out salinity to pulling seedlings is exclusively done

Figure 4a. Vien An: Division of labour – wet season rice

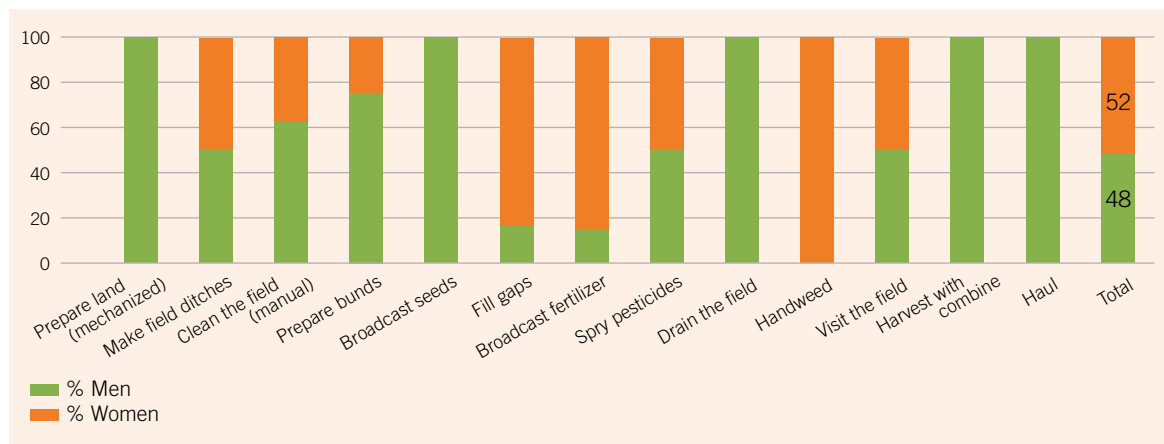


Figure 4b. Vien An: Division of labour – dry season rice

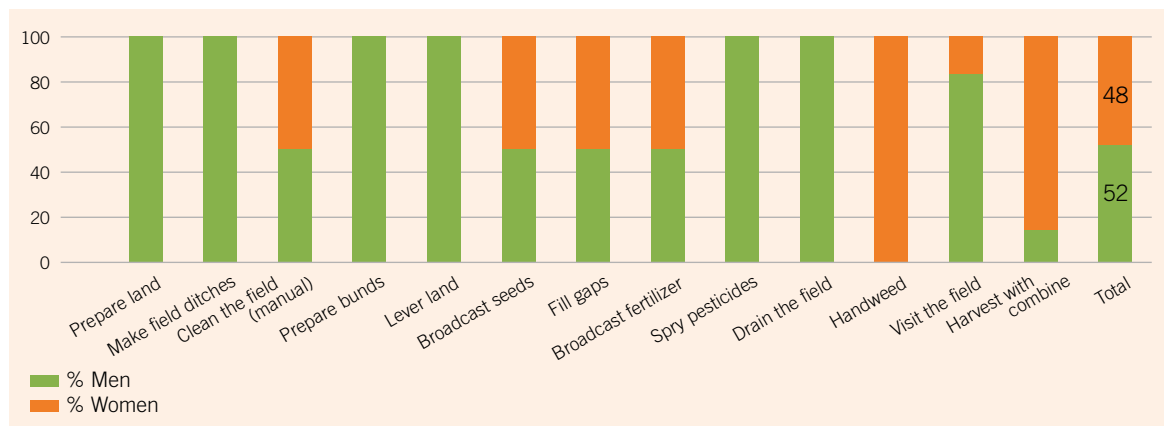
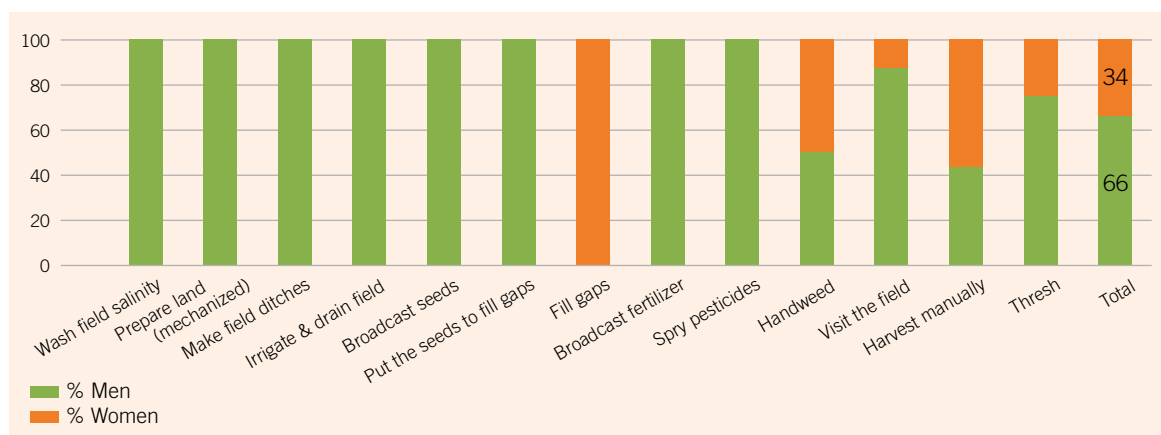


Figure 4c. Hoa Tua1: Division of labour – wet season rice



by men and requires a lot of time and effort. Men also devote more time to field visits. Interestingly, hand weeding, an activity that used to be assigned to women, is shared, while gap filling remains exclusively a task for women. Women also manually harvest with a sickle, as the softness of the soils do not allow for mechanised harvesting. Mechanical threshing is predominantly done by men although women also help. Thanks to the mechanical threshing, women save time for winnowing.

Hoa Tua1 village: Shrimp production (dry season)

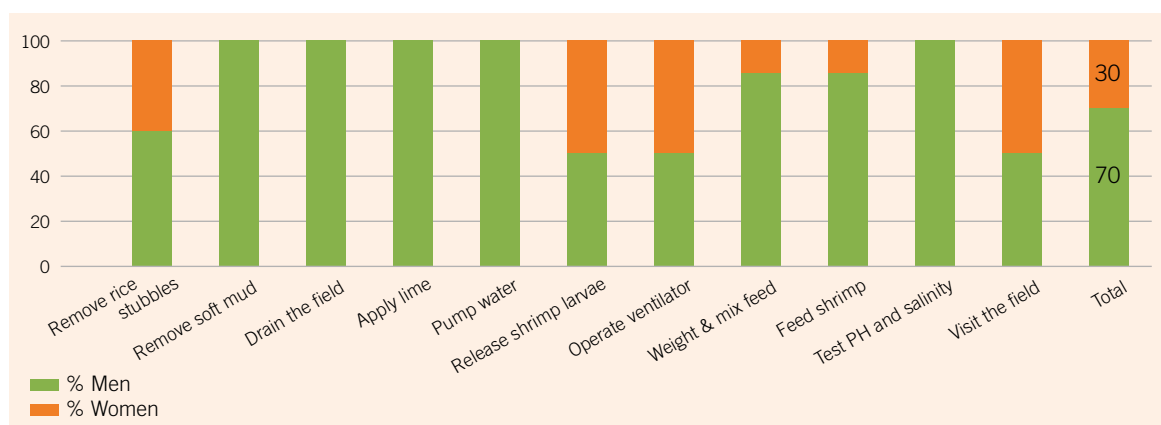
Shrimp farming is both labour and knowledge-intensive. After harvesting rice, farmers have to carefully prepare the pond for shrimp production in order to prevent disease infestation. Women contribute by removing the stubbles that remain in the soil after harvesting rice. Once this operation is complete, men remove the mud, drain the field, apply lime to reduce soil acidity,

and irrigate the fields. Men and women share the work strictly linked to shrimp farming: there is an equal distribution of labour for releasing the shrimp larvae, operating the ventilator to provide oxygen to the shrimp, and visiting the fields. More men than women are involved in weighing and mixing the feeds, feeding the shrimp, and classifying them for sale. Of the total person days/ha spent on shrimp production during the dry season, women and men contribute 30 percent and 70 percent, respectively (Figure 4d). This season also coincides with the cultivation of vegetables (squash and green beans) grown on the bunds or upland fields, which sees heavy labour inputs by women (see Appendix Table 4).

Workforce distribution

Labour inputs are often the highest share of total production costs for smallholders, and family labour allows households to save on these costs. In

Figure 4d. Hoa Tua1: Division of labour – dry season shrimp



both communities households were found to rely on family labour, though to different extents (in Figure 5a and b below family labour is disaggregated by “HH men” and the “HH women”¹²). In this section we present the diverse profile of the rice and shrimp workforce in order to illustrate the yearly contribution of women and men (sum of two seasons) and discuss the importance and implications of unpaid labour.

In both villages, the workforce includes family labour (male and female) plus hired labour. In addition, farmers in Hoa Tual cope with labour and cash shortages during the peak rice season by using exchange labour (male and female), a practice based on reciprocity, trust and good will among a group of community members (mostly friends and relatives).

Figure 5a highlights the vital importance of both male and female unpaid family members’ labour contributions to the rice–rice production system

(67 percent total). Hired labour, which is also almost evenly divided among men and women, makes up the remaining 33 percent of the workforce. Family labour is even more important in the rice–shrimp production system, as family members work both as unpaid and exchange labourers (Figure 5b), resulting in very low levels of hired labour (7 percent of labour is made up of hired males and hired females are close to zero). In contrast to the rice–rice system, the demand for male family labour is higher than for female family labour.

Total labour inputs in the rice–shrimp system are significantly higher (239 person days/ha) than in the rice–rice system (140 person days/ha). Women’s labour inputs compared with men (Figures 6a and 6b) are higher in the rice–rice system (51 percent) than in the rice–shrimp system (31 percent).

In summary, in both production systems, family members contribute significantly in saving on labour costs and securing returns on investments.

Figure 5a. Vien An: Rice-rice workforce distribution

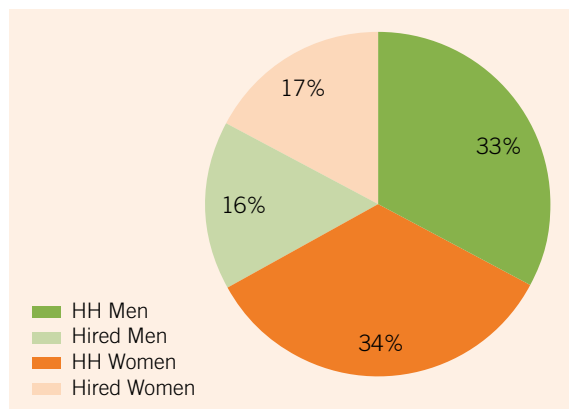


Figure 5b. Hoa Tual: Rice–shrimps workforce distribution

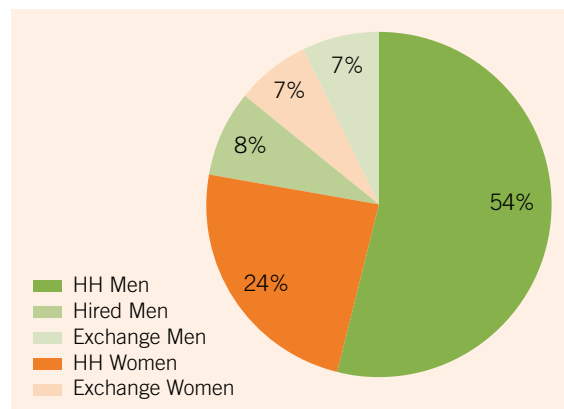


Figure 6a. Rice–rice: Gender division of labour

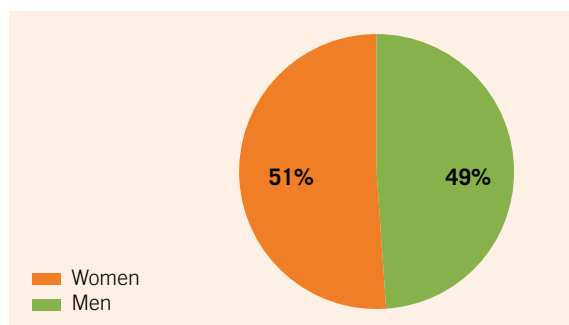
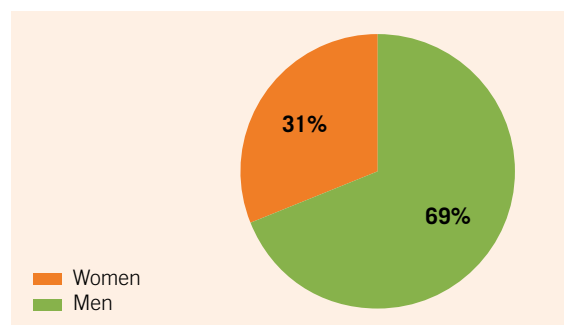


Figure 6b. Rice–shrimp: Gender division of labour



12 The research did not separately assess female-headed households nor was the labour of other household members included (eg. sons and daughters).

Production returns from rice–rice and rice–shrimp

This section presents an economic analysis and discusses the benefit–cost ratio (BCR) and overall returns to rice–rice and rice–shrimp production. As part of this analysis, a financial value was assigned to both paid and unpaid labour in order to highlight the importance of these contributions to the productivity of each system. In order to determine the value of labour, hourly labour inputs were converted to workday equivalents per plot per season. The labour days were then multiplied by the average wages or lump sums paid to women and

men (these differ by gender) for the agricultural task in question. By including both actual and implied costs to the system, the analysis helps to highlight the importance of labour contributions that would otherwise be invisible to the system.

Table 2 below illustrates that rice–shrimp yearly brings in a gross return 2.4 times higher than rice–rice (US\$2 838/ha versus US\$1 186/ha). However, because the cost of material inputs for rice–shrimp production is over four times higher than it is for rice–rice production, the BCR for rice–shrimp is

Table 2. Costs and benefits in rice–rice and rice–shrimp farming (US\$)

Farming system	Rice–rice			Rice–shrimp		
	Rice (wet)	Rice (dry)	Rice–rice converted into ha*	Rice (wet)	Shrimp (dry)	Rice–shrimp converted into ha*
Plot size	0.65	0.26	0.91	1.3	0.2	1.5
Yield (kg/plot)	3 500	1 800		9 750	500	
Price (VND/kg converted in US\$/kg)	0.19	0.23		0.25	3.64	
Gross returns (US\$)	665	414	1 186	2 438	1 820	2 838
<i>HH men labour costs (including exchange labour)</i>	108	25	146	307	165	314
<i>HH women labour costs</i>	105	13	130	177	80	171
Hired men labour cost	116	70	204	122	100	148
Hired women labour cost	45	11	61	7	0	5
Total labour costs (US\$) (TLC)** <i>(Including cost of unpaid labour)</i>	161 (374)	81 (119)	265 (541)	129 (613)	100 (345)	153 (638)
Seeds	59	24	91	82	205	191
Fertilizer	37	50	96	199	36	157
Pesticides	23	55	85	223	0	149
Shrimp medicines	-	-	-	-	227	152
Shrimp feed	-	-	-	-	788	525
Fuel	-	-	-	-	8	5
Total material costs (TMC)	119	128	272	504	1 264	1 179
Total variable costs (TC) = TLC+TMC <i>(Including cost of unpaid labour)</i>	280 (493)	209 (247)	537 (813)	633 (1 117)	1 364 (1 609)	1 332 (1 817)
Net (GR Returns–TC) <i>(Including cost of unpaid labour)</i>	385 (172)	205 (167)	649 (373)	1 805 (1 321)	456 (211)	1 506 (1 021)
Benefit/Costs ratio (BCR) (=GR/TC) <i>(Including costs of unpaid labour)</i>			2.20 (1.45)			2.13 (1.56)

Note: Figures are rounded up.

*Farming system figures are all weighted against sum of the seasonal plot sizes (e.g.: /0.91 ha for rice–rice and /1.5ha for rice shrimp)

**Labour costs = Labour days/plot/season x estimated wage equivalent (based on average wage for each gender for different operations) – see Appendix Table 5 for an example.

actually slightly lower than it is for rice–rice (the rice–shrimp system brings in US\$2.13 for every dollar spent and rice–rice US\$2.20). This brings to light another important difference between the two systems: the high cost of material inputs required for shrimp production makes engaging in rice–shrimp a financially risky enterprise for smallholders.

The analysis and sex disaggregation of labour costs shows that both production systems would be unsustainable without family labour. If households had to pay wages for all currently unpaid labour inputs, the BCR for both production systems would be significantly lower (1.45 for rice–rice and 1.56 for rice–shrimp). Net returns for rice–rice, which are already comparatively low, would be almost halved. Rice–shrimp production especially benefits from unpaid labour contributions: households save on 76 percent of labour costs by relying on family and exchange labour (compare to rice–rice, which saves 51 percent by relying on family labour). Unpaid female family labour inputs account for 24 and 27 percent of the value of all labour costs in rice–rice and rice–shrimp production. If women received wages equal to those of men, this value would be even higher.

4.3.2. Division of labour in complementary productive activities (livestock)

Livestock constitutes a major asset for many rural households and is a primary livelihood resource for many low-income rural communities (FAO, 2012). Although livestock production is not the main productive activity in either of the two villages in this study, it still contributes significantly to overall household income. Daily milk offtake from dairy cows provides a regular flow of cash income often used to pay for purchases of food and household items. Keeping livestock also represents an important wealth storage strategy: farming households raise livestock in order to create a buffer against risks such as floods or to have access to an emergency source of cash for unexpected expenses such as medical treatment, marriages, funerals and school fees. Examining the division of labour for cattle and pig farming is therefore interesting not only from the perspective of gaining a fuller understanding of women's time use and labour contribution, but

also as a way of making women's contribution to household income and financial stability more visible.

Despite ample available research on this subject, women's role in livestock production tends to be undervalued by policy makers. It is often assumed that large animals are men's business, while pig and poultry management are exclusively women's domain. Following the same approach as for the primary productive activities discussed above, sex-disaggregated labour information was collected on the time (hours/day) spent on cow and pig farming by women and men family members. The data was collected on the basis of an average number of livestock per household. Overall, cow farming requires a substantially larger amount of time compared to pig farming (the difference lies in an average of 8 to 14 hours/day for cows and 1 hour/day for pigs). Pig farming, however, provides good returns on such a relatively small labour commitment.

Cow farming

Contrary to the traditional view that cattle management is men's business, findings reveal that women in both villages contribute over 40 percent of labour for this activity (Figures 7a and 7b). In Vien An an average household owns three milking cows and men and women share equal time in almost all cattle production activities except for collecting grass for animal fodder, which is mostly carried out by men and is especially time-consuming during the dry season (6 hours/day). In Hoa Tua¹, farming households on average raise one to two cows for fattening. Women and men provide equal labour inputs in almost all management activities except for bathing the cows and cleaning the shed, which are carried out exclusively by men.

Pig farming

Pig farming is more relevant in Vien An than in Hoa Tua¹ (the average amount of pigs reared by women is five compared to two). In terms of distribution of labour, women from both villages carry out most of the pig farming activities, while men contribute to feeding the piglets and taking care of sick animals (Figures 7c and 7d). The only significant difference between the two villages is that men in Vien An mix the feed instead of women. Pig sheds

Figure 7a. Vien An: Division of labour – cow farming

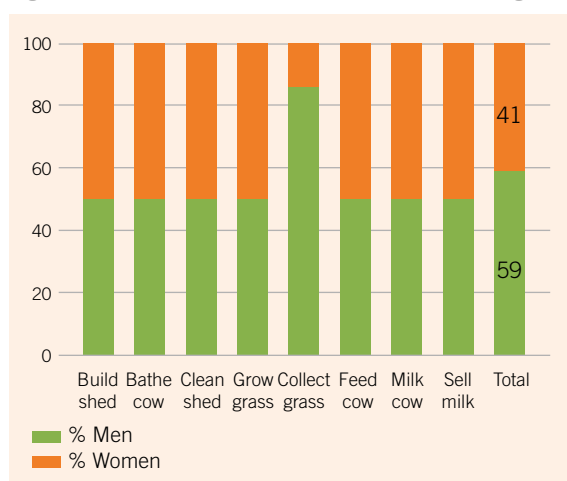
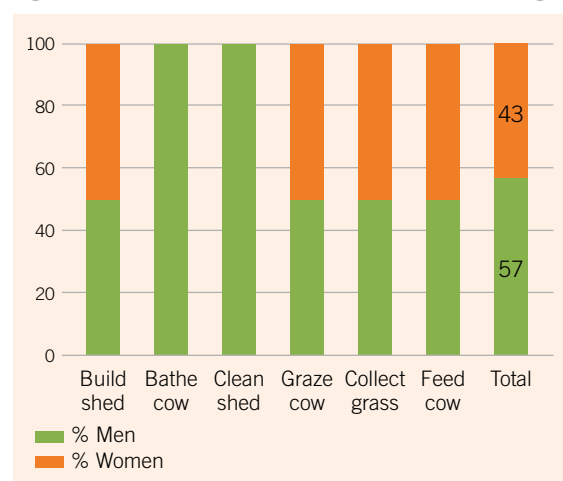


Figure 7b. Hoa Tua1: Division of labour – cow farming



Note: As “building the shed” is a one-off activity, it is not included in the total share (based on hours/day).

Figure 7c. Vien An: Division of labour – pig farming

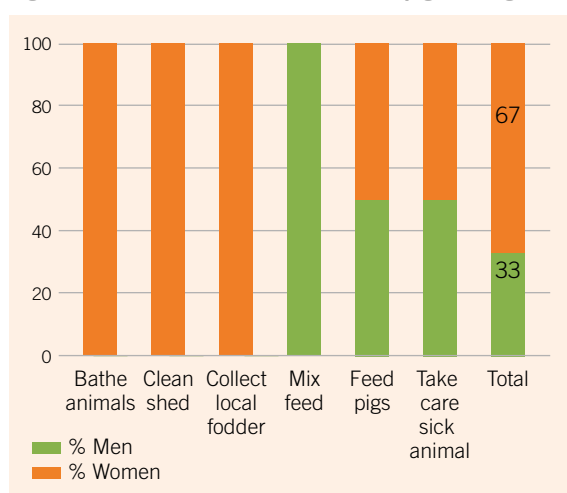
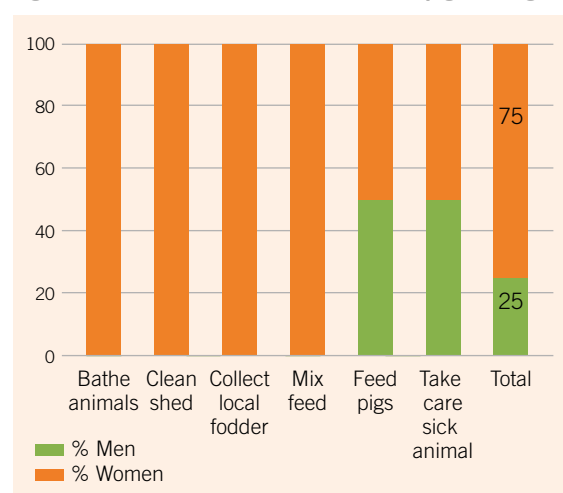


Figure 7d. Hoa Tua1: Division of labour – pig farming



are often attached to the houses, which makes it easier for women to combine pig management tasks with other household chores and childcare responsibilities. Women also reduce the costs of commercial feeds by collecting vegetables (see “collect local fodder”) cooking them and mixing them with commercial feeds.

Returns from pig farming in Vien An

This section includes an assessment of the profits made in Vien An from pig production as this was reported as an important collateral income-generation activity and a source of savings for women, despite the fact that piglets are susceptible to diseases and mortality if not well managed. Women buy and raise piglets to sell after four months, when they reach 100 kg. Table 4 shows that the return on investment (ROI) to the family

for one pig sold at VND40 000 is 3.1 (over three times the cost of investment). As with rice and shrimp, the analysis aimed at unveiling the hidden costs of unpaid labour¹³. Results show that even when the family labour costs are fully included in the analysis, the returns to investment would still be 1.45 (e.g. close to a 50 percent increase vis-à-vis the initial investment).

As pig farming relies to a great extent on women’s work (67 percent), pig breeding could be a strong trigger for women’s economic empowerment, assuming that returns to labour accrue directly to the individuals who are investing their time.

¹³ A value was attributed to women and men’s labour contribution based on the prevailing market wage. In this case this was the same amount for men and women: VND12 500/h.

Table 3. Cost and benefits of pig farming (5 pigs), Vien An

Costs	VND*
Shed cost for 1 year (for 6 m ² , which can last for 10 years)	150 000
Cost (VND900 000 per head)	4 500 000
Feed (4.5 bags x 40 kg x 5 pigs x VND1 500/kg)	1 350 000
Medicine (for 4 months)	250 000
Estimated value of labour of family members (men and women)**	(1 815 000)
Electricity (VND25 000 for 4 months)	100 000
Total costs (TC) <i>including cost of unpaid labour</i>	6 350 000 (US\$288.64) <i>8 165 000 (US\$371.14)</i>
Gross returns (GR) VND40 000 x 5 pigs (@100 kg each)	20 000 000 (US\$909.09)
Net returns (GR–TC) <i>including cost of unpaid labour</i>	13 650 000 (US\$620.45) <i>11 835 000 (US\$537.95)</i>
Return on Investment (ROI) = Net benefits/total costs <i>including cost of unpaid labour</i>	3.1 <i>1.45</i>

* Exchange rate: US\$1 = VND22 000

** Male labour – 0.4 hours/day x VND12 500/hr (VND100 000/8 hours) = VND5 000 x 120 days = 600 000
+ female labour – 0.8 hours/day x VND12 500/hr (VND100 000/8 hours) = VND1 215 000 x 120 days (4 months)

Information was not collected on control over income (section 4.5 analyses data on decision-making authority over productive inputs only) but it seems likely that women's control is relatively weak, as they do not appear to fully use this income generation opportunity despite revealing how they planned for the pigs to reach a certain weight to be able to sell them better.

4.4 Work burden (productive and reproductive tasks)

In addition to measuring the division of labour within the productive sphere, the study also looked at men and women's overall time allocation within an average span of 24 hours in order to assess the work burden generated by multiple and sometimes overlapping tasks. Representatives from the two villages participated in the exercise and the two groups were further divided by gender and asked to discuss their daily time-use in order to find consensus on how to present a typical day from the time they woke until they retired in the evening.

Interviewees identified daily activities that were later grouped, for ease of reference, under four major time clusters: productive (agricultural work), reproductive (household work, childcare), leisure, and personal care and sleep time. This last category includes personal hygiene, eating, resting and exercising. As farmers from Vien An did not highlight considerable differences between seasons, the data presented for that village is for the wet season only.

The exercise revealed relevant differences between women and men in the daily share of time spent on productive and non-productive tasks. It also highlights how the time cost associated with a heavy reproductive work burden¹⁴ places constraints on women's productive capacities as well as on their time for rest and leisure. Work burden is a major obstacle to balanced and efficient time management for women, and the fact that a large part of the tasks they carry out are not recognized as work prevents women from getting the support they need from partners and the community at large.

¹⁴ The definition of productive and reproductive roles can be found in the Glossary of terms.



Time allocation exercise in Hoa Tua1

The exercise also revealed significant similarities and differences between the two villages and production systems. The overall work burden for both men and women is higher in Hoa Tua1 than in Vien An, and this is reflected in less time for sleep and personal care. Men in both villages spend between 4.5 and 5.5 hours on leisure during both wet and dry seasons, but they do not perform “women’s tasks” such as household chores and childcare, whereas women in both villages are exclusively responsible for reproductive work and they also contribute significantly to productive work, including by performing “men’s tasks.”

Even though the overall work burden is higher in Hoa Tua1, the proportion of time allocated to work, rest and leisure is more balanced between men and women in Hoa Tua1 than it is between men and women in Vien An. Women in Vien An put in 5.25 more hours of work per day than men while having only 1 hour of leisure and less time for sleep and personal care than men. This is because in addition to putting in an average of one more hour of productive work per day than men, they also carry out all reproductive work. In Hoa Tua1, on the other hand, women’s *combined* productive and reproductive work during the wet season is close to being even with men’s productive work. As a result, they have more time for leisure than women in Vien An (3 hours), and more time for sleep and personal care than men in their own village.

Vien An village (wet season)

During the peak period women reported spending more time engaged in productive work (7.5 hours/day) than men (6.75 hours/day). This information coincides with the information shared in Figure 3a (percentage share of labour/ha) and acts as a corrective to the cultural perception that men are the only family members who do productive work and earn income. In addition to their productive work, women also spend 2.5 hours per day on household chores and 1.75 hours per day on childcare (including helping with homework), making their overall daily work burden just over 5 hours greater than men’s. Only one hour remains available for leisure. In contrast, men do not spend any time in reproductive tasks and they dedicate 5 hours to leisure. They also dedicate more time to personal care and sleep (Figure 8a). Figure 8b clusters women’s productive and reproductive work to enable the reader to visualise the overall workload.

Figure 8a. Vien An: Women and men’s time allocation – wet season rice

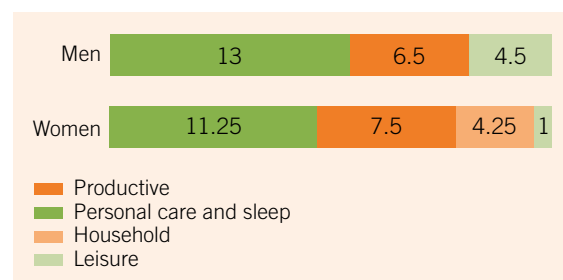
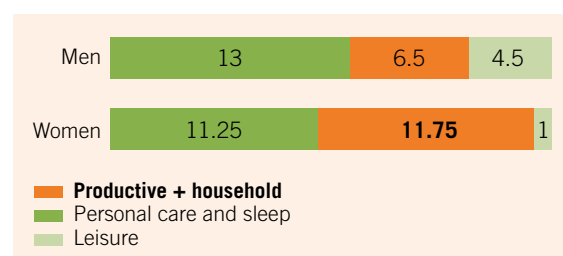


Figure 8b. Vien An: Women’s work burden – wet season rice



Women’s days are extremely busy, performing intermittent/simultaneous tasks to fulfil household, childcare and productive activities while men tend to engage in continuous or single tasks for longer stretches of time. Before going to the field women take their children to school. Later in the day, they rush back from the fields to fetch them, cook and

help with homework. This work is interrupted by the need to feed the animals and milk the cows. The remaining time they have is often spent in the field performing time-consuming tasks such as gap-filling or hand weeding.

Hoa Tua1 village: Rice (wet season)

Men and women’s overall time use in Hoa Tua1 is less imbalanced. Men spend more time (11 hrs per day) than women (6 hours) in productive work during the peak wet season. However, this means that women are able to balance their time more equally between productive and household tasks, for an overall work burden which is almost the same as men’s. Men have two more hours for leisure than women, but they also spend less time on personal care and sleep (Figures 9a and 9b).

Figure 9a. Hoa Tua1: Women and men’s time allocation – wet season rice

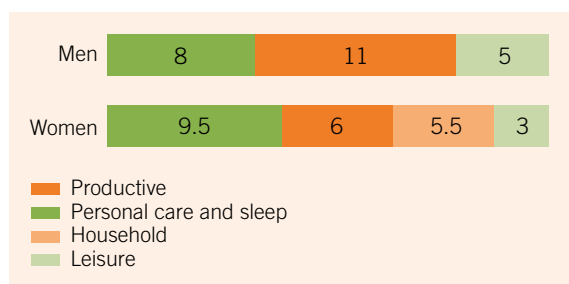
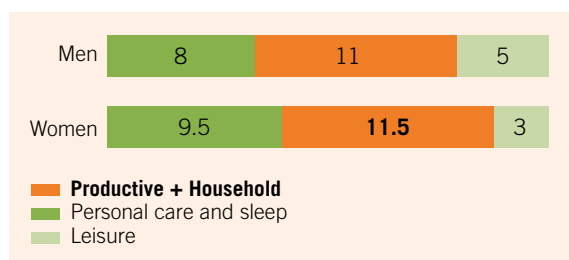


Figure 9b. Hoa Tua1: Women’s work burden – wet season rice



Hoa Tua1. Shrimp (dry season)

During the dry season, women’s work burden increases, while men’s stays about the same. Men spend an average of 10.8 hrs per day on productive work. Part of this is guarding the fields during harvesting season because of frequent shrimp thefts. Women, however, have a heavier overall work burden: they have to add 6 hours per day of household work (including 3 hours for child care) to the 7.5 hours they already spend on productive

work, and men do not help in any household activities (Figures 10a and 10b). The additional time that women spend working comes out of their personal care and sleep; the average amount of time spent on leisure remains the same.

Figure 10a. Hoa Tua1: Women and men’s time allocation – dry season shrimp

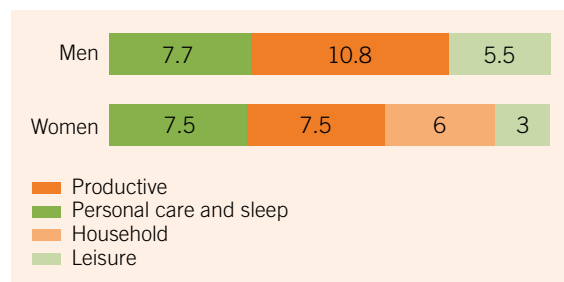
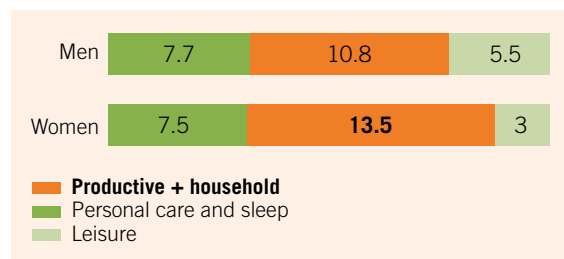


Figure 10b. Hoa Tua1: Women’s work burden – dry season shrimp



Impact of time-consuming tasks in both villages

The most time-consuming activities and their consequences were discussed in a focus group. These activities deserve closer observation in order to facilitate the identification of labour-saving technologies that could be introduced to reduce labour intensity. Many of the most time-consuming tasks are not mechanized and therefore may tend to affect women more than men.

In order to identify the most time-consuming activities, the study compared the amounts of time dedicated to individual rice and shrimp tasks (see Appendix Table 4). For rice production, it emerges that wet season rice is more time demanding than dry season rice. During the wet season, rice production requires a greater amount of manual tasks such as cleaning of the fields (in Vien An over 12 hours/ha, with 7.7 hours done by men), pesticide spraying (in Vien An over 13 hours/ha shared equally between men and women), hand weeding (in Vien An 18.5 hours/ha done exclusively

Table 4. Most time-consuming tasks for women (and health-related consequences)

Re-planting or gap filling. Rice seedlings need to be re-planted when gaps in the rice fields emerge due to flood damage or rat and golden snail infestations. Replanting and gap filling are repetitive and demanding tasks commonly relegated to women. After pulling the seedlings, women have to carry them to the muddy fields. Of the women labourers, 30 percent have to pull seedlings by hand and 70 percent use the gap-filling tool. When they carry out this operation, their body is submerged in the muddy water, so in addition to suffering from fatigue, back and leg pains their general health is also affected.

Hand weeding. The crop establishment method used is broadcasting pre-germinated seedlings, which causes weed problems. Again, women's bodies are submerged in the muddy fields during this work. As a result, they suffer from severe back pains and gynaecological infections.

Spraying pesticides. Women spray pesticides both on upland crops (vegetables) and on rice fields, particularly when men are unavailable. Exposure to pesticides is especially harmful to women's reproductive health.



Farmer mixing shrimp feed

Feeding shrimp. This activity is required 3 to 4 times per day and involves carrying the feed containers to the field. Preparing the feed requires technical knowledge and time. Furthermore, women have to carry about 10 kg or more of feed and broadcast it on the shrimp pond. During the peak season, when the men tend to be busier, women take over in feeding shrimp and also monitor the amount of feed in the container. The frequency and intermittent work affects their productivity in doing other work. They suffer from leg pains due to the frequent feeding during the day.

by women), gap filling (in both villages over 9 hours/ha mostly done by women) and manual harvesting (in Hoa Tual about 14 hours/ha shared by men and women). Shrimp production is highly time-consuming in terms of clearing the land after rice farming (removing rice stubbles takes 12.5 hours/ha, removing soft mud takes 10 hours/ha and applying lime 15 hours/ha – all mostly done by men), shrimp feeding (close to 19 hours/ha mostly done by men), while another heavily time-consuming task is operating the ventilator (44 hours/ha equally shared between men and women). Table 4, above, describes the main time-consuming activities reported by women and highlights their consequences on health.

4.5 Participation in farm-related production decisions

Cultural and context-specific differences affect the division of labour and the decisions made at household level as to which technologies and services are to be used by whom for production. As seen in this case study, women's labour inputs are not always fully recognized or "visible", with the

result that decisions regarding technology use tend to favour men's labour requirements. Moreover, the power or authority to make decisions about the farm generally rests with the head of the household, who usually has the relevant knowledge and access to information.

An insight into family level decision-making can guide development interventions that aim at providing equal access to productive inputs. Understanding the extent of household members' decision-making power regarding farm inputs and resources can help to assess their level of empowerment and ability to make choices about farm production and its derived benefits. Given the limited time for research, a few key interview questions were formulated to capture these differences and the responses reveal that women's decision-making power is not reflective of their labour engagement: in both rice and shrimp production, men appear to make the majority of decisions.

In Vien An, where women's labour contribution is around 50 percent, men decide which varieties to use, how and when to apply inputs, which

Table 5a. Farm-related decision-making, Vien An village

Who decides? Decision taken individually, equally (=) or more by men/women (>)	Rice production	Onion leaf production
What variety/crop to grow	M>W	M=W
Seed rates	M	W
Timing and amount of fertilizer to use	M>W	M>W
Timing and amount of pesticides	M>W	M=W
Whether to use new technologies	M>W	M=W
To attend farm meetings	M>W	M=W
Amount of farm products to use for home consumption	W	W
Selling price	M=W	W

Table 5b. Farm-related decision-making, Hoa Tua1 village

Who decides? Decision taken individually, equally (=) or more by men/women (>)	Rice production	Shrimp production	Green bean production	Squash production
What variety/crop/breed to use	M=W	M>W	W>M	W
Amount of seeds/shrimp larvae to use	M>W	M>W	W>M	W>M
Timing and amount of fertilizer/shrimp feed to use	M	M	M>W	W>M
Timing and amount of pesticides	M>W	M>W	M=W	W>M
Whether to use new technologies	M>W	M>W	M>W	M=W
To attend farm-related meetings	M>W	M>W	M>W	W
Amount of farm products to keep for home consumption	M>W	M=W	W	W
At what price the commodity should be sold	M=W	M	W	W

technologies to use and which farmer's meetings to attend. Women usually only make decisions related to how much rice to keep for home consumption. For onion leaf production, women and men consult each other on most decisions and women have direct responsibility for deciding how much seed to use and how much to keep for home consumption.

In Hoa Tua1, men are the major decision-makers for both shrimp and rice production: they consult with their wives on almost all production decisions, but ultimately have more decision-making power. The only decisions in which women participate equally are the selection of rice varieties and the amount of shrimp to keep for home consumption. However, in the production of green beans and squash, which

are socially accepted as women's activities, women's greater labour contribution does translate to greater decision-making power. For more than half of the decisions involved in vegetable production, women either make decisions alone, or have more power to decide than men (Table 5b).

4.6 Access to labour-saving technologies and services

There are labour-saving technologies and related services available to support productive and household chores, but their accessibility and adoption by farmers, and women in particular, depends on overcoming demand and supply constraints.

On the demand side, women and men's contributions at the household level need to be recognized, so that a discussion takes place on technology needs and possible cultural constraints linked to the "appropriateness" of its use can be overcome. This is especially important because the information on technologies available needs to reach the actors who actually provide a given type of labour input so that they may assess whether the solution being proposed is suitable, financially viable and corresponds to their needs. It is equally important that women and men have time to attend meetings and to join a cooperative or group that provides access to agricultural credit, technologies and services.

On the supply side, research institutions, project implementation and extension agents need to consult farmers to develop and introduce technologies that are responsive to local needs. They should be sensitive to gender differences and provide the service, technical know-how, rental and maintenance options that are designed to be accessible to those who carry out the work. Mobility, in the form of suitable transport, needs to be assured so that people can easily reach training facilities and demonstration plots.

The data collected and the discussions held at community level on gender roles and time allocation in both villages indicate that men and women face labour constraints linked to overall time availability and seasonal labour peaks, simultaneous work commitments and lack of financial capacity to hire wage workers; they also have uneven access to technologies designed for specific needs and adapted to local conditions. In Vien An, there is a labour shortage during the peak season because of the higher incidence of male out-migration. Women commented that this trend has increased their farming responsibilities in addition to household and complementary livestock management activities.

More in depth analysis would be needed at the household level to further understand the gender dynamics that affect productivity and access to technology: this would enable local authorities

and extension workers to introduce technologies specifically designed to assist time-consuming operations and also to provide inclusive and adequate services to farmers. In Hoa Tual, for example, women contribute to shrimp farming without being exposed to technology training and skill enhancement. Similarly, technology solutions could be identified to support some of the most time-consuming activities.

This section will focus on the gender differentiated access to technologies and services to understand which technologies and services are currently available and whether they respond to local needs.

4.6.1 Labour-saving technologies

Despite the obvious presence of women working in fields and homesteads, perceptions that women are not farmers and food producers still prevail, thus reducing women's access to technologies and services (Paris, 2009). Women farmers are also still underrepresented in agricultural research for development and extension programmes.





Over the past decade, the Department of Agriculture and Rural Development (DARD) has introduced several technologies and farming practices in both villages through extension services and farmers' organizations. Among these are short-duration rice varieties, improved management practices to reduce inputs for rice production, shrimp technologies, agricultural machines and light tools. Farmers themselves have also invented several simple tools to overcome some of their labour constraints.

Table 6 describes these technologies and how they contributed to reducing time and labour constraints.

The research conducted for this study revealed that most existing agricultural tools and equipment tend to support the labour needs of men; moreover, service providers do not necessarily take into consideration the fact that women carry out tasks traditionally done by men.

Technologies are often designed for men's use and physiques, with the result that they risk being too

Table 6. Adopted labour-saving rice and shrimp technologies

Rice technology	Description and labour-saving aspects
<p>Short-duration rice varieties</p>  <p>©FAO/Bay Deanh Van</p>	<p>Farmers grow short-duration and salinity tolerant rice varieties. These varieties are also high-yielding, and have good nutritional properties. Aside from increasing productivity and production, short-duration varieties reduce the labour time spent during the season from 180 days to 105–120 days per season.</p>
<p>“Three Reductions, Three Gains” farming practice (3R3G)¹⁵</p>  <p>©FAO/TTN Chi</p>	<p>The 3R3G farming practice, introduced to the area in 2007, reduces the use of seeds, pesticides and fertilizer. Seed rates were reduced from 25–28 kg per 1 300 square meters to 16–20 kg per 1 300 m² and yields were increased by 200 kg per 1 300 m². This practice has benefited both men and women because savings on pesticides and fertilizer are used for buying farm supplies, for food and for children’s education. Moreover, this practice has reduced the amount of labour time needed for spraying pesticides and applying fertilizer, tasks which are predominantly done by men, but are also increasingly done by the women.</p>
<p>Combine (harvester-thresher) Vien An, Tran De district</p>  <p>©FAO/TTN Chi</p>	<p>The combine harvester was introduced by the Department of Agriculture in Tran De district in 2011. All of the farming households in Vien An make use of this technology through service providers. A farmer can rent a combine for the equivalent of US\$115/ha. This machine has reduced labour requirements and post-harvest losses by 10 percent, and increased income due to savings in hiring manual labour for harvesting. The total amount saved is about 470 000 VND/big cong (US\$21.36/0.2 ha). Households use the savings for house repair, children’s education and daily expenses. The introduction of the technology has reduced the amount of hand cutting and grain gathering after threshing carried out by women, as well as the amount of hauling and rice gathering for men. However, during the wet season, rice stalks lodge and cannot be harvested with the combine. As a result, they must be harvested manually and this tedious task is relegated to women.</p>
<p>Gap-filling tool</p>  <p>©FAO/TTN Chi</p>	<p>The gap-filling tool is a labour-saving technology which has been adopted by all households in Vien An village. It serves to pull seedlings and re-transplant them on the fields. The tool is attached to a long bamboo pole and has 3 prongs for picking up seedlings and transplanting them on the soil. It was invented by a female farmer and produced locally in the village. The tool reduces the amount of labour required for pulling seedlings from the nurseries and re-transplanting them, and thus reduces women’s back pains, drudgery and fatigue. Men are beginning to use this tool for gap filling, which is traditionally a women’s job.</p>

1 Huelgas and Templeton (2010).

Lightweight pesticide sprayer

©FAO/TTN Chi

Spraying pesticides for example, herbicide reduces women's labour in weeding. There are two kinds of sprayers: the light weight sprayer for 8 litres which can be carried by women and the heavy-weight mechanical sprayer for 16 litres which is often carried by men.

Since women often take over from men in spraying pesticides, they should be given training on the judicious use of pesticides and knowledge on safe pesticide management (use and storage of empty pesticide containers) to avoid ill effects on the health of family members especially the children.

Portable rice thresher

©FAO/Hoang Dinh Nam

The portable rice thresher is an alternative to the combine for when the soil is too soft and deep to use the combine. It is rented by farmers through service providers coming from other provinces, such as Vinh Long province. Traditionally, threshing is done manually. In 1985, a local manufacturer modified a large thresher (introduced to save labour but too heavy to operate) into a small thresher (250 kg). In addition to its reduced weight, this thresher can be dismantled so that it can easily be transported on a vehicle or boat.

The time saved ranges from one to eight hours per hectare, but only men use this technology. Farmers use the free time created by this technology to prepare soil for shrimp culture. This machine reduces men's labour in threshing and eliminates the time spent by women on winnowing and removing rice straw from the fields.

Shrimp technologies**Description and labour-saving aspects****Ventilator for shrimp culture**

©FAO/Bay Doan Van

The ventilator was introduced in 2002 in Hoa Tua1 village through training from DARD. It is required equipment for shrimp production and serves to increase the oxygen content of the water (by mixing air with water in order to replace oxygen deficits, it flushes the excreted, potentially toxic, carbon dioxide and ammonia). The pump also creates a horizontal physical water current in the pond when sufficient numbers of aerators are employed and implementation is done correctly.

Without the ventilator, shrimp production is 500 kg/ha; with the ventilator, farmers can get 5 000 kg/ha. Operating the ventilator requires labour as it is heavy to carry and needs to be switched on and off several times a day.

Mud remover equipment

©FAO/Ha Phan

This equipment removes the mud after rice harvesting in preparation for shrimp production. Introduced in 2005 by a farmer-inventor, it reduces men's drudgery and labour during land preparation.

Without mud remover equipment, it takes 48 hours per square meter to remove the mud. With the remover, it takes only 3 hours per square meter.

heavy for women to handle comfortably. In Hoa Tua1, the combine (harvester-thresher) cannot be used due to the soft muddy soils, and the alternative is a manually operated mechanical thresher that is heavy to transport, mount and operate. In Vien An, female (de facto) heads of household complained that the technologies available for them to carry out heavy tasks such as land preparation and spraying

pesticides are too heavy for women to carry. Farmers are inventive and have designed tools for gap filling and removing mud, but they need more support to share their experiences and develop these tools. Increased dialogue on work burden and labour-saving technologies at household/community level and with service providers would be an important step toward supporting farmers' needs.

4.6.2 Services

Electricity, water and transport

Electricity, water and transport infrastructure and services are essential for agricultural development. While all households in Vien An village have access to electricity, only 50 percent of these can access piped water, which is essential for cooking and childcare. The rest either rely on women and children collecting rainwater by placing big clay jars near the roof spout or they purify water from the canals with alum. Weak road infrastructure also affects mobility: the roads inside the village can only be used by motorcycle or bicycle, so transporting inputs and farm products from the fields is a challenge. In Hoa Tua¹ all households have access to piped water and electricity. This enables farmers to use the ventilator, which is a major requirement for shrimp production.

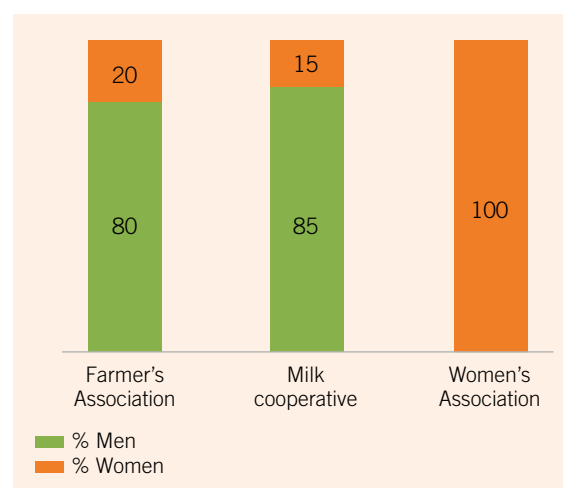
Extension and advisory services

Farmers in both villages make use of a number of different types of agricultural inputs (certified seeds, shrimp larvae, technologies, fertilizer and pesticides) and rely on services for land preparation, distribution/trading and veterinary care. The service providers are the Soc Trang Department of Agriculture and Rural Development (DARD) and a set of community organizations. Through membership to these organizations, farmers can also gain access to collateral services such as training, credit and information. This study explored the level of women's access to services and inputs, their membership in key local organizations and the type of training extended to them. Aside from government extension (DARD), the most important organizations that provide services in both villages are the Farmers' Association, the Cooperatives and the Women's Association.

In Vien An, membership in the Farmers' Association and the Milk Cooperative is dominated by men (Figure 11a). Given that the Farmers' Association collaborates with DARD in organizing technical training, and meets with the farmers to inform them of the schedule of seed sowing, women's opportunities for training and technical skill development are likely to be negatively affected by their lack of representation in the Association. This association also manages the Milk Cooperative,

which buys the milk produced by the farmers in the community and provides a credit scheme that allows members to take out loans at a low interest rate (2 percent per month). Women are therefore also largely excluded from collateral membership benefits such as credit, which would give them autonomy to rent machinery and access information. In order to address some of these challenges, women have founded their own association that offers advice on government laws, women's rights, health and sanitation practices and also provides training on improved crop and livestock management.

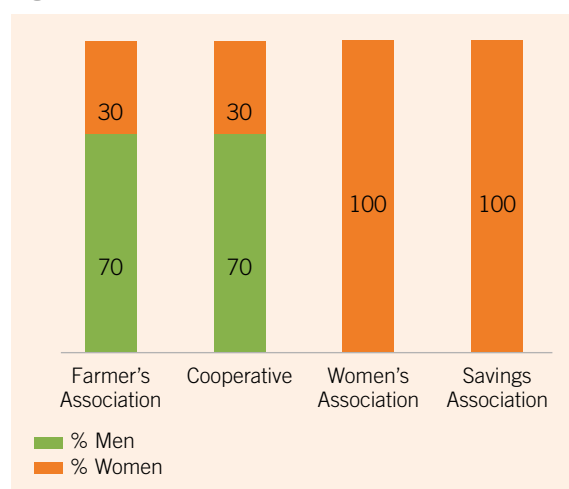
Figure 11a. Vien An: Membership to community organizations



Hoa Tua¹ presents a similar picture: the Farmers' Association and cooperatives are male-dominated. Government policies (e.g. seed and shrimp larvae distribution schemes and technical training activities) are implemented through these two organizations and therefore mostly target heads of household, who are primarily men (who are also the land owners). Through the cooperatives, farmers can buy inputs at lower prices. The cooperatives also facilitate the signing of contracts between farmers and buyers and help farmers improve their products to enable them to get higher prices. Women's membership to these organizations is only at 30 percent. The Women's Association and the Savings Scheme organizations, on the other hand, are exclusively for women (Figure 11b). The members of the Women's Association hold weekly meetings to discuss issues such as government laws and women's rights. The women organize themselves for saving

schemes, training on health care, family planning and training on improved rice and animal production. The Savings Scheme organization collects money from its members to pool a larger amount to help build up capital. A member contributes VND50 000/month and accumulates savings which are useful as additional income or to invest (e.g. for buying a piglet or trading vegetables).

Figure 11b. Hoa Tua1: Membership to community organizations



In the case of both villages, it remains unclear whether women's associations, created to compensate for women's limited participation in farmers' organizations and milk cooperatives, provide adequate and sufficient services to their members.

Agricultural training activities

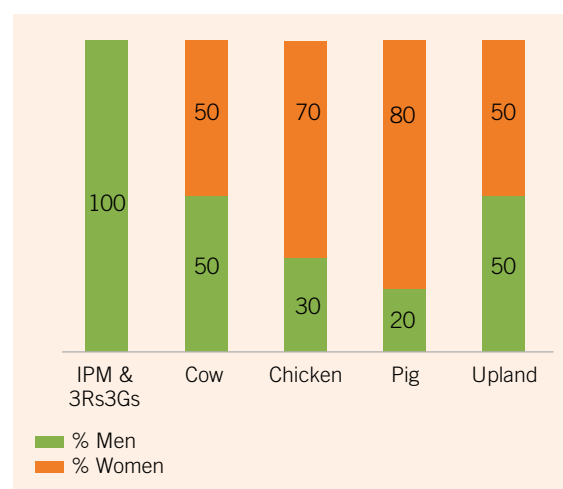
One of the major factors influencing agricultural productivity is a farmer's technical knowledge on improved farming practices obtained through participation in training and extension programmes. Women cannot always access these programmes and providers may not always target the most relevant actors for training.

The training activities listed below were organized by community organizations in collaboration with the local government and the Soc Trang Department of Agricultural and Rural Development (DARD). Access to training differs, to some extent, by income group (due to a number of factors such as farm size and land ownership; farmers'

interest or incentive to participate; availability of time, especially for women; bias towards male and wealthier farmers). The figures presented below are based on data from households belonging to the poorer income group, as this is where the most notable differences in access seem to occur. Level of access also reflects common beliefs about the traditional gender distribution of labour, which, as discovered in this study, might not take into consideration recent changes in labour use.

In Vien An, for instance, women from the poor households are not included in some trainings, such as integrated pest management (IPM) and 3Rs and 3Gs (Figure 12a). The fact that women substitute men in spraying chemicals to control pests on rice is not taken into consideration, thus resulting in a gap in training. Not surprisingly, women's participation is much higher for trainings on improved livestock management and safe production of vegetables.

Figure 12a. Vien An: Participation to training courses

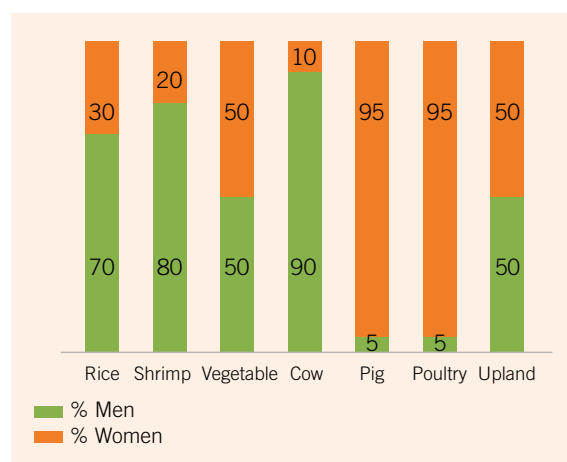


Note: The data refers to women and men from poor income groups

In Hoa Tual village, access to training is more balanced. Both men and women attended the training courses on reduced usage of pesticides for improved rice farming and production of vegetables. The vast majority of participants in trainings covering pig and poultry farming were women, which is unsurprising considering their recognized role in those areas. However, women's participation in the improved livestock management course was low despite the fact that women's labour contributions in this area are

significant (43 percent, see Figure 3b). Women were also under-represented in the shrimp management course (Figure 12b). Topics covered by the training course included: how to measure the oxygen, pH, salinity; guide to use medicine for shrimp; identifying which medicine to use and not to use; how to select larvae which are active and of the same size; how to feed shrimp the right quantity and frequency. Women's under-representation is the result of their perceived lack of participation in shrimp farming. However, as this study has shown, women *are* performing several technically demanding tasks, which suggests that their lack of participation in trainings actually enhances risks to shrimp farming.

Figure 12b. Hoa Tua1: Participation to training courses



Note: The data refers to women and men from poor income groups

Agricultural credit

Farmers need capital to invest in crop, shrimp and livestock production and they can obtain loans both from formal and private money lenders. As shown in Table 7, men are the main borrowers of formal loans from the Farmers' Association and Cooperatives in both villages. Farmers take out

loans and pay after 4 months at 1 percent per month interest rate. During the wet rice season, farmers usually borrow in June and pay in October. In the dry season, they borrow in October and pay back in February. Men have greater access to formal sources of credit for several reasons:

- Higher degree of membership to the Associations and Cooperatives that provide loans at lower interest rates;
- The title of the land which serves as collateral for a loan is mostly under the husband's name;
- Due to higher levels of education and mobility, they are more capable of managing loan transactions (women have less time and knowledge to access information and credit).
- In Vien An (Table 7), a very high percentage of poor and middle income women take out loans from informal sources at higher interest rates (5 to 6 percent). They usually need capital to purchase tools or for small trading such as buying and selling vegetables. They take out loans before the peak production period to purchase inputs and pay after harvest, particularly during the dry season when yields/ha and rice income are higher. Better off women rely on their husbands to access formal credit.

In Hoa Tua1, informal borrowing of money is not practiced. Instead, a small percentage of women access the formal credit system and take out loans from the Women's Savings Scheme group. They contribute VND50/month (minimal amount) as savings for larger loans. Loans ranging from VND300 000 to VND500 000 (\$13.60 to \$22.73) are extended exclusively to members, who use them for farm inputs, feed for pigs, medical expenses and social obligations.

Table 7. Share of access to formal/informal credit

Villages	Vien An						Hoa Tua1					
	Poor		Middle income		Better off		Poor		Middle income		Better off	
	M	W	M	W	M	W	M	W	M	W	M	W
Formal	90%	10%	100%	-	100%	-	70%	30%	80%	20%	90%	10%
Informal	20%	80%	30%	70%	-	-	-	-	-	-	-	-

4.6.3 Training and technology priorities identified by women in the two communities

In addition to the existing technologies and services available in the two communities, focus group discussion participants also identified additional labour-saving technologies and practices that could assist women in their domestic work, as well as farming and non-farm activities. Women had well-developed ideas regarding their needs and were often able to envision strategies for technology introduction and adoption. Below are some examples:

- **Piped water (Vien An):** where there is no piped water, women have to collect rainwater and store it in big clay jars. Access to running water is a priority for daily household chores, childcare and other domestic responsibilities.
- **Labour-saving technologies:** In order to save time and reduce the drudgery linked to specific tasks, women expressed the need to explore accessible and simple labour-saving technologies that can also be affordable, easy to operate and maintain and which could support income-generation. The gap-filling tool is one example of labour-saving equipment that is spreading among women as well as men. Similarly, particular land management practices that promote weed suppressing cover crops were mentioned as possible answers to weeding.
- **Timing of training offer:** training programmes should always include women and take into consideration their household tasks;
- **Certified rice-seeds:** there is a demand on the part of women to have the Women's Savings Association introduce/offer certified or purified seeds of new rice varieties as well as training on how to produce better quality seeds. This was seen as an opportunity to compare new varieties in terms of performance, taste and cooking qualities;
- **Good agronomic practices¹⁵:** Despite their experience in rice farming, women asked to be trained on good agronomic practices (GAP) for rice production. It was suggested that demonstration trials or “hands-on” training would be better than the lectures often conducted by agricultural extension services.
- **Integrated pest management (IPM):** Women expressed the need for training on integrated pest management and better agro-ecological practices, including the integration of useful flowers and plants such as marigold, which attracts “friendly” insects. This would provide a valuable alternative to using pesticides in their vegetable plots.
- **Business training for improved management of poultry and pig farming:** The profitability of small livestock production depends in large part on the quality of management. Women specifically expressed the need for business training that would enable them to improve their investments.

¹⁵ GAPs are practices achieving an optimum balance between economic, social and environmental goals; as such they improve efficiency but also look at labour constraints and “acceptable working hours” (FAO, 2004).

5. Conclusion

The primary purpose of this study was to explore the differences between women and men's participation in and benefit from the rice–rice and rice–shrimp farming systems in Soc Trang, Viet Nam. By recognizing the importance of linking an understanding of gender differentiated dynamics and labour inputs to the equitable provision of productive inputs and resources, the study was not only able to produce general information on how women fare in the two farming systems, it was also able to detect the ways in which local perceptions about gender influence labour patterns, create additional constraints for women, and hinder the recognition of women's work. The study yielded valuable information on the contributions made by women to each system, both in terms of labour and proportion of household income. It also produced a wealth of useful data for making overall comparisons between the two production systems, which will help government and development partners to better understand the advantages and potential challenges of moving to rice–fish or other integrated production systems.

This chapter is structured into two sections: Key Findings and Recommendations. The Key Findings section is divided into three overall findings that came out of the study, each of which contains a set of more specific findings related to it. The Recommendations section proposes five main areas of action that are necessary to address the main concerns highlighted by the study.

5.1 Key findings

5.1.1. Of the two farming systems, rice–shrimp farming involves greater risks and challenges, but these are outweighed by the social and economic benefits it brings

A recurring theme that emerged from this study was an apparent link between diversified livelihoods and an accrual of a number of socio-economic benefits. In small-scale production, diversification of economic activities offers the opportunity to secure basic subsistence while taking advantage of additional opportunities for economic empowerment. Furthermore, because of the nature of women's labour in small-scale agricultural settings, production systems that are highly diversified may create the possibility for women's labour contribution to gain in perceived importance and receive greater recognition, thus leading to improvements in gender equality as well as in the efficiency of the economic system as a whole.

In comparing the rice–rice and rice–shrimp systems, the findings discussed below appear to confirm this possibility, and suggest that while close attention needs to be paid to the challenges that may arise as part of a transition to a more mechanized and labour-intensive system, there is great potential for integrated crop–livestock–fish systems to promote socio-economic growth and development if women are actively involved, recognized and supported.

Unpaid family and exchange labour is central to sustaining production in both systems, and it plays an especially important role in shrimp farming

From a production perspective, rice–rice and rice–shrimp primarily differ in terms of material costs and labour requirements. However, because traditional economic models tend to focus exclusively on financial costs in their benefit–cost analyses, the importance of unpaid labour to each production system can be easy to miss. Due to the high demand on labour during the conversion of land from rice to shrimp, rice–shrimp farming is highly labour intensive (239 days/ha compared to 140 days/ha for rice–rice). Both systems would be unsustainable without family labour, but while the rice–rice system meets over a third of its needs through hired labour, the rice–shrimp system is almost entirely dependent upon family and exchange labour (92 percent). To demonstrate the importance of this contribution to each production system, this study conducted a benefit–cost analysis that measured the market value of unpaid labour inputs and included it as a cost to the system together with hired labour and material inputs (See Table 4). Once unpaid labour is factored in as a production cost, farmers’ return on investment decreases significantly. This is especially true for the rice–shrimp system, where the benefit–cost ratio is only marginally better than it is for rice–rice once unpaid labour is accounted for (i.e. if they had to pay for all labour, farmers in Hoa Tua1 and Vien An could only expect US\$1.56 and US\$1.44 respectively for every US\$1 spent).

A purely economic perspective, which only treats exchange labour as a coping mechanism for cost reduction, however, risks to overshadow some important social and also economic benefits (see findings b–d in this section) derived from traditional labour arrangements. Family and exchange labour are often deeply rooted practices that may not necessarily be irrelevant to or incompatible with newer, more market-oriented systems of production. Furthermore, labour exchanges can offer the opportunity for social cohesion, which is an essential element of smallholder productive systems. Any analysis of smallholders’ role within national and international markets will have to take the existence of such labour practices into account.

Hoa Tua1’s rice–shrimp farming system is more diversified than Vien an’s rice–rice and brings in a significantly higher net income

Overall returns on shrimp production are much more substantial than they are for rice, so even after subtracting the high cost of paid labour and material inputs, the net income from primary productive activities for households in Hoa Tua1 is about 2.3 times higher than in Vien An (US\$1 506/ha versus US\$649/ha). This finding is consistent with those of other studies comparing rice–rice and rice–fish production in Southeast Asia (e.g. FAO, 2016). Livelihoods in Hoa Tua1 are also more diversified than in Vien An. Middle and better off households in Vien An derive 50 and 60 percent of their household income from rice alone, and poor households rely on agricultural labour and non-farm income (including remittances) for 75 percent of their income. In contrast, poor households in Hoa Tua1 rely less on non-farm income and agricultural labour (50 percent) and more on farming activities, which represent 50 percent of income and are close to evenly distributed among rice, shrimp, non-rice (i.e. vegetables), and livestock. Middle income households in Hoa Tua1, like households in the corresponding income category in Vien An, derive almost all of their income from farming, but unlike Vien An households, their income is much more evenly distributed among the various types of productive activities: 25 percent each from rice and shrimp, and 20 percent each from vegetable and livestock production (compared to 50 percent from rice, 28 percent from milk sales, and only 5 and 3 percent respectively from vegetables and small livestock).

Benefits from rice–shrimp farming may foster improvements in economic and social equality

A comparison of the two villages also reveals lower levels of inequality present in the rice–shrimp system. In addition to a higher average household income from rice–shrimp production, Hoa Tua1 has a much smaller proportion of poor households compared to Vien An (13 percent vs. 41 percent) and women in Hoa Tua1 also fare better than their counterparts in Vien An in a number of ways: their burden of work is less uneven compared to the men in their community, and they have more time for

leisure compared to women in Vien An. They also have their own savings institution and more access to formal credit, and seem to benefit from a greater participation community organizations, and higher rates of participation in agricultural trainings.

The large investment required for rice–shrimp farming makes it a risky enterprise for vulnerable categories (i.e. poor and female-headed households), but if risks are managed it can bring in economic growth for the community

For smallholders, the cost of material inputs necessary for rice–shrimp farming is very high (just over four times higher than for rice–rice). Shrimp farming also requires more technical know-how and training than rice, and is subject to a number of additional risks, including shrimp disease. As a result, rice–shrimp farming represents a higher level of financial risk to poor households and households with lower levels of access to credit (e.g. female-headed households). It also puts women, who have less access to training and technology, at a disadvantage for engaging in shrimp production. On the other hand, as we have seen, rice–shrimp has the potential to bring in substantial benefits to households if these risks can be mitigated.

In contrast to rice–shrimp, rice–rice production involves less financial risk, is less mechanized, and relies more heavily on a hired workforce. At first glance, the larger market for hired manual labour in Vien An may seem like an opportunity for the poorest and least skilled to access wage labour. This is especially so for women, who take lower wages and tend to carry out manual tasks. However, while this opportunity may be beneficial to disadvantaged individuals in the short-term, a system of production based on inefficient labour practices and unequal wages is unlikely to favour sustainable economic development. The apparent correlation in the villages between lower income status and reliance on wage work, not to mention the higher levels of poverty and gender inequality present in Vien An, would seem to support this hypothesis. Rice–rice may be less risky, but it also offers fewer opportunities for economic growth.

This overall evaluation of the two systems brings to light an important consideration for governments and development partners to address when promoting new technology-dependent and labour-intensive production systems. The rice–shrimp system does appear to create more value than rice–rice and eventually lead to a more equitable distribution of benefits for the community. However, it has two main weaknesses: the additional labour burden it creates and the risks it presents to the most vulnerable members of the community. Both of these factors should be addressed through appropriate interventions (see Recommendation 5).

5.1.2. Women’s contribution to both farming systems is essential

The time-use data collected for this study suggests that on average, women work up to 5.25 hours more than men every day. This estimate includes household responsibilities, which tend to go unrecognized as work, and which therefore may lead to a lack of recognition of women’s contribution. Local perceptions also hinder recognition of women’s productive work: women’s contributions to primary or “male” economic activities remain relatively invisible while the economic importance of “female” activities is consistently undervalued (see Finding 3 below). For these reasons, the sex-disaggregated data collected for this study on labour inputs and income *for all significant economic activities within the production system* is especially helpful in that it brings to light the true value of women’s productive contribution.

In Vien An, women are responsible for 51 percent of labour in rice farming and 41 percent of the labour that goes into raising cows. These two activities alone account for 70 to 78 percent of all income among middle and better off households. Weighing women’s labour contribution against the share of household income for each activity reveals that close to 50 percent of the income derived from these traditionally “male” activities is actually the result of female labour (see Figures 2a and Appendix Table 3). Women also put in the majority of labour for other on-farm activities (vegetables, pigs, poultry), which account for an additional 8–10 percent of income among middle and better

off households. As we have seen, poor households in Vien An rely primarily on agricultural labour and non-farm income, including remittances (75 percent of income comes from these two sources), but interestingly, “female” activities such as vegetable production and small livestock account for a greater proportion of farming income in these households than rice and milk sales put together.

Due in large part to men’s dominance in shrimp farming, a superficial glance at the rice–shrimp system in Hoa Tua1 might initially suggest a reduced economic role for women: they contribute 31 percent of the labour that goes into rice and shrimp farming. However, livelihoods in Hoa Tua1 are more diverse than in Vien An, and agricultural labour and non-farm income are less significant to household income. A closer look at other on-farm activities presents a different picture altogether: women are responsible for 63 percent of labour in vegetable production and 47 percent of labour in livestock (this figure does not include poultry, which in any case falls under women’s responsibilities). Livestock and vegetable production account for 20 percent of income in poor and better off households and 40 percent in middle-income households. In the middle wealth group, vegetable production *alone* accounts for one fifth of all income. In other words, women’s relatively smaller role in primary productive activities masks the significant economic contribution they make through other on-farm activities.

5.1.3. Cultural norms, and expectations about gender roles, prevail over changes in the division of labour and create additional constraints for women

Social and economic changes such as migration, the influx of remittances, or the introduction of new agricultural practices and technologies affect production systems so that the gender division of labour constantly adapts to farmers’ evolving needs. For example, women in the two villages not only carry out the tasks that are traditionally assigned to them, but they also increasingly take on “heavy” tasks that are culturally perceived as men’s work (e.g. digging ditches, cleaning the fields and preparing the bunds, spraying pesticides and

conducting field visits to check for disease or pest infestation). This study reveals that the disconnect between the shifting reality of labour distribution and persistent local ideas about what constitutes “men’s work” and “women’s work” has its effects on women’s access to productive resources and services. For instance, women in Hoa Tua1 perform shrimp tasks for which they are not trained. The fact that gender roles remain the same despite transformations in labour dynamics reinforces inequalities and in some cases creates additional constraints for women. The study found several such constraints to be present in both villages; these are discussed below.

Women’s productive labour is not sufficiently recognized

The data collected on labour inputs for this study clearly demonstrates that in both villages, women make essential contributions without which neither production system could thrive, and yet their role as economic agents does not appear to be fully acknowledged. Women are highly involved in economic activities such as rice farming and raising cattle for milking and fattening, but because these activities are perceived as “men’s work”, the labour women contribute in these areas remains largely invisible. Furthermore, traditionally “female” activities such as raising poultry and pigs or farming vegetables tend to be given less importance, when in reality they bring significant economic and nutritional value to households, especially in the poor and middle income groups, where rice and shrimp only make up between 5 and 50 percent of total income (See Figures 2a and 2b). Finally, the study found that both systems rely heavily on unpaid family labour, but while men’s work is perceived as economic activity and is therefore catered to by government and service providers, women’s productive work is often culturally associated with subsistence or family duty and as such receives less recognition and support.

Women are time poor and subject to an excessive work burden

Based on self-reported time use data, the study found that women's overall daily work burden ranges from half an hour to over five hours above men's, depending on the season and production system. Men do not take part in reproductive tasks in either village; as a result, women are solely responsible for the 4.5 to 6 hours of domestic work and childcare-related tasks to be carried out each day. This means that increases in labour requirements (i.e. due to male outmigration or the introduction of a labour-intensive productive activity) disproportionately affect women's labour burden, leaving them with less time for leisure, and in some cases, less time for sleep and personal care than men. This burden is further increased by the fact that time-consuming manual tasks are largely relegated to women, while tasks supported by labour-saving technologies are usually carried out by men (see next finding).

Uptake of technology by women is weak

The nexus between men and technology, and women and manual labour, persists for a number of reasons:

- The technology introduced by government through extension services (DARD) targets both men and women in theory, but the invisibility of women's work affects government's capacity to target women's labour needs;
- Labour-saving technologies tend to be developed to support the primary economic activities of the production system (in this case rice and shrimp), rather than for the "complementary" activities that rely mostly on female labour;
- Within the primary economic activities, technology is mainly developed for tasks dominated by men (land preparation, application of chemicals, harvesting and threshing tasks), while women still mostly carry out manual tasks such as pulling seedlings, re-transplanting (gap filling) and weeding. An especially illustrative example of this dichotomy is the division of harvesting responsibilities in the rice-rice system: during the dry season, when only manual harvesting is possible, women carry out this task, while during the wet season harvesting by combine is done by men;

- When a labour-saving technology is developed for a traditionally "female" task, men often begin to show interest and share in or take over that task;
- In shrimp farming, the support and training men receive in using technologies allows them to carry out increasingly advanced tasks, thus enhancing their skills and reinforcing the association between men and technology, while further widening the gap in competitiveness between men and women.

Gender inequalities persist in access to advisory services, agricultural training activities and credit

Despite their high level of participation in farming, women have less access to extension and advisory services, agricultural training activities, and credit. Due to the cultural invisibility of women's work, patterns of service delivery tend to reflect traditional gender roles rather than women's actual needs. Furthermore, women are underrepresented in local institutions such as farmers' organizations, which are key entry points for accessing training, information, farm inputs, and credit for crop and livestock production.

Participation in farm-related production decisions is unequal and does not reflect labour contribution

The influence of cultural norms and expectations about gender is especially noticeable in the way in which farm-related decisions are made within the household. Men have the greater decision-making influence by far with regards to rice and shrimp production, and they also have a significant amount of influence over traditionally female-dominated vegetable production activities. This distribution of power does not reflect actual labour contributions: In Vien An, for example, women contribute slightly more than men to rice production and significantly more to onion leaf production, and yet men dominate almost all production decisions. It seems more likely that the causes behind such an imbalance derive from the prevailing cultural expectations about gender roles and responsibilities, which both prevents recognition of women's work and limits their say in matters considered to be the purview of men. Even in Hoa Tua¹, where women have a number of advantages compared to women

in Vien An, the balance of decision-making power remains significantly skewed in men's favour. As we have already seen, ideas about gender also influence women's access to productive resources and services, which in turn helps to determine women's level of economic empowerment. Women's lack of access to technology, training and credit is therefore also a likely factor limiting their voice in decision-making.

5.2 Recommendations

5.2.1. Carry out gender-focused research

From the research perspective, sex-disaggregated data on labour and time use is needed to acknowledge key productive actors and make labour contributions visible. This would allow for the identification of sources of bias and inequality and help policy and project design to better focus on constraints. A gender-sensitive labour analysis, which takes into account different wealth groups, can identify needs and likely impacts of technologies while focusing on solutions that can be labour-saving. As part of this analysis, men and women's understanding of specific farming practices needs to be reviewed to identify knowledge gaps. Moreover, with the spread of agricultural mechanization in South Viet Nam, it is necessary to assess the likely implications on women's and men's time use, work burden, food security, nutrition and overall family welfare.

This study also revealed that farming households have a high degree of market orientation. There is a need to conduct gender analysis beyond production, which was the scope of this study, to the entire value chain, to also capture women and men's roles in post-harvest operations, processing, and marketing. Given the findings of this study on improvements in the status of women in the rice–shrimp system, it would also be interesting for future studies to explore further any possible connections between integrated rice–livestock–fish production systems, diversified livelihoods, and gender equality.

5.2.2. Challenge gender norms: encourage discussion and promote the redistribution of work burden at the household level

Both the rice–rice and rice–shrimp system present inequalities in the division of the overall workload at the household level. Women have to juggle simultaneous household and productive tasks and often, during the dry season, are also in charge of community work. Lack of time affects productivity, health, availability for training and participation in local institutions, choice and quality of life.

A first step towards addressing this imbalance lies in making household members aware of men and women's time use and facilitating a discussion on how work can be re-distributed. Discussing emergency situations is one way to introduce the subject (e.g.: what happens if the wife falls ill or has an accident). There are participatory exercises, approaches and methodologies at household and community level that can be used to discuss workload and generate more understanding of work constraints in order to redress some of the labour imbalance and channel resources to the end users¹⁶.

5.2.3. Support inclusive community dialogue to identify needs and strengthen technology development

The process of matching supply and demand for labour-saving technologies and services needs to be supported: at the community level, development projects/initiatives need to closely work with government extension and NGOs to make women and men's work visible so that farmers can express their needs. Local technology developers also need to be made aware of the end users' needs so that they may develop and introduce tools that successfully address work burden. This study shows that women are knowledgeable and aware of the training and technology they need: if consulted, they have strategies to overcome labour strain (for example, they expressed the need for carts with wheels to transport their farm products). Moreover, they have

¹⁶ See the following links for further resources on household methodologies: https://www.ifad.org/topic/household_methodologies/overview ; <http://www.fao.org/dimitra/about-dimitra/en/>

also shown initiative by locally manufacturing a tool that was broadly adopted by women (and more recently by men also).

The Department of Agriculture and Rural Development (DARD) has established strong relationships with village Women's Cooperatives. Thus DARD can build on this relationship by **engaging women's cooperatives along with other local cooperatives in dialogues that are related to farm production as well as income generation.** The first step is to highlight and recognize the important roles of women in agriculture and discuss strategies on how to improve women's lives as farmers, mothers and homemakers. DARD can show the results of this study to initiate the dialogue.

5.2.4. Avail women of the skills, technology and services they need

Despite the fact that women are heavily involved in farming activities, agricultural extension and service providers tend to communicate with and serve male farmers because it is more culturally acceptable, and because men usually have more access to communication technologies and more time available. Providers of training, technology and services should both target women as farmers in their programmes and provide basic training on gender to extension services responsible for interacting with the community. Furthermore,

training programmes for women should take into account their specific constraints, including level of education and limited availability of free time.

The findings of this study reveal that women are involved in spraying pesticides on rice and on upland crops, yet none of them participated in **IPM training.** It is essential that women be included in training courses on basic knowledge in pest and disease diagnosis, pesticides and application methods. Women's participation in shrimp and cow farming should also be recognized and government extension services (DARD) should ensure a higher level of participation from women in trainings on technology use and farming methods.

Agricultural research institutions such as the International Livestock Research Institute (ILRI) and Viet Nam's Ministry of Agriculture and Rural Development have plans for long-term partnerships in **livestock development research.** Women are very active in pig and poultry production, and should therefore be involved in testing and dissemination of livestock-related technologies and also be targeted for training. More efforts should be given to the production and transportation of **green fodder,** and on the **preparation of feeds based on local ingredients.** DARD could support farmers, especially the women, to adopt improved pig production practices. Through the Vietnamese

Good practice examples for training on rice production

"Ecological engineering"

Women from Tien Giang Province participated in a training to learn how to keep their rice fields ecologically sound and balanced by planting flowers around them. The "friendly" insects and other organisms that live in this diverse vegetation around the rice fields help control rice pests such as the brown planthopper. Women were trained to observe the increase in bees and parasitoids (called small bees) that visit the nectar-producing flowers grown on bunds and to preserve them. If the women continue implementing what they learned, in the long term, households will save as much as \$50-100 per season by reducing insecticide inputs without suffering any production loss.

Source: (IRRI Rice Today 2013).

Participatory varietal selection (PVS) of new rice varieties for submergence prone and salt-affected areas

Through PVS, men and women can express their criteria in selecting rice varieties as well as test the new seeds/ varieties on their own fields. For example, in most Asian rice farming systems, weeds are pests that cause low yields. Women from poor farming households provide unpaid labour and suffer the drudgery of hand weeding to obtain higher yields. Experience in eastern India revealed that when participants of PVS were given training on removing weed seeds and off-types to maintain the quality of seeds to be planted for the next season, the knowledge they gained gave them more decision-making authority on weed and seed management.

Sources: Chi et al., 2011; Manzanilla et al., 2011; Paris et al., 2008.

Good Animal and Husbandry practices (VietGAHP) pig farmers' income could be increased by reducing piglet mortality and improving overall farm productivity. This would lead to increased supply of cheaper pork to consumers, while ensuring higher income to farmers from higher volume sold.

In addition to providing training through cooperatives, government extension services can address women's knowledge gap by providing more subject-focused training programmes and 'hands-on' training through Farmer Field Schools (FFS). FFS is a popular education and extension approach developed by FAO and partners, and evidence to date suggests that this approach works in reaching small farmers, particularly women¹⁷.

Women's time spent fulfilling day-to-day household chores can be reduced by providing access to improved household water sources, in the case of Vien An village. There is also a need for the local government to support poor households in the construction of latrines for better health and sanitation in the village. Day care centres established in the village could support women farmers during the peak agricultural season.

With the rapid adoption of information technology, there is a need to tap into potential for dissemination of climate-related information, market prices and improved crop production practices through cell phones. The provision of affordable cell phones to women can supply them with key knowledge and help link them to the market. They can get better prices for rice, shrimp and livestock, and also have better access to input and product markets, veterinary services, and rental services for agricultural machinery.

Through consultation, the risks associated with men taking control over farming technologies can also be mitigated. Measures in support of women's ownership and control over technologies should be established in order to avoid women being

deprived of income-earning opportunities. One way to achieve this is to provide women's groups with training in operating a specific piece of equipment and managing its rental use. Groups of women can be organized to act as service providers for a portable threshing machine or for pulling of seedlings and gap filling, particularly during peak crop season.

5.2.5. Mitigate the social and economic risks inherent to rice–shrimp farming

When introducing farming practices that rely on high input costs (e.g. shrimp), specific policy measures need to be explored to mitigate farmers' risks and special attention needs to be paid to supporting those who are made most vulnerable during shifts toward mechanization. As we have seen, the risks inherent to rice–shrimp production include a significant increase in the overall burden of labour, gender imbalance in participation in shrimp farming, and the high cost of material inputs. Implementing Recommendations 2 through 4 can help to mitigate the first two risks. If labour burden from other activities is reduced and women are better targeted as rice and shrimp producers through training and increased participation in key institutions, a more equitable and efficient production system will result.

As for managing financial risk, facilitating access to formal credit for under-served categories, such as women, is an important first step. This would imply working both with financial service providers and local women. The former would need to be encouraged to develop products that can be easily made accessible to women who might lack access to collateral – while the capacity of the latter would need to be strengthened with financial literacy and household business planning skills (if women, for instance, are supported to build a track record of successful positive repayments through credit bureaus, they can enhance their ability in accessing loans).

¹⁷ For more information on the FFS approach: <http://www.fao.org/agriculture/ippm/programme/ffs-approach/en/>.

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Appendices

Appendix 1

Vien An – Overview of productive data by wealth group

Rice, vegetable farming and livestock breeding data

Productivity/wealth status	Poor	Middle income	Better off
Rice average yield			
Wet season: 6 t/ha – dry season: 7 t/ha			
% of households which grow rice	100	100	100
Average production (kg)/household/yr	3 550	9 500	20 000
% Sold	90	90	95
% Consumed	10	10	5
Onion leaves (dry season)			
% of households which grow onion leaves on upland fields	30	60	10
Plot area (m ²)/household	500	2 000	2 000
Average production (onion) kg	2 400	8 000	4 000
% Sold (seedlings)	80	80	80
% Consumed	20	20	20

Livestock production

Livestock productivity/wealth status	Poor	Middle income	Better off
Dairy cattle			
% of households with cattle	30	40	30
Number of cows/household	1–2	2–4	5–7
% Sold	100	100	100
Swine fattening			
% of households with pigs	10	20	10
Number of pigs/household	1–2	4–6	7–10
% Sold	100	100	100
Poultry			
(% of households with chickens)	20	50	30
Number of chickens/household	5–10	10–20	10–20
% Sold	50	50	50
% Consumed	50	50	50
Duck			
% of households with ducks	2	10	0
Number of ducks raised (heads)	10–20	20–50	0
% Sold	50	70	0
% Consumed	50	30	0

Source: Small group discussions with key community leaders.

Appendix 2

Hoa Tua1 – Overview of productive data by wealth group

Rice, shrimp and vegetable farming and livestock breeding data

Productivity/wealth status	Poor	Middle income	Better off
Rice Average yield			
Wet season: 6 t/ha – dry season: 7 t/ha			
% of households which grow rice	100	100	100
Average production (kg)/household/year	850 dry rice (6.5 t/ha)	3 000 dry rice (6.5 t/ha)	5 000 dry rice (6.5 t/ha)
% Sold	5	50	20
% Consumed	95	50	80
Shrimp			
% of households who raise shrimp	85	100	100
Average production (kg)/household/year	200	450	1 000
% Sold	10	100	100
% Consumed	90	0	0
Green beans (upper bunds)			
% of households who grow beans	30	50	20
Average production (kg)/household/year	5	10	20
% Consumed	100	100	100
Squash (upper bunds)			
% of households who grow squash	30	50	20
Average production (kg)/household/year	200	400	650
% Sold	99	99	99
% Consumed	1	1	1

Livestock production

Livestock/productivity/wealth status	Poor	Middle income	Better off
Cattle fattening			
% of households	30	45	20
Number of cows/household	1	2	4
% Sold	100	100	100
Swine fattening			
% of hhlds	20	30	0
Number of pigs/household	1	2	0
% Sold	100	100	100
Poultry			
(% of households)	100	100	100
Number of chickens/household	10	30	15
% Sold	90	70	100
% consumed	10	30	0
Duck			
(% of households)	60	70	20
Number of ducks raised	10	25	15
% Sold	100	80	100
% Consumed	0	20	0

Source: Small group discussions with key community leaders.

Appendix 3

Summary sex-disaggregated labour data

Labour inputs in rice, vegetables, shrimp and livestock production in Vien An and Hoa Tua1 village

Vien An village	Men (person days)	Women (person days)	Total person days/ha
Crops			
Rice (wet) Person days/ha	47 (48 %)	51 (52 %)	98 (100)
Rice (dry) Person days/ha	22 (52 %)	20 (48 %)	42 (100)
Onions Person days/ha	77 (39 %)	121 (61 %)	198 (100)
Rice–rice Person days/ha	69 (49 %)	71 (51 %)	140 (100)
Livestock			
Cows (3 heads) hours/day (wet season)	8.2 (59 %)	5.7 (41 %)	13.9 (100)
Pigs (5 piglets) hours/day	0.4 (33 %)	0.81(67 %)	1.21 (100)

Hoa Tua1 village	Men (person days)	Women (person days)	Total person days/ha
Crop and Shrimp			
Rice (wet) Person days/ha	38 (66 %)	20 (34 %)	58 (100)
Shrimp (dry) Person days/ha	126 (70 %)	55 (30 %)	181 (100)
Rice–shrimp (Person days/ha)	164 (69 %)	75 (31 %)	239 (100)
Squash (Person days/ha)	58 (48 %)	64 (52 %)	122 (100)
Green beans (Person days/ha)	18 (21 %)	68 (79 %)	86 (100)
Livestock			
Cows (1–2 heads) hrs/day	5.0 (57 %)	4.0 (43 %)	9 (100)
Pigs (1–2 piglets) hrs/day	0.2 (25 %)	0.6 (75 %)	0.8 (100)

Livestock wage rates: Women are paid VND100 000/day (US\$4.54/day). Men are paid VND120 000 to 150 000/day.

Appendix 4

Seasonal sex-disaggregated labour data (days/ha)

Vien An

Wet rice	Total M/ha	Total F/ha
Prepare land	0.4	0
Make field ditches	1.5	1.5
Clean the field (manual)	7.7	4.6
Prepare bunds	4.6	1.5
Broadcast seeds	1.5	0
Fill gaps	1.5	7.7
Broadcast fertilizer	2.3	0.4
Spray pesticides	6.7	6.7
Drain the field	5.4	0
Handweed	0	18.5
Field visit	10	10
Harvest with combine	3.5	0
Haul	1.7	0
Sub totals	47	51
Total men and women days/ha		98

Dry rice crop	Total M/ha	Total F/ha
Prepare land	0.1	0
Make field ditches	0.2	0
Clean the field (manual)	1.4	1.4
Prepare bund	1.9	0
Level land	0.5	0
Broadcast seeds	0.5	0.5
Fill Gaps	7.7	7.7
Broadcast fertilizer	1.4	1.4
Spray pesticides	2.9	0
Drain the field	3.4	0
Handweed	0	7.7
Visit the field	1.4	0.3
Harvest with Combine	0.2	1.4
Sub totals	22	20
Total men and women days/ha		42

Yearly total: 140 days

Hoa Tua1

Wet season rice	Total M/ha	Total F/ha
Wash salinity in the field	2.4	0
Prepare land/mechanical	0.8	0
Make field ditches	0.8	0
Irrigate the field/drainage	0.2	0
Broadcast seeds	0.5	0
Pull the seeds for gap filling	6.9	0
Fill gaps	0	9.2
Broadcast fertilizer	3.5	0
Spray pesticides	6.9	0
Handweed	0.8	0.8
Visit the field	6.7	1.0
Harvest manually	6.1	7.8
Thresh	2.3	0.8
Sub totals	38	20
Total men and women days/ha		58

Shrimp	Total M/ha	Total F/ha
Remove rice stubbles	7.5	5
Remove soft mud	10	0
Drain the field	0.3	0
Apply lime	15	0
Pump water	7.5	0
Release shrimp larvae	0.6	0.6
Operate ventilator	22	22
Weigh & Mix feed	15	2.5
Feed shrimp	18.8	3.1
Test PH and salinity	7.5	0
Visit the field	22	22
Total	126	55
Total men and women days/ha		181

Yearly total: 239 days

Appendix 5

Labour cost calculation

Example based on the costs attributed to the labour input of household men in Vien An's wet rice season (see labour costs referred to in Table 2 on page 15)

Activity	HH men* (days/ha)	VND/day**	Cost/ha in VND
Land preparation (hired labour)	0		
Making internal field ditches	1.54	150 000	231 000
Cleaning the field (manual labour)	4.62	150 000	693 000
Bund preparation	1.54	150 000	231 000
Broadcasting seeds	0.77	120 000	92 400
Gap-filling	1.54	120 000	184 800
Broadcasting fertilizer	1.15	120 000	138 000
Spraying pesticides	6.73	120 000	807 600
Water pumping/draining the field	0.58	150 000	86 700
Hand weeding (women's labour)	0		-
Field visit	10	120 000	1 200 000
Combined harvester (hired labour)	0		-
Hauling (hired labour)	0		-
Days/ha	28.47		
Total			3 664 500
		US\$ conversion	167
		Cost equivalent of HH men labour US\$/plot size (167/0.65)	108

* HH men: Household men

** US\$1 = VND22 000

Appendix 6

Costs and returns of upland crops

Cost and returns of upland crops (including household labour inputs in days/ha)

Hoa Tua1 Squash production on 1400m² (0.14 ha)	
Household men labour (days/ha)	58
Household women labour (days/ha)	64
Seed cost/ha (VND)	1 347 518
Labour cost/ha (VND)	16 345 745
Fertilizer cost/ha (VND)	1 134 752
Pesticide cost/ha (VND)	1 177 305
Total cost (VND)	20 005 319
Yield (kg/ha)	8 511
Price (VND/kg)	7 000
Squash gross return (VND/ha)	59 574 468
Net return (VND/ha)	39 569 149
Benefit–cost ratio*	2.98

Hoa Tua1 Green bean production on 1000m² (0.10 ha)	
Household men labour (days/ha)	18
Household women labour (days/ha)	68
Seed cost/ha (VND)	200 000
Labour cost/ha (VND)	10 725 000
Fertilizer cost/ha (VND)	1 480 000
Pesticide cost/ha (VND)	250 000
Total cost(VND)	12 655 000
Yield (kg/ha)	1 500
Price (VND/kg)	30 000
Green bean gross return (VND/ha)	45 000 000
Net return (VND/ha)	32 345 000
Benefit–cost ratio*	3.56

Vien An Onion leaf production on 500m² (0.05 ha)	
Household men labour	31
Household women labour	49
Labour cost/ha (VND)**	1 600 000
Selling cost (VND)	1 000 000
Insecticide cost (VND)	200 000
Total cost (VND)	2 800 000
Yield (kg)	600
Price (VND/kg)	6 000
Onion leaf gross return (VND/ha)	3 600 000
Net return/crop (VND/ha)	800 000
Net return per year (2 crops) (VND/ha)	1 600 000
Benefit–cost ratio*	1.28

* BCR = GR/TC

** 80hrs/season (40 days x 2 hrs) @ VND20 000/hrs

This case study focuses on smallholder farms in Soc Trang, southern Viet Nam. Its purpose is to illustrate and compare women and men's contributions to two integrated, rice-based farming systems: the first and more traditional one is centered on double rice cropping, while the second adopted an innovative practice which integrates rice and aquaculture (shrimp farming). The study explores how gender norms affect the division of labour and farmer's access to and decision-making about productive inputs, technologies and services.

The conclusion introduces a set of key findings from a social and economic perspective, acknowledging the importance of recognizing “invisible family labour” when pursuing agricultural productivity goals and pointing to the benefits of integrated agriculture/aquaculture/livestock systems. It is followed by recommendations, aimed at policy makers, researchers and development partners.

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