
Activity 1.2

This summary forms part of the ACIAR Project AGB/2012/061
Improving smallholder farmer incomes through strategic market development in mango supply chains in southern Vietnam

Study: Year 1 Summary – Household baseline survey

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Executive Summary

This baseline study was conducted in the frame of the ACIAR project “*Improving smallholder farmer incomes through strategic market development in mango supply chains in southern Vietnam*” which aims to identify opportunities and deliver interventions using a whole-of-chain approach underpinned by a strong market and economic perspective. It investigates socio-economic and demographic characteristics as well as farming and market practices, resource endowment including land and productive resource access, income sources, and level, production sales, labor allocation, and with an emphasis on gender roles within the households (HH) including in orchard management systems.

Overall, the surveyed farmers appear to be quite well-endowed in terms of equipment, social capital and they are not stuck into poverty traps and in logics of indebtedness. Most of them (80%) have savings and dedicate the higher share of their total income to investing in mango production (with surveyed farmers being highly specialized in mango production). A high proportion of sampled farmers have collective responsibility within collective organizations.

The vast majority of the surveyed farmers are producing both during main and off seasons. However, significant variations regarding the costs of pesticides and fertilizers between main and off season were found. While Cat Chu and Cat Hoa Loc were expected to be strongly represented in the survey, it is interesting to note that a significant proportion of the survey also cultivate the Taiwanese variety, especially in the district of Cao Lanh City (district in which all farmers also cultivate Cat Chu with these two varieties being found as the most common combination, (37% of the sample). Interestingly intercropping with other crops is a common practice. It is important to note that the price pattern for Cat Hoa Loc differs from the one for the other two most frequent varieties, which might be further considered with regard to floral induction activities.

So far, value chains appear to be quite rudimentary with unsophisticated quality management and commercial transactions at farmer level. It is interesting to note that under current value chain operations, village collectors appear to be controlling quality on a more regular basis than the other buyers (with criteria which are easy to check at the time of the transaction: size of the fruits and their color as well as the absence of defect and bagged fruits).

The use of certified standards is not a common practice though cost for certification are mostly incurred by local authorities, which is consistent with the most frequent standard being VietGAP (85%). There seems to be lack of market demand for it so far as well as a lack of adapted inputs and knowledge about these standards. And only GlobalGAP farmers are currently in a position to earn significant price premium.

The survey also provided concrete evidence of gender unbalances at household level with regard to production activities and decision making, and showed that these could be less marked at marketing level, with women buyers being a common feature of mango chains. This points out to the potential for using whole of the chain approaches in addressing gender concerns as part of the project intervention. Another important entry point for the project in this regard concerns the support and work with farmer groups and cooperatives. While cooperatives and farmer groups appear to play an important role for farmers to network with others and access more information, participation is very biased towards men. This coincides with the fact that, so far, participation to social activities is mostly decided by the men in their own. Furthermore, in the vast majority of the cases, only the men in the households are member of the collective organizations. This constitutes an important point of vigilance for project intervention. Proactive action from the project to ensure enhanced women participation in these collective organizations could act as a leverage point to improve the gender balance and empower women.

1.0 Introduction

Aim & scope, background

Tropical fruits, specifically mango, make a significant contribution to Vietnam's economy and nearly half are produced in the Mekong Delta region. The region located in the southern part of Vietnam is playing an important economic role in supporting over 15m people and contributing over 27 per cent of national Gross Domestic Product (GDP). Mango has been identified as the key fruit for this project due to its importance in both central and local governments' policy, the positive market environment, and, more importantly, potential to benefit smallholder's livelihoods in southern Vietnam.

The ACIAR project "*Improving smallholder farmer incomes through strategic market development in mango supply chains in southern Vietnam*" within which this baseline study is conducted aims to identify opportunities and deliver interventions using a whole-of-chain approach underpinned by a strong market and economic perspective. Its final goal is to improve the net income and livelihoods of smallholder mango farming families in southern Vietnam by increasing the throughput and profitability of mango production. This project is the first phase of a longer-term research strategy, which aims to build a competitive position for smallholders and the broader mango sector through capacity building activities. It intends to target identified priority innovation and adoption gaps to achieve a competitive position in mango supply chains in the southern Vietnam provinces of Dong Thap and Tien Giang. The research aims to upgrade the level of competitiveness for stakeholders (farmers, traders and processors) along the supply chains and to generate a shift from opportunistic and irregular market associations to systematic players within identified growing supply chains. This approach means smallholders must acquire new skills and build their capacity to participate and respond appropriately in dynamic markets. An emphasis has been placed on understanding roles and opportunities for women throughout the project. In southern Vietnam, improvements in market development are critical for competitiveness and improved income for smallholders. This project will seek to examine the role of gender and the relevance to community benefits that flow from improved supply chains.

The project is led by Griffith University (GU) and the Sub-Institute of Agricultural Engineering and Postharvest Technology (SIAEP) and collaborating with the Southern Horticultural Research Institute (SOFRI) and the Southern Centre of Agricultural Rural Policy and Strategy (SCAP). A strategic feature is the targeted involvement of the technical institutions of the Department of Agriculture and Food, Western Australia (DAFWA) and the French agricultural research agency, CIRAD.

This baseline survey investigates socio-economic and demographic characteristics as well as farming and market practices, resource endowment including land and productive resource access, income sources, and level, production sales, labor allocation, and with an emphasis on gender roles within the households (HH) including in orchard management systems. Hence, the following topics were investigated by the questionnaire: household characteristics, household assets, land, mango production, quality standards, other crops and livestock production, savings and loans, other income sources, and consumption patterns.

2.0 Methods

Questionnaire design

The baseline survey questionnaire design was first drafted by Estelle Biénabe and Isabelle Vagneron from Cirad building upon the questionnaire used by Subervie and Vagneron (2013), which study investigated the impact of GlobalGap certification on smallholder lychee farmers. Further insights were drawn from the questionnaire used for a study conducted in Indonesia to assess the sustainability and long term trajectories of dairy production systems (Sembada, 2018) in which Isabelle Vagneron was also involved and from the questionnaire used for a study conducted in Lao PDR on the impact on smallholder rice producers of the Helvetas project on rice producer group creation and organic certification (Helvetas, MAF, 2006; Vagneron, Lemeilleur and Chialue, 2017). A gender and social inclusion lens was applied when designing the questionnaire.

A first version of the questionnaire was circulated among the different institutions and activity leaders for feedback. Results from the qualitative gender case study were built into the questionnaire design. Insights from Nozomi Kawarazuka and her 2 colleagues from Care International, i.e. the SRA gender team in charge of the gender study, were incorporated into the questionnaire. The questionnaire design also benefitted from their sensitization of key project partners during the gender-awareness training for local researchers to understand how gender integrates with the agricultural research and interventions organized in HCMC on the 11th and 12th of December 2018 ("Social analysis and action for improving sensitivity in agriculture training"). This allowed to capture current HH situation including socio economics, demographics, education and skill levels, HH characteristics (roles, responsibilities, access to information and the time spent by gender), finance and endowments.

The different inputs were compiled in the questionnaire version that was used for being finalized during the workshop organized by CIRAD with SCAP in HCMC on the 27th and 28th of February 2019. The version agreed on was set into the Kobotool box format by Estelle Biénabe prior to the workshop. During this workshop, the experiences from local researchers were used as inputs to refine the questionnaire under this format during the first day of the workshop. Changes were made based on balancing between information needs and time and respondent fatigue constraints, ensure consistency, accuracy and non-redundancy across questions. The second day of the workshop was used to train the 9 enumerators (Hung and Linh from SCAP, Tiên from SOFRI, Linh from SIAEP, and 5 social science students with experience in conducting surveys) for administering the questionnaire on the tablets. Further insights were gained with regard to improving the questionnaire, in particular in terms of ease of administration.

Final revision of the questionnaire was made based on the feedback from the pre-test of the questionnaire with 20 farmers. A total of about 450 questions were finally retained, consisting in household composition and member socio-economic characteristics, general livelihood characteristics, land tenure and use, other farm assets and agricultural equipment, farmer networks and access to services, mango production and post production activities (labor differentiating between men and women, and input use), marketing of mangoes, financial characteristics of the households, food consumption behavior and decision making distribution in the households. The questionnaire distinguishes between in and off seasons, in particular with regard to production and marketing data.

Sampling, survey implementation and data treatment

The sampling has been carefully conducted to identify mango growers for not only the baseline survey, but also for the project implementation under activity 1.1. First, based on the target of 270 farmers in 3 districts (Cao Lanh City and Cao Lanh district in Dong Thap province; Cai Be district in Tien Giang province), we selected 3 communes in each district with regard to their shares of mango areas. Second, we requested local governments to provide a list of mango farmers in each commune. Then, we randomly chose 30 farmers in each commune for the interviews. Criteria used for considering farmers as mango growers were: a) the income from mango of these households must account for at least 60 percent of the total income and b) these farmers must have willingness to share (information and experience in mango production) and commit to participate in the project in at least 3 years. Farmers' commitment is crucial for the implementation of this project because they might be requested to apply/adopt new technologies and interventions in responding to market opportunity and production improvement that are obtained from other activities under the project.

Once in possession of the corresponding list of farmers, face-to-face interviews were conducted by well-trained enumerators in the 3 districts between the 20th and the 24th of May using a tablet-based programme. The programme were developed by Dr. Estelle Biénabe (Team-leader) on the Kobotool platform with sophisticated checks for plausible and missing data. At the end of the survey, 227 households were successfully interviewed¹. Respondents were persons directly involved in mango production. The remaining farmers from the list of 270 farmers, targeted for intervention at the time of the sampling, were either not available or not actual mango producers, and could therefore not be interviewed. Decision was made not to conduct additional interviews given cost and time constraints as well as uncertainties as to the actual farmers targeted for intervention at that stage and considering that this was not a requirement from an impact assessment perspective. The same sample is to be used when conducting the end line impact assessment questionnaire. It will be important when conducting the end line survey to differentiate between the sampled households which will eventually benefit from the project intervention from those not benefiting from it. Some difficulties were faced when administering the questionnaire due to its length and the willingness to avoid redundancy, which created complexities in terms of questions conditioned to previous answers².

Data treatment reported in this document was done using Stata 16.0.

¹ Of these, one interviewee was a retired man who was then put in a separate sheet in the final database but was considered as part of the general analysis.

² Two conditions were not properly programmed in Kobotool box. This resulted first in a few missing questions and data on household composition for 9 interviewees, which were asked over the phone through follow up interviews by SCAP colleagues, based on an additional data collection table prepared by Estelle Biénabe. Second, this resulted in missing data regarding labor, which could not be gathered during subsequent interviews. The following questions: *For how many working days (seasonal men/women workers)?* And *Average daily wage for seasonal men/women workers (in thousand VND)?* were only asked to interviewees who were hiring permanent labour, hence a small proportion of the interviewees.

3.0 Results

General characteristics of the surveyed farmers

The survey was conducted with 227 farmers distributed as described in the table 1 below in the three targeted districts. Quite a significant proportion (about a third) of the farmers have completed high school or university, with some variations across districts. All the respondents are from the Kinh ethnic group. Only 10 respondents are women (4% of the sample). Respondent age is on average of about 54 years with an important proportion of the sample already above this age.

Table 1

	Cao Lanh City	Cao Lanh district	Cai Be	Total
Number of sampled farmers	81	75	71	227
Average size of the household (HH)	4,1	4	3,9	4 ³
Head of HH age (in % farmers in sample)				
<i>Less than 30</i>	1	1,5	1,5	1
<i>Between 31 and 45</i>	31	18,5	17	22,5
<i>Between 46 and 55</i>	12,5	31,5	29	24
<i>Between 56 and 70</i>	50,5	47	44,5	47,5
<i>More than 70</i>	5	1,5	8	5
Head of HH education				
<i>University completed</i>	6	5,5	1,5	4,5
<i>High school completed</i>	28,5	27	25	27
<i>College completed (3 years)</i>	2,5	3	0	2
<i>Lower college (2 years)</i>	0	3	1,5	1,5
<i>Secondary school completed</i>	38,5	47	39,5	41,5
<i>Primary school completed</i>	22	14,5	25	21
<i>No certificate</i>	2,5	0	6,5	3
<i>No schooling or could not complete primary school</i>	0	0	1	0,5

On average the household size is of 4 people, with additional persons to the husband and wife ranging from 0 to 7 persons; and the vast majority of the respondents are married as evident from table 2.

Table 2

Marital status	Proportion (%)
Married	96
Single	2
Widow	2

³ Ranging from 1 person to 9 persons

Regarding education level, respondents, which are mostly men, overall have a higher education level than their spouse as evident from table 3 below.

Table 3

Education level – Proportion in the sample (in %)	Respondent	Spouse
University completed	4,5	2,5
High school completed	27	15,5
College completed (3 years)	2	0,5
Lower college (2 years)	1,5	1
Secondary school completed	41,5	38
Primary school completed	21	39
No certificate	3	2,5
No schooling or could not complete primary school	0,5	1

Livelihood main characteristics

Household activities and income sources

The systems of activities for the sampled households are quite specialized into agriculture and are not very diversified. Only a very few HH has other activities than agricultural ones and the most frequent one is civil servant as evident from table 4 and 5 below.

Only 8 respondents indicated not producing mango during off season, and all of them indicated farming their own farm as their main activity. Of those, the two spouses who indicated participating to agricultural work also indicated farming their own farm as their main activity. For those producing both during main mango season and off season (217 respondents), only 5 did not answer “farming own farm” as their main activity during main mango season but a much larger proportion (49 respondents) had other activities as main activity off mango season as evident from table 4 below.

The large majority of the spouses participate to agricultural work, i.e. 144 persons (63,5% of the sample) and most spouses farm their own farm during the main mango season. As expected, the level of inactivity is higher for spouse than for respondents. For those spouses not participating to agricultural work, the majority indicated “Housework” as their main activity, with a few being retired, civil servant or having salaried work or to a lesser extent even, shop keeper/ collector.

Table 4

Main activity	Respondent		Spouse	
	During main season	During off season	During main season	During off season
Farming own farm	212	170	117	80
Inactive/ Housework	1	25	18	49
Civil servant	1	10	1	1
Other salaried work	1	5	4	6
Farm worker outside	1	3	0	0
Shop keeper/ collector	1	3	2	3
Fisherman	0	1	0	0
Industry worker/ artisan	0	0	0	3

On average, respondents stated that the proportion of the HH income resulting from farming activities was as high as 86%, which is consistent with the high level of involvement in agricultural activity described above (see table 5 below). Mango production represents on average for the whole surveyed population 74,5% of the total household income. This confirms that i) these households are highly relying on mangoes and (ii) impacts from the project intervention will significantly affect these smallholders' livelihood. Table 5 also shows some slight variation in the main activity of the head of HH between the main mango season and off season.

Table 5

	Cao Lanh City	Cao Lanh district	Cai Be	Total
Income resulting from farming activities	83,5%	86,5%	88,5%	86%
Income from mango in the total HH income	77,5%	73,5%	72,5%	74,5%
Main activity of the HH head during main season				
<i>Farming own farm</i>	77	67	68	212
<i>Farmer worker outside</i>	1	0	0	1
<i>Civil servant</i>	0	0	1	1
<i>Shop keeper/ collector</i>	0	1	0	1
<i>Other salaried work</i>	0	0	1	1
<i>Inactive/ Housework</i>	1	0	0	1
Main activity of the HH head during off season				
<i>Farming own farm</i>	59	55	56	170
<i>Farmer worker outside</i>	2	0	1	3
<i>Civil servant</i>	4	4	2	10
<i>Shop keeper/ collector</i>	1	2	0	3
<i>Fisherman</i>	0	0	1	1
<i>Other salaried work</i>	2	0	3	5
<i>Inactive/ Housework</i>	11	7	7	25

Only 4,5% of the sample indicates being in the 'Near poor' category and 1 household in the 'Poor category' according to government classification. And only 13,5% of the households indicated receiving remittances from relatives for an average amount of 41 million VND.

About a half of the surveyed households (see table 6 below) indicated not earning any income from non-agricultural source. In case where the household earns income from non-agricultural source, it is mainly through the spouse and then to a less extent through a child.

Table 6

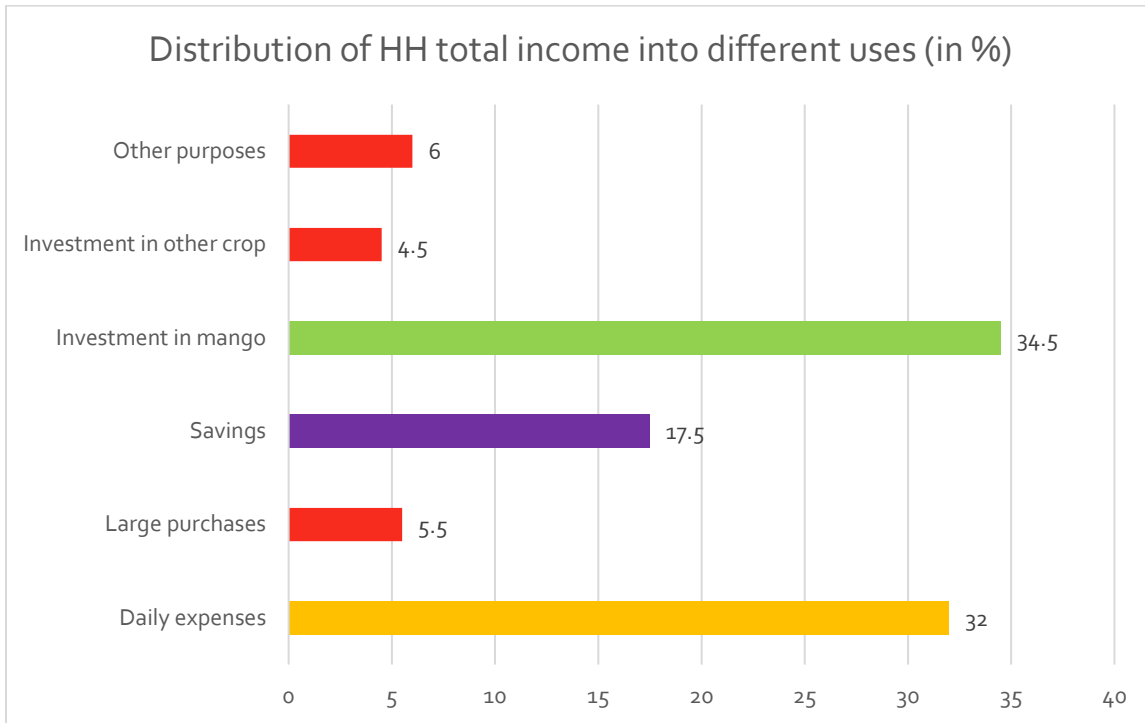
Member in the household earning non-agricultural income source	Proportion of respondents
Nobody	51
A child	23
The spouse	34
The respondent	10
Interview and her spouse	2
Spouse and a child	1
A parent	0,5
Interview and a child	0,5

General household financial situation and behavior

It is interesting to note that respondents indicate that respondents indicated dedicating the higher share of their total income to investing in mango production as evident from graph 1 below, followed by daily expenses and then savings. This will have to be further investigated during the course of the project. This is consistent with the large majority of the surveyed farmers, indicating not having borrowed money in 2018 because they did not need it (more than 60%, only 7 farmers stated their fear to borrow as the reason for not doing it and one, borrower denial/ rejection. And more than 80% of those who borrowed money in 2018 indicated not having problems to pay back their loans. Additionally, almost 80% of the respondents indicated never being short of cash for living and production expenses, and of those having answered positively to a cash shortage, almost half of them do not face this situation every year.⁴ All these figures seem to confirm that overall, these mango producers are not stuck into poverty traps and that for most of them, their economic situation is quite healthy.

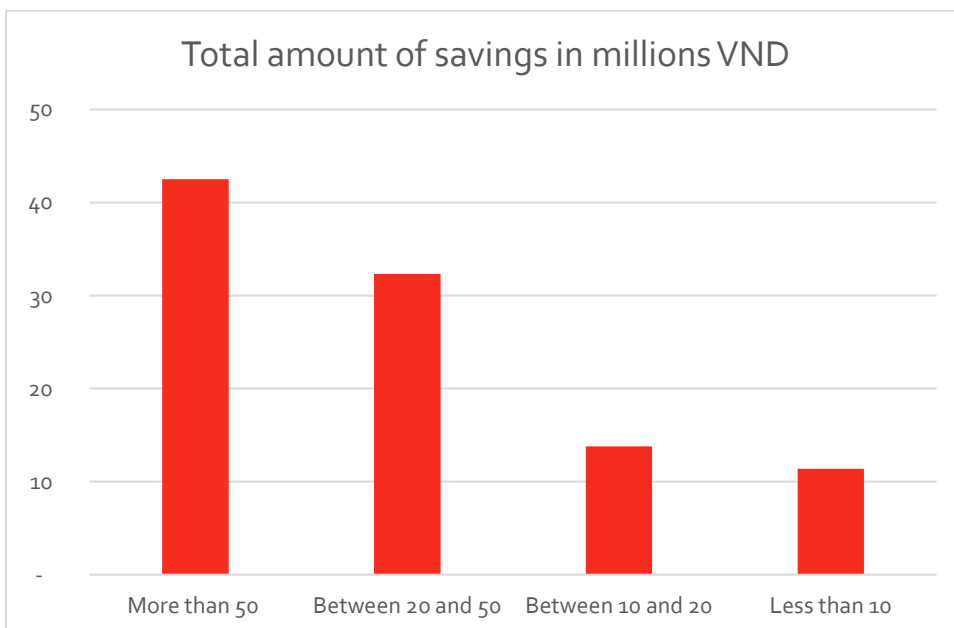
⁴ For those facing shortage of cash, this mostly happens during the months of June, then May and July, much less during the other months (especially January, February and March).

Graph 1



Only 27% of the respondents answered having a bank account. However, almost 74% indicated having savings, which is consistent with results presented above. 42% of them indicated that their total saving amount is above 50 million VND as evident from graph 2 below. And most of the respondents who hold savings (80%) keep them at home, which is consistent with the low proportion of the respondents having a bank account. A much lower proportion keeps them in a bank account (27%); and a few uses village (or other) saving funds or informal credit groups.

Graph 2



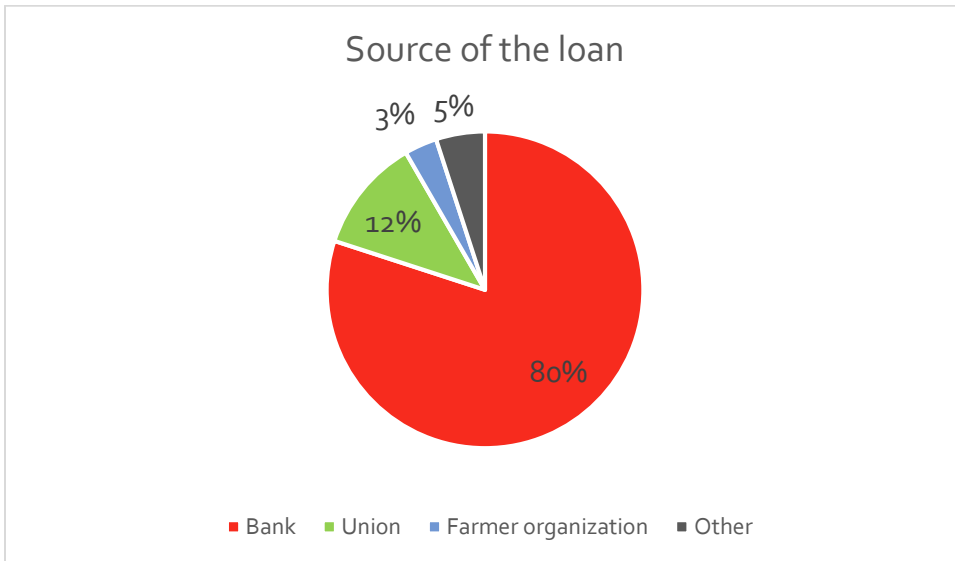
Most households (HH) actually indicated not having borrowed money in 2018 (more precisely 73,5% of the sample) and almost all of them (159 against 8) indicate not borrowing because they do not need it. Furthermore, of those borrowing money, the large majority indicate having no problem to pay back their loan (49 against 11). And most HH indicate having savings (in the same proportion as those indicating not borrowing). Interestingly however, 63,5% of the respondents who stated borrowing money also indicated having savings (see table 7 below, representing 16,5% of the overall sample). And conversely 16,5% of the respondents indicate both not having savings and not borrowing money. As evident from the above results, financial management varies widely across surveyed HH but do not appear to be a major constraint for these HH.

Table 7

Savings	Borrowing	No	Yes	Total for savings
No		38	22	60
Yes		129	38	167
	Total for borrowing	167	60	227

Those farmers having borrowed money mostly did it from the bank as evident in graph 3 below.

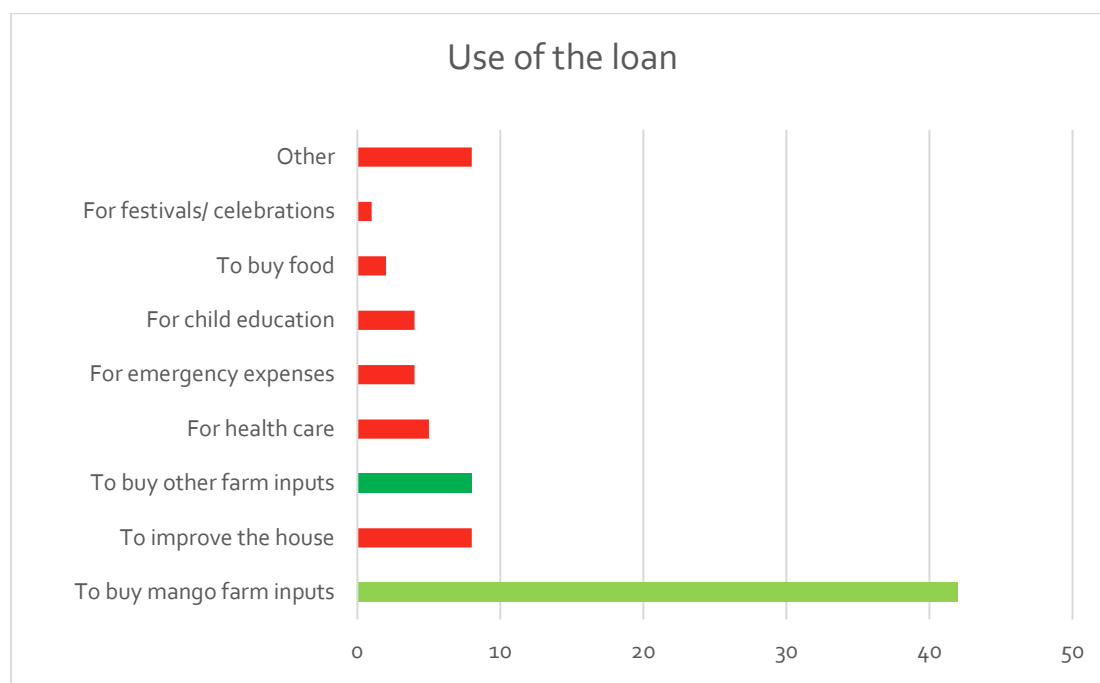
Graph 3



And for those respondents who borrowed money, most of them stated having borrowed money for buying mango farm inputs as evident from graph 4 below.⁵

Graph 4

⁵ Interviewees were given the possibility to select several answers.



General household consumption patterns

The data below are presented in this report for the sake of comprehensiveness in presenting results from the survey. However, they will become much more relevant when compared with the end line survey results. Quite similar patterns are observed for the different categories of food in terms of consumption changes since 2013 as evident from table 8 below. More increase in consumption than decrease is reported for the different categories by the interviewed households, especially in terms of fruits and vegetables consumption, which may indicate increased consumer awareness about healthy diets and / or improved farmer livelihoods. This result is in line with the findings from the Market segment report under the Activity 1.4 where the share of fruits and vegetables are also shown to be increasing while rice consumption is decreasing.

Table 8

Changes since 2013 in the consumption of:	Did not change	Increased	Decreased
Rice	51,5%	24,5%	24%
Aquaculture ⁶	49%	36,5%	14%
Meat ³	42%	36%	22%
Vegetables ³	55%	37,5%	7%
Fruits	49%	42%	9%

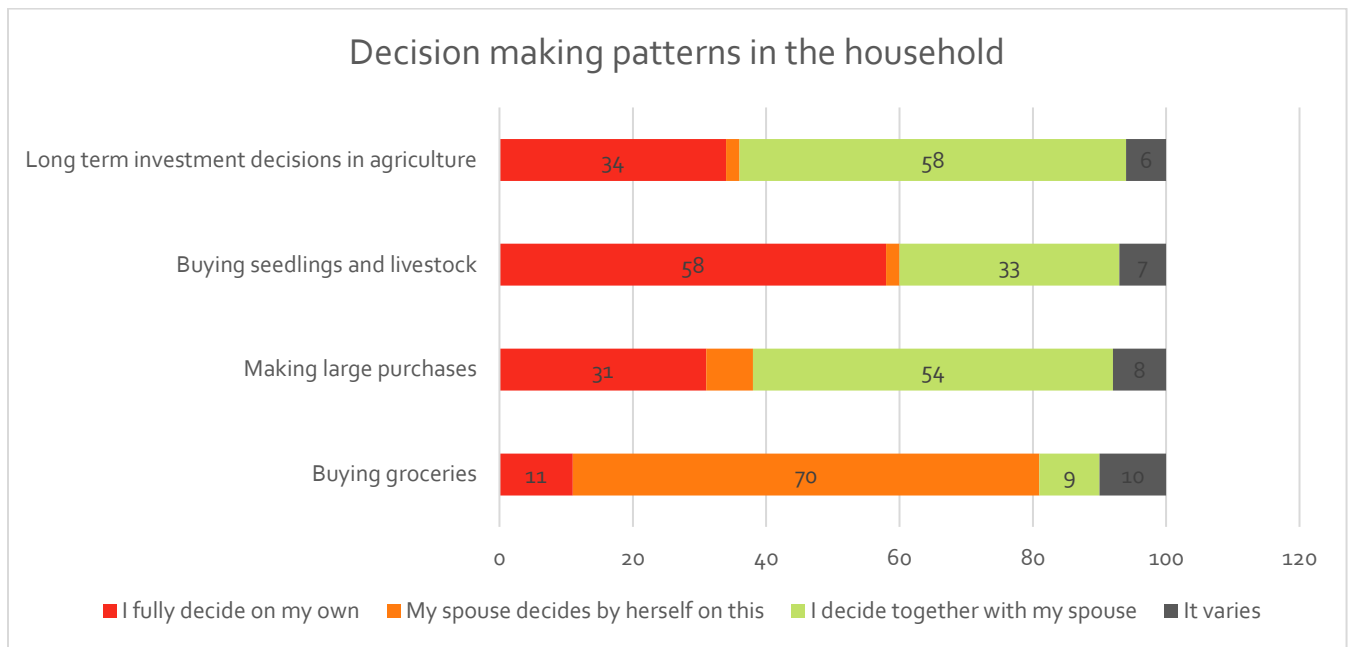
Decision making in the households and gender considerations

As expected, decision making patterns vary significantly according to the nature of the decision being made, as evident from the two graphs 5 and 6 below. With respondents being almost all men, as expected, grocery expenses decisions are mostly

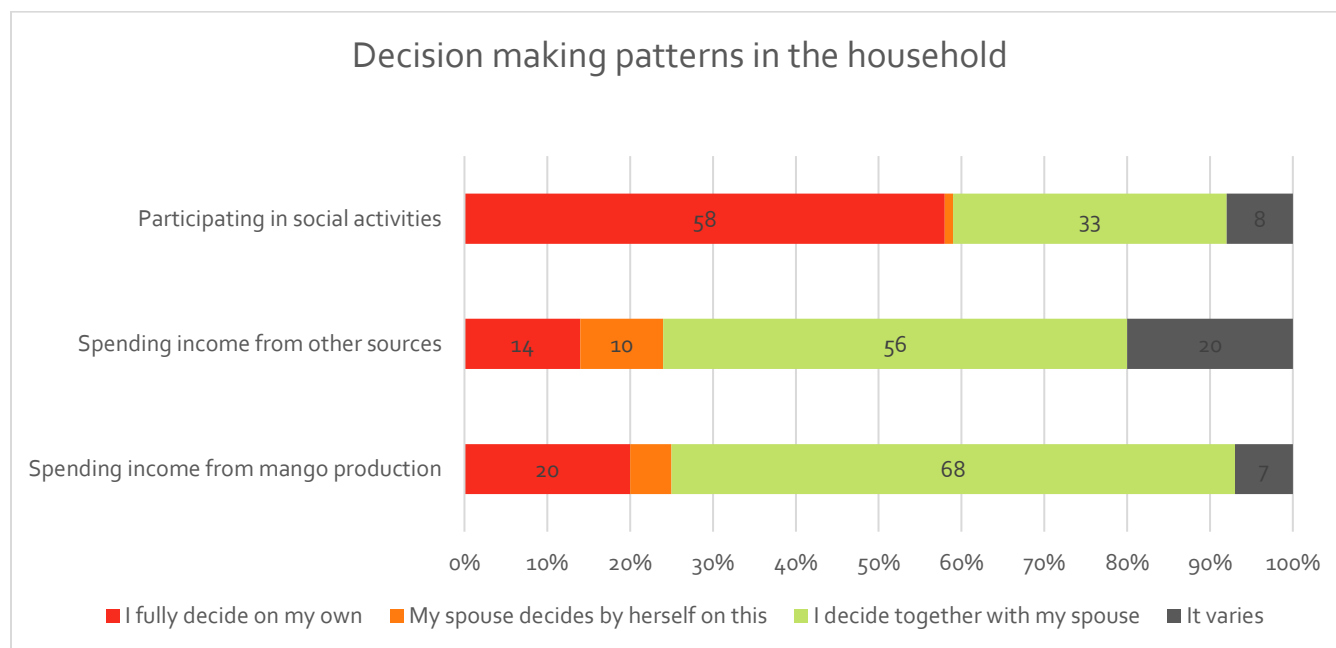
⁶ One interviewee indicated not consuming the corresponding type of food any more.

made by the spouse (with more than 95% of the respondents being male). Conversely, decisions related to seeds, seedlings and livestock purchases are more attached to the respondent in his capacity as being the main person involved in production, especially mango production. It is interesting to note that decisions on long term investment in agriculture as well as on large purchases are for more than half of the respondents made together with the spouse. This is consistent with decision on income spending also mainly being made jointly by the respondent and his spouse. It will be interesting to understand why this is even more so regarding income from mango production as evident from graph 6. Importantly, from a gender perspective, overall except for groceries, respondents indicate that the spouse rarely decides by herself; and participation to social activities is mostly decided by the respondents in their own.

Graph 5



Graph 6



Household assets

The surface of the houses of the farmers is on average of 150 m². And almost all farmers own their house (224 out of the 227 interviewed). The data presented in table 9 below will be relevant when compared with the end line. Indeed, possible improvements to the house and its surroundings would give an indication that households are better off.

Table 9

	Frequency	Proportion of the sample
Toilet in the house	213	94%
Water from the tap	204	90%
Concrete wall	145	64%
Fenced gate	123	57%
Brick wall	59	26%
Tiled roof	33	14,5%
Wooden wall	22	9,5%

When considering other personal assets, the level of endowment appears to be quite high: more than 96% of the sample possess a refrigerator, 62%, a washing machine, 39%, an air conditioner and 37,5% a computer.

36,5% use a smart phone of which 11,5% use both smart phone and basic cellphone. 59,5% only possesses a basic cellphone. Importantly, 9 respondents (4%) still state not using any type of phone. As expected of those latter category, only one respond is under 55 years.

Interestingly all respondents are located less than 2 km from the closest accessible concrete road for motor vehicle. 5 households possess a pickup truck and 3 a car while most of the sample own a motorbike (more than 98%) as is usually the case in Vietnam.

Agricultural assets

In terms of use of agricultural equipment in 2018, it is interesting to note that almost half of the farmers have used their own irrigation system and all the households, except one, own a water pump (see table 10 below). Almost all farmers are using a motorized sprayer, with some using also hand sprayer.

Table 10

Agricultural equipment use	Frequency	%	Men only	More men	Both	More women
Harvesting poles	226	99,5%	183	60	22	6
Water pump	226	99,5%	157	41	23	3
Pruning equipment	224	98,5%	181	29	12	2
Motorized sprayer	223	98%	204	17	2	0
Picking crates	217	95,5%	85	67	48	17
Grass chopping machine	152	67%	136	11	3	2
Own irrigation system	109	48%	68	26	12	3
Hand sprayer	73	32%	65	6	2	0
Hand tractor	4	2%	4	0	0	0

With regard to gender consideration, while in many surveyed households, both men and women are participating to agricultural activities, most agricultural equipment is used almost only by men, or at least more by men, except for picking crates where a significant proportion of women are also using them (see table 10 above).

Land, livestock and labor

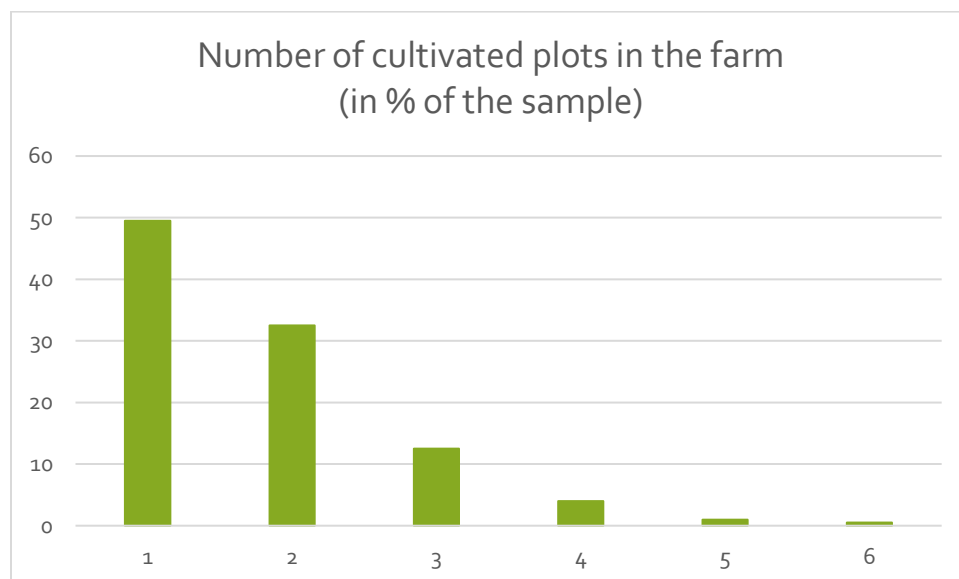
On average, the surveyed households are using 9600 m² and only 5,5% of them employ permanent labor, with some variations regarding the distribution of land use size and labor employment across districts as detailed in table 11 below.

Table 11

	Cao Lanh City	Cao Lanh district	Cai Be	Total
Proportion of HH using permanent labor	10%	4,5%	1,5%	5,5%
Average farm land size (m ²)	9400	11200	8300	9600
Farm land size (m ²) (in % farmers in sample)				
<i>Less than 5000</i>	33	16	28	26
<i>Between 5000 and 8000</i>	22	24	39	29
<i>Between 8000 and 12000</i>	22	33	17	24
<i>Between 12000 and 16000</i>	11	7	7	8
<i>Between 16000 and 25000</i>	8	17	6	10
<i>More than 25000</i>	4	3	3	3

About a half of the sample cultivate crops on one plot and almost all the surveyed farmers (more than 98%) work on 4 plots or less as evident from graph 7 below. Hence, this reflects a low level of fragmentation, especially compared to other crops such as rice.

Graph 7

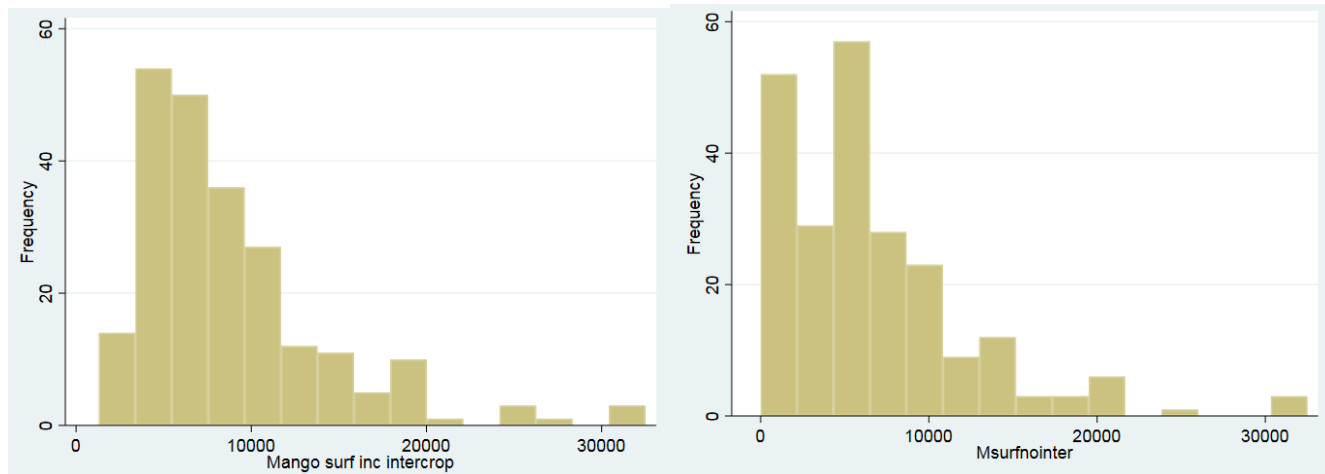


The total mango surface including area under intercropping is on average of 8790 m², and excluding it, of 6460 m². And more than ¾ of the sample has an area below 9500 m² as evident from table 12 and graph 8 below. 67 respondents indicated having surface under intercropping with other fruits (on average 7830 m², ranging between 1000 m² and 25000 m²). Only 8 households sold land between 2013 and 2018, of which 6 sold perennial crop type of land.

Table 12

Farm mango surface in m ²	Proportion (%) (incl. intercropping)	Proportion (%) (excl. intercropping)	Proportion (%) (only intercropping)
Less than 4500	16,5	39	24
Between 4500 and 7500	35,5	29,5	30
Between 7500 and 10000	24,5	10	28
Between 10000 and 14500	11	12	12
More than 14500	12,5	9,5	6

Graph 8: Distribution of mango surface with and without including intercropping with other fruits



Overall, the average mango surface in Cai Be is 8030 while it is 8525 in Cao Lanh City and 9910 in Cao Lanh District and distributed as indicated in table 13 below⁷.

Table 13

% farmers	Cao Lanh City	Cao Lanh district	Cai Be
Less than 4500	16	21	13
Between 4500 and 7500	43,5	34,5	27
Between 7500 and 10000	23,5	22	28,5
Between 10000 and 14500	9	10	14,5
More than 14500	8	12,5	17

⁷ Differences in mango areas across districts are not statistically representative.

Only eleven respondents indicated also cultivating paddy rice covering surfaces between 2500 m² and 25000 m² for an average of 9925 m². 10 respondents are also cultivating other fruits covering surfaces between 2500 m² and 10000 m² for an average of 4800 m², and 4 cultivate other crops. Only one farmer has got land under pasture. This means that surveyed farmers, which have small surfaces in general, show a high level of specialization in mango production. While the majority of the sample do not raise animals, 42,5% do have poultry (on average about 31 poultry animals), 6% pigs (on average about 16 pigs) and 3% other animals (on average about 16 pigs).

Given the problems encountered with collecting data regarding seasonal labor as mentioned previously, only the following information could be analyzed. Only 11 households are employing permanent workers for agricultural activities. These employ between 1 and 3 workers, for an average of 1,7 workers per household. Among the 19 permanent workers employed overall by the surveyed farmers, only 2 are women who are employed by 2 different households. The average daily wage rate varies between 150.000 and 350.000 VND.

Organizations and access to services

A majority of farmers from the sample indicated being part of a farmer union. However, there is still a significant proportion of farmers not members of this type of union (i.e. 39,5%, see table 14 below). Yet, 22% of the respondents indicate being member of this organization because 'Everybody is a member'. Only less than 5% of the sample are a member for accessing credit and about 3% for buying inputs⁸. The majority of the farmers also pertain to a cooperative (54%) while the proportion of respondents member of a farmer group is lower (38,5%). This lower proportion is largely attributable to the much lower proportion of surveyed farmers members of such type of organization in the district of Cai Be (17%) as evident from table 14 below. Overall farmers in this district show a lower level of membership to the different types of organizations considered. Conversely more than ¾ of the surveyed farmers in Cao Lanh district pertain to a cooperative.

It is worth noting that only 9% of the respondents are members of credit groups and while, as could be expected, the most frequent reasons for being a member are 'To manage savings' (13 cases) and 'To access credit' (9 cases), not all farmers did consider these as being a reason for being a member to this organization. Together with the fact that credit access does not appear as a widely stated reason for being a member of farmer unions, it seems that the considered mango farmers do not rely on collective organizations to access credit. This is consistent with the fact that most HH actually indicated not having borrowed money in 2018 and for those who did, having done it with a bank as discussed above.

⁸ The answer 'Other to the reason for being a member of a farmer union' is the most frequent (89 farmers out of the 137 members of farmer unions); unfortunately, the interviewees were not asked to specify this answer not to lengthen too much the questionnaire.

Table 14

Farmer membership to:	% total sample	% for Cao Lanh City	% for Cao Lanh district	% for Cai Be
Cooperative	54	52	77	35,5
Farmer group	38,5	50,5	47	17
Farmer union	60,5	59,5	71,5	51,5
Other union	31	28,5	35,5	29
Credit group	9	10	8,5	8
None	12,5	2,5	7	27,5

Of the respondents, 11 indicated being president and 1, secretary of farmer unions; 11 indicate being president of other unions; and 12 indicate being president of a farmer group or of a cooperative, 2, secretary and 1, treasurer, which constitute a high proportion of farmers having collective responsibility. 2 respondents indicated being both president of a farmer union and of other unions.

In most cases, only the respondent himself is the member of the farmer union (i.e. only in 10 cases, both the men and the women are a member), which indicates a point for vigilance for project intervention to improve gender balance considering that mostly men have been interviewed.

31% of the sample of the respondents indicate being neither a member of a farmer group nor of a cooperative (see table 15 below). Concurrently, a number of respondents indicate being members of both a farmer group and a cooperative (23% of the sample as evident from table 15 below). The latter contradicts Vietnamese colleague information shared during project workshops according to which farmers either are participating to a farmer group or to a cooperative, but not to both at the same time. The majority of the sample indicates being part of cooperatives, and a lesser proportion to farmer groups.

Interestingly, farmers participating to both a farmer group and a cooperative are much higher in Cao Lanh district than in the other two districts (see table 14 below) while in Cai Be, farmers participate much more to cooperatives than to farmer groups (see table 15 below).

Table 15

Distribution memberships	Proportion total sample	Proportion Cai Be	Proportion Cao Lanh City	Proportion Cao Lanh District
None	31	54	22	16
Participation to cooperative only	31	29	27	37
Participation to farmer group only	15	10,5	26	7
Participation to both	23	6,5	25	40

With respondents being given the possibility to provide several answers, the two main reasons for being a member of a farmer group or of a cooperative stated by the respondents are to access technical advice and training (see table 16 below)⁹. Access to markets only comes as the third reason. Again access to credit does not appear among the main reasons for being part of organizations, which is consistent with the results presented above.

Table 16

Reasons for being member of farmer group or cooperative	Proportion (% sample)
To access technical advice	58
To access training	52
To better market products	37
To buy inputs	13,5
To access social care	13
To access productive equipment	12,5
To access credit	8,5
To store products	4,5
Everybody is a member	4,5
To manage savings	3,5
As user of water	2
Other	7

Results presented in table 16 above are also consistent with the fact that technical advice is the most frequently quoted services being provided by farmer groups or cooperatives (see table 17 below). Unfortunately marketing services were not proposed as possible answers to respondents with regard to the services received. However, information in this respect can be derived from the topics of the trainings received by the respondents in 2018, where marketing only appears after quite a number of topics related to production (see table 18 below).

⁹ Interviewees could propose several answers.

Table 17

Services provided by farmer group/ cooperatives	Proportion (% sample)
Technical advice to you	57
Input on loan/ credit	10,5
Input cash sales	8,5
No service	8,5
Financial credit	5,5
Technical advice to your spouse	5

124 respondents, out of the 157 members of farmer groups and cooperatives, indicated that these organizations organized training in 2018, with more than 5 days on average of attendance of training for these farmers in 2018. As expected and evident from table 18 below, the most widely covered topic is mango growing. Interestingly record keeping is the 3rd more quoted topic of training. It would be interesting to investigate more about this, especially as most HH indicated not having a traceability system in place with their main buyer (i.e. 90% of the farmers selling mangoes both off and in season, and 95% of those not selling mangoes off season).

Table 18

Topic of the trainings followed by the respondents in 2018	Proportion (%)
Mango growing	52
Pest control	42,5
Record keeping	32
Weed control	31
Post harvest	24
Composting	19
Marketing	19
Irrigation	17,5
Tunnels	14
Other	9,5

Mango production systems and practices

Variety use

Interviewed farmers are mostly cultivating Cat Chu and the Taiwanese varieties (about 2/3 of the sample, see table 19 below). Cat hoa loc only comes third, with a small proportion cultivating R2E2. Most farmers cultivate several varieties and unsurprisingly, the most common combination of varieties used by farmers is by far Cat chu and Taiwanese varieties (37% of the sample). Interestingly while only 8% cultivate only Cat chu and only 6% only the Taiwanese variety, the proportion cultivating only Cat Hoa Loc is higher (12,5%).

As expected from local partner prior knowledge, use of varieties differs widely across districts, with all the farmers in Cao Lanh City (81 farmers) cultivating Cat Chu while only 37% of the farmers in Cai Be and 64,5% of those in Cao Lanh District do it. Conversely 80,5% of the farmers in Cai Be produce Cat Hoa Loc against 8,5% in Cao Lanh City (see table 19 below). The use of the Taiwanese variety is less contrasted across districts though more widely used in Cao Lanh City, which is consistent with Cat Chu and Taiwanese variety being grown together. This table 19 points out that mango farmers might have developed diversification strategies into cultivating different mango varieties to reduce risks (production risks in relation with different failure rates of the varieties in flowering manipulation, or different market risks as further developed below). Understanding further these strategies could be

Table 19

Variety used	Proportion total sample (%)	Proportion Cao Lanh City	Proportion Cao Lanh District	Proportion Cai Be
Cat chu	68	100	64,5	37
Taiwenese variety	67,5	90	63	47,5
Cat hoa loc	47	8,5	55,5	80,5
R2E2	5,5	1	1,5	0
Other	1	0	8,5	1,5

The average surface cultivated with mango, including surfaces intercropped with other fruits, is of 8810 m² for farms which produce Cat Chu, of 8760 m² for farms, which produce Cat Hoa Loc and 9427 m² for farms, which produce the Taiwanese variety. More details on the distribution are provided in table 20 and graph 9 below. These confirm that the Taiwanese variety is on average produced in relatively bigger farms, though differences in areas with other varieties are not statistically significant, which could be expected given that most farmers are cultivating different varieties.

Graph 9

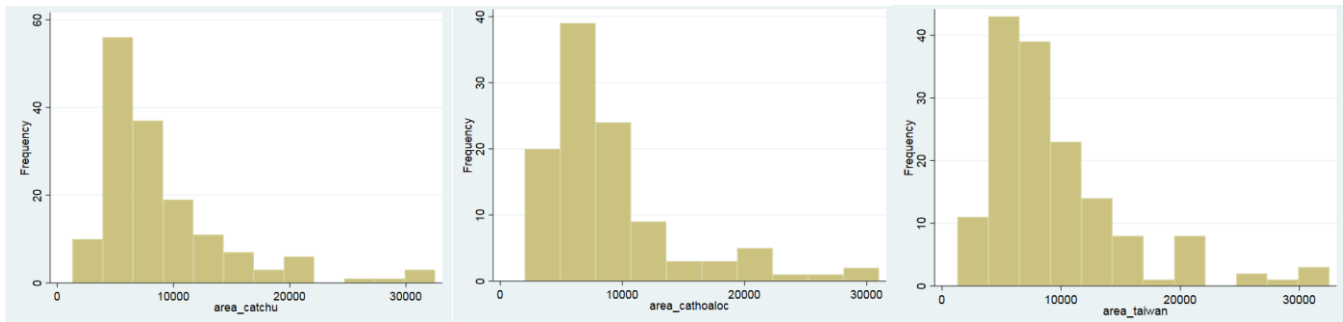


Table 20

Farm mango surface (including intercropping) in m ²	% for farmers producing Cat Chu	% for farmers producing Cat Hoa Loc	% for farmers producing Taiwanese
Less than 4500	17,5	17,5	14,5
Between 4500 and 7500	35,5	35,5	32,5
Between 7500 and 10000	24	24,5	25,5
Between 10000 and 14500	10	9,5	13,
More than 14500	13	13	14,5

Interesting 73% of the respondents who cultivate the Taiwanese variety are intercropping mangoes with other fruits while only 56,5% of those who cultivate Cat Hoa Loc 61% of those who cultivate Cat Chu do it.

Table 21 below presents the average productivity level of the main varieties per tree in the main season and off season²⁰. Interestingly, only the productivity of Cat Hoa Loc seems much higher during the main season than during off season, and given the high level of variability in these data, even that difference is not statistically significant.

Table 21

<i>Volume of production per tree (in kg)</i>	Cat chu	Cat Hoa Loc	Taiwanese
During main season	58.41468	70.26409	21.92718
During off season	59.9799	50.39706	20.17097

Farmer practices and gender considerations

²⁰ It is important to note however that there is a high level of variability in these figures.

It is interesting to note that not all the surveyed farmers are undertaking themselves harvesting activities: 12% do not harvest themselves during the main season and 13% off season. Furthermore, post-harvest activities are only undertaken by 58,5% and 60% of the farmers, respectively during the main and off seasons as evident from table 22 below. This table also presents some differences in this regard across districts and according to the type of buyers. The proportion of farmers undertaking post-harvest at farm level are similar across the main mango varieties¹¹. Transport is taken care of by 41,5% farmers during main season and 41% off season.

Table 22

Proportion of farmers undertaking post-harvest activities at farm level	During main season	During off season
For the whole sample	58,5	60
Per district		
In Cao Lanh City	61,5	63
In Cao Lanh district	57,5	57,5
In Cai Be	55,5	58,5
Per type of main buyer		
Collector outside the village	54	54
Local wholesaler in the provincial city	65	67,5
Village collector	66,5	66,5
Farmer group/ cooperative	50	50
Processor	60	60

When looking at average annual prices for the main varieties for those farmers undertaking post-harvest on farm and those not undertaking as shown in table 23, there appears to be slight differences, which are not statistically significant. This can help explaining why many farmers do not undertake post-harvest activities.

Table 23

<i>Average annual prices (in VND)</i> ¹²	Cat chu	Cat Hoa Loc	Taiwanese
Post-harvest own farm	17.800	56.100	24.900
No post-harvest on farm	19.500	53.700	25.100
Average price for the variety	18.450	55.100	25.000

Table 24 below clearly indicates a gender differentiation in mango production practices. Most activities are mainly undertaken by men (considering that more than 95% of the respondents were men). This is particularly so for activities such as floral induction, pest control and weeding, which are mostly directly undertaken by the respondent himself.

¹¹ 59% for Cat Chu and Cat Hoa Loc and 58% for the Taiwanese variety.

¹² Prices across criteria are not statistically different except when separating between those farmers which state that the color is important for their main buyer and those not ($P < 0,05$).

Table 24

	Respondent (%)	Spouse (%)	Other men (%)	Other women (%)
Watering	95,5	41,5	47	10,5
Fertilizer application	95	28,5	43,5	5
Floral induction	91	10	41	0,5
Pruning	90,5	12	40,5	1,5
Pest control	89	10	39	1,5
Weeding	88,5	16,5	41	6
Harvesting	76	54	44,5	18,5
Record keeping	59	4	8	0
Fruit bagging	55,5	18	30,5	3

It is also interesting to note that a non-negligible proportion of the sample does not undertake record keeping.

Input use and cost

Only one of the surveyed farmers indicated not using pesticides. And almost all interviewees are using floral inducing chemicals (95,5%, as evident from table 25 below). It is interesting to note that more than 75% of the farmers are using organic fertilizers, and this proportion holds when considering only those farmers practicing intercropping with other fruits.

Table 25

Input use	%
Pesticides	99,5
Floral inducing chemicals	95,5
Herbicides	88,5
NPK mix	88,5
Growth regulators	79,5
Organic fertilizers	78
Potassium	69
Input use (continued)	%
Nitrate	58,5
Phosphate	54,6

Micro-fertilizers	46,5
Compost purchased	13
Other inputs	9
Compost produced	5,5

There are significant variations regarding the costs of inputs between main and off season for fertilizers and pesticides as evident from table 26 below. This difference would probably be worth exploring further in the project. In other crop production, it is common that fertilizers represent about 40% of the production cost. However, in the case of mangoes, pesticides and flowering manipulating chemicals are much more prominent. This indicates an important area of exploration for the project to help reduce harmful chemical applications while maintaining or improving the effectiveness of input application. This would significantly contribute to improve farmers' health and the environment.

Table 26

Cost in VND	Total farm cost	Cost / tree ¹³
Fertilizers main season	6.630.000	33.000 ^{**}
Fertilizers off season	7.648.000	40.500
Pesticides main season	13.491.000	68.000 ^{***}
Pesticides off season	21.342.000	116.500
Other inputs main season	5.685.000	29.000
Other inputs off season	6.227.000	33.500

Only slight differences are also observed in pesticide and fertilizer cost across the farmers according to whether or not the cultivate the main varieties and whether they have surface under intercropping (see table 27 below).

¹³ ($p < 0,05$) for fertilizers and ($p < 0,01$) for pesticides (ttest).

Table 27

Cost in VND Variety	Fertilizers main season	Fertilizers off season	Pesticides main season	Pesticides off season	Other inputs main season	Other inputs off season
Catchu	6.762.000	7.667.000	14.511.000	22.299.000	6.613.000	6.963.000
Cat Hoa Loc	6.950.000	7.868.000	12.418.000	20.536.000	4.177.000	4.410.000
Taiwanese variety	7.046.000	7.945.000	14.64.000	21.527.000	6.426.000	6.746.000
Intercropping	5.930.000	7.561.000	12.319.000	21.396.000	4.619.000	5.733.000
Total for the farm	6.630.000	7.648.000	13.491.000	21.342.000	5.685.000	6.227.000

The main input provider for almost all the farmers is a private input provider (223 surveyed households, i.e. more than 98% of the sample). Only 3 farmers stated the farmer group or the cooperative as their main input provider and 1, an NGO or project. This is consistent with access to inputs not being a major reason for being a member of collective organizations.

In most cases, the respondent is the one buying the inputs (198 surveyed households, i.e. more than 87% of the sample) and he is the one deciding on which inputs are needed and how to use them (180 surveyed households, i.e. almost 80% of the sample). With almost all respondents being men, this is consistent with the common observation from the project partners that mostly men are in charge of input management. 41 respondents indicated deciding with external advice, be it themselves (in 34 cases) or their spouse (in 7 cases).

Information sources for mango production

As could be expected, a majority of farmers get information on mango production from other farmers as evident from the table 28 below. Interestingly, farmer groups and cooperatives appear to play a significant role in this regard, far more significant than extension officers. Local input suppliers, while a non-negligible source of information, is only quoted by 30% of the sample, just after television. This is consistent with the fact that surveyed HH show a higher level of confidence in the information from farmer group/ cooperatives and from other farmers than from local input suppliers.

Table 28

Source of information	% sample	Confidence in the source		
		Very confident	Confident	Not confident
Other farmers	56	16	73	11
Farmer group/ cooperatives	54	38	59,5	2,5
Television/ TV materials	31,5	14	49,5	36,5
Local input suppliers	30,5	10	64	26
Neighboring farmers	27,5	6,5	73	20,5
Extension officers	19,5	18	70,5	11,5
Chemical companies	18,5	12	25,5	59,5
Internet	5,5			
Project staff/ NGO	3,5			
Publications/ printed materials	2			
Social network	2			
Other	53,5			

It is interesting to note that confidence in the information from farmer group/cooperatives is by far the most trusted. Conversely, of those considering local input suppliers as a source of information, about a quarter expresses not being confident in this information.

Table 29

Reasons for changing practices	%
Earning a better profit	79,5
Reducing costs	57
Marketing requirements	55,5
Safety concerns	51,
Complying with regulations	37,5
Environmental impact	31,5

With respondents being given the possibility to provide several answers, the most stated reason for changing management practices is earning a better profit and the second most stated is a reason which serves the same objectives, i.e. reducing costs (see table 29 above). Economic incentives appear to play a more important role in driving practice changes than market requirements or regulatory constraints. Interestingly almost a third of the sample considers environmental impact as a driver for change.

Marketing of mangoes

Characteristics of the buyers

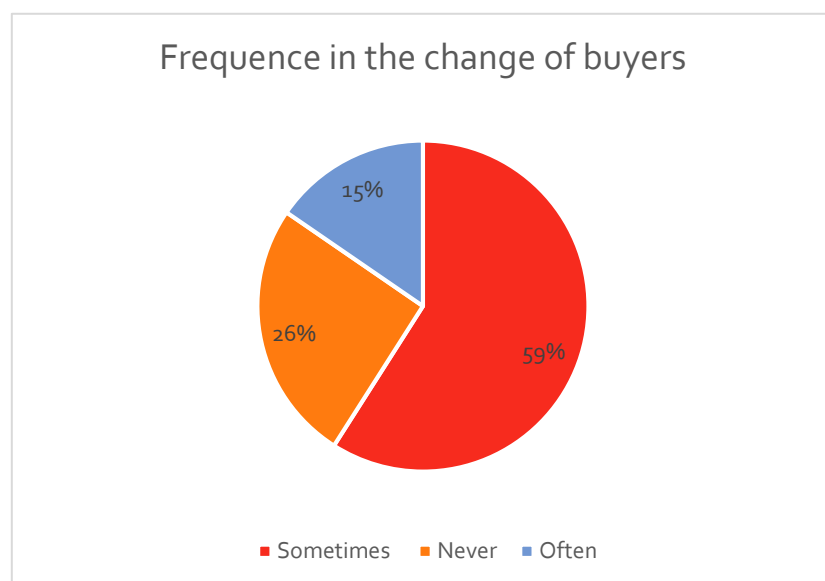
The vast majority of farmers directly sell their mangoes at farm gate mainly and only very few transports them for sales beyond the district level as evident from table 30 below. This is consistent with the low average transportation cost indicated by the respondents for 2018, i.e. about 2.140.000 VND.

Table 30

Location of the main selling point	Frequency	Proportion of the sample
At farm gate	151	66,5%
In the farmer commune	36	16%
In the center of the district	22	9,5%
In the center of the province	6	2,5%
Outside the province	4	1,5%

It is interesting to note that, on average, respondents are working with between 2 and 3 buyers: almost 60% of the farmers operates only with 2 buyers and more than 95% with no more than 5 buyers. Off season, no respondents indicated working with more than 5 buyers. Overall, the majority of farmers indicate changing of buyers sometimes but not often as evident from the graph 10 below. This is consistent with other collected data in the survey: half of the farmers states working with buyers at least since 2015. On average, farmers sell 60% of their mangoes to their main buyer during the main season. And almost all (except 7 respondents) only sell mangoes to this buyer. Almost the same applies to the main buyer off season and the second main buyer during the main season, with mango being the only production traded with this buyer (except for 2 farmers).

Graph 10



As evident from table 31 below, which captures the answers given by the farmers producing both during main and off seasons, almost half of the sample works mainly with buyers located outside its village, be they collectors outside the village or even local wholesalers. When relating this with the previous data, this means that the main channel is directly through 'distant' collectors who organize transportation up to the farms. Farmer group/ cooperatives and processors are not a significant outlet for the farmers sampled. Wholesalers from HCMC, though operating with a few number of farmers, are more active off season than during the main season as could be expected. The same apply to local retailers.

Table 31

<i>In number of farmers for each category of buyer</i>	Main buyer main season	Main buyer off season	2 nd main buyer main season	2 nd main buyer off season
Collector outside the village	65 (36,5%)	63 (35,5%)	37 (26,5%)	38 (30%)
Local wholesaler in the provincial city	43 (24,5%)	43 (24,5%)	35 (19,5%)	28 (22%)
Village collector	33 (18,5%)	50 (28,5%)	28 (20%)	24 (19%)
Farmer group/ cooperative	10 (5,5%)	7 (4%)	15 (11%)	11 (8,5%)
Processor	10 (5,5%)	2	8 (6%)	3
Local retailer	3	5	10 (7%)	8 (6,5%)
Wholesaler in HCMC	3	4	10 (7%)	8 (6,5%)
Exporter directly	1	1	1	0
Direct sales to consumers on local markets	0	1	1	1
Other	9	4	3 ¹⁴	4 ²

¹⁴ Of these 177 farmers, 20 only worked with one buyer during the main season and 16 during off season.

The differences in prices across buyers vary according to the varieties and to the season as evident from table 32 below. Overall while processors offer among the lowest prices for Cat Chu and Cat Hoa Loc, they value better the Taiwanese varieties during the main season than the other buyers providing consistent prices across main and off seasons. And farmer groups/ cooperatives also offer higher prices for the Taiwanese variety. Conversely this variety is less valued at least during the main season by the collectors who are the ones offering the best prices for Cat Chu mangoes.

Table 32

Average prices per main category of buyers (in VND)	Cat Chu		Cat Hoa Loc		Taiwanese	
	Main season	Annual	Main season	Annual	Main season	Annual
Collector outside the village	12.400	19.300	28.400	57.200	16.200	25.200
Local wholesaler provincial city	9.600	16.900	31.300	55.600	15.600	25.100
Village collector	10.000	18.300	36.500	57.300	16.700	24.700
Farmer group/ cooperative	10.300	17.900	34.500	48.900	24.000	29.000
Processor	9.800	15.700	30.000 ¹⁵	40.000 ¹⁶	26.000	25.600

On average farmers have been working with their main buyer during the main season for at least 3 years and they trade with this buyer 5135 kg of mangoes, with half of them trading 4000 kg or less, and the highest volume being traded with the main buyer being of 30000 kg as evident from graph 11 below. It is worth noting that the latter refers to a farmer who only works with one buyer. The higher volume being traded by a farmer in the sample is 75000 kg but this farmer deals with several buyers. On average, be it during the main season or off season, respondents sell lower volumes to farmer group/ cooperative than to village collector or to collector outside the village as evident from table 33 below.

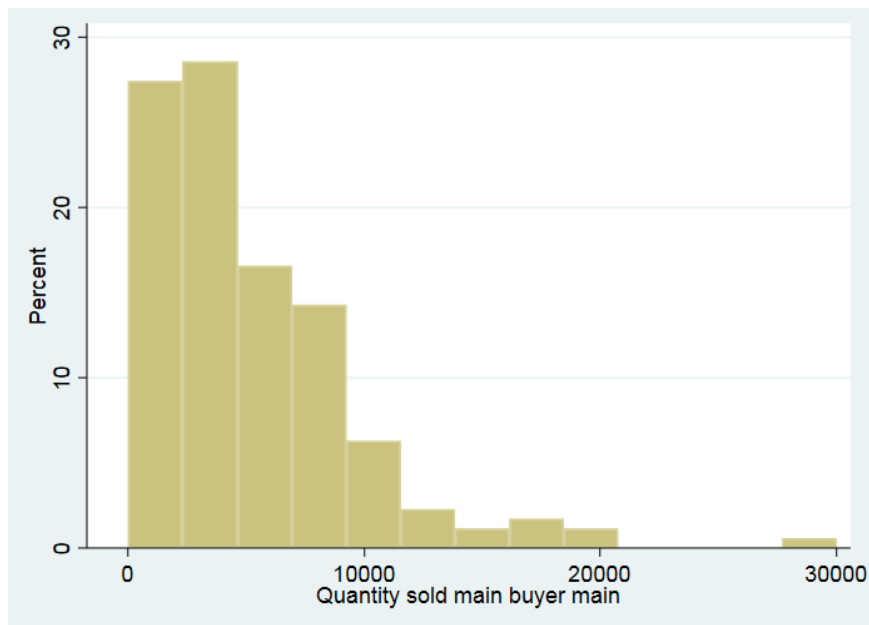
Table 33

In kg (for the most important buyer categories)	Average quantity sold to main buyer in the main season	Average quantity sold to main buyer off season
Village collector	5697	5909
Collector outside the village	5178	5064
Local wholesaler in the provincial city	4107	4788
Farmer group/ cooperative	3951	3790

Graph 11

¹⁵ Only 2 observations

¹⁶ Only 2 observations



Patterns regarding the second main buyer during the main mango season are quite similar to these for the main buyer, with interestingly more farmers dealing with farmer organizations, local retailers and wholesalers in HCMC as second main buyers. Half of the farmers indicated working with their second main buyer as well as with their main off season buyer at least since 2015. On average, sales to the second main buyer during the main season are of 2.182 kg (i.e. less than a half compared to the main buyer) and the majority no more than 1500 kg (ranging from 30 kg to 15000 kg). For half of the main and off season farmers, this represents no more than 20% of their mango sales.

Regarding main buyers off season, the main difference with the main mango season buyers is the highest occurrence of village collectors (see table 31). Quantities sold off season to this buyer are quite similar to or even higher than the one being sold during the main season (see table 33), with significant variations across farmer (half of the farmers trading 4000 kg or less, and the highest volume being traded being of 30000 kg). On average, farmers sell 65% of their mangoes to their main buyer during off season and half of them sells at least 70% to this buyer. Quantity sold on average to the second main buyer during off season is of 2185 kg, varying from 200 to 15000 kg and with half of the farmers selling 1000 kg or less. On average, farmers sell about 28% of their mangoes to their second buyer during off season.

Interestingly, although the majority of the main buyers during the main season are men, 44 farmers indicated that their main buyer is a woman and for 35 farmers, the person in charge can either be a man or a woman. This gender pattern is found across the different categories of buyers considered. For example, for the second main buyer during the main season, proportions are not very different, with a higher proportion of farmers indicating that this is not fixed (68 out of the 177). Based on this, marketing activities seems to be less biased towards men than production activities².

When looking at differences across districts (see table 34 below), it appears that collectors outside the village are less dominant in Cao Lanh City than in the other two districts. Local wholesalers have a better market position in Cai Be than in the other two districts.

Table 34

<i>% sample Main buyer main season</i>	Total sample	Cai Be	Cao Lanh City	Cao Lanh District
Collector outside the village	36,5	41	28	44,5
Local wholesaler in the provincial city	24,5	37	17	20,5
Village collector	18,5	11	23	20
Farmer group/ cooperative	5,5	7	7	2
Processor	5,5		15	
Local retailer	1,5		3	2
Wholesaler in HCMC	1,5			5,5
Exporter directly	0,5		1	
Other	5	4	6	5,5
Total	100	100	100	100

When looking at differences across varieties, it is interesting to note that a higher proportion of farmers who cultivate Cat Hoa Loc has as main buyer a local wholesale in the provincial city (see table 35 below). Conversely, farmers who cultivate Cat Hoa Loc operate less frequently with village collectors and processors as main buyers.

Table 35

<i>% sample Main buyer main season</i>	Total sample	Cat Chu	Taiwanese variety	Cat hoa loc
Collector outside the village	36,5	37	35	36
Local wholesaler in the provincial city	24,5	17	25	33
Village collector	18,5	23	21	14
Farmer group/ cooperative	5,5	6	4	7
Processor	5,5	8	6	2
Local retailer	1,5	2	2	0
Wholesaler in HCMC	1,5	1	2	4

Characteristics of the transactions¹⁷

It is striking that, by far, price is the main reason stated by farmers operating both during main and off seasons for working with their main buyer during the main season; then comes trust and long term relationship, which is consistent with farmers, on average, having worked with this buyer for at least 3 years and selling the majority of their production to him (as evident from table 36 below). Quality dimensions only come after convenience aspects, and again there are very weak linkages with producer organizations.

Also important to note is that only few farmers indicate benefiting from services from their main buyer, the most quoted ones being advanced payment (8,5%) and technical advice (8%). Importantly only 2 farmers indicated benefiting from input provision from their main buyer and only one from support for certification. On the other hand, payment immediately after delivery appears to be the norm according to farmer answer (83,5%). Only 3 farmers indicate being paid after more than 10 days. This is consistent with Smith (2014) who indicates for Dong Thap province that collectors pay cash on deliver to farmers.

Table 36

Reasons for working with main buyer	Frequency	%
Price	147	83
Trust	94	53
Long term relationship	76	43
Convenient payment	75	42,5
Consistency in buying	71	40
Convenient distance	41	23
Low quality requirements	35	20
Good value for quality	26	14,5
Good post-harvest services	18	10
Buyer related to farmer group/ coop	10	5,5
To access training/ technical support	2	1
Variety requirements	2	1
No proper choice	1	0,5

The fact that price is a main consideration in the relation between the farmers and their buyers is also reflected in 'price agreement' being stated by about 40% of the farmers producing both main and off seasons as the most difficult thing when

¹⁷ Given the length of the survey, decision has been made to only investigate these dimension for the main buyer during the main season. Given that similar patterns are observed across main and off seasons as well as between the first and second main buyer with the first one representing on average a significant share of the sales, generalization of the results presented in this section should not introduce significant biases.

selling mangoes. Interestingly almost the same proportion of farmers indicates not facing any difficulty when selling mangoes.

Overall, it appears that value chain linkages are quite basic for the sampled population. However, 30 farmers out of the 177 producing both in and off mango seasons indicated having a written contract or a formal commitment from their main buyer to purchase their production, with one of these farmers indicating having a written contract already since 2002 and on the other extreme one only being under contractual agreement since May 2019.

With respondents being given the possibility to indicate several criteria, appearance of the fruits (size, color and defects) are quoted as the most important criteria for buyers, then comes the fact that the fruits are bagged and the maturity level as evident from table 37 below. The size of the fruits is confirmed to be the most important attribute of the transactions, which concurs with the grading system (with fruits of bigger size corresponding to higher grades). These results also reflect the fact that the use of certified standards is not a common practice as further discussed below.

Table 37

Criteria of the buyer	Frequency	%	Cat chu	Cat hoa Loc	Taiwanese
Size of the fruits	148	83,5	83%	81%	85%
Color	128	72,5	72%	76%	72%
No defect	114	64,5	62%	74%	62%
Bagged fruits	108	61	65%	55%	66%
Maturity level/ ripeness	94	53	58%	52%	52%
Firmness	50	28			
Volume delivered	17	9,5			
Other	16	9			
Standard certificate	8	4,5			
Precocity of harvest	3	1,5			
Time between harvest and delivery	2	1			

For farmers selling Cat Chu, the ripeness is a more important for the main buyer than average. For farmers selling Cat hoa loc, color and the absence of defects are more important than average while bagged fruits are considered as less important than for the other two most important varieties. For farmers selling the Taiwanese variety, the size appears to be a bit more important than average.

Though differences across the main categories of main buyers are not wide, as could be expected, processors are much less interested in the color and the defects than the other buyers as evident from table 38 below. Overall, village collectors appear to be more requiring in their criteria than the other main categories of buyers. Collectors outside the village attach less importance to ripeness, defect and bagged fruits.

Table 38

<i>Criteria</i> <i>Main category of buyer main season</i>	<i>Size of the fruits</i>	<i>Color</i>	<i>No defect</i>	<i>Bagged fruits</i>	<i>Ripeness</i>
Collector outside the village	82%	71%	54%	52%	37%
Local wholesaler in the provincial city	88%	81%	81%	65%	60%
Village collector	91%	88%	85%	76%	73%
Farmer group/ cooperative ¹⁸	90%	70%	70%	60%	70%
Processor ¹¹	100%	30%	40%	80%	60%
Total for the whole sample	83,5%	72,5%	64,5%	61%	53%

It is interesting to note that, though quality was not quoted as a major consideration by farmers in their choice for working with their main buyer, 44% of the farmers producing main and off seasons indicate that quality is controlled by their main buyer at each delivery as evident from table 39 below. On the other hand, 20% indicate that their main buyer never controls the quality of their produce. And though a majority of these farmers indicate that product quality is always controlled, almost the same proportion states not receiving information about the quality of their fruit from this buyer. Furthermore, only 15 out of the 177 indicates receiving a different price according to the quality of their product (be it a reward or a discount price). Hence, there appears to be very few price incentives in relation to quality at the moment. In line with the above, i.e. very basic quality management, only 18 of the respondents indicates having a traceability system in place.

Table 39

Frequency of control by the main buyer	For farmers producing during main and off seasons (% of sample)	For farmers not producing off season (% of sample)
At each delivery	44	59,5
Often	27	16,5
Occasionally	9	12
Never	20	12

Interestingly, village collectors appear to be controlling quality on a more regular basis than the other buyers as evident from table 40 below. When disaggregating farmer responses when asked about the criteria of their main buyer, it appears that size of the fruits and their color as well as the absence of defect and bagged fruits are even more quoted by the farmer when the main buyer is a village collector. Further understanding of the role of the village collectors in the value chain would be necessary to gain insights into these market requirements and their implications for upgrading.

¹⁸ Only 10 observations

Table 40

Main buyer during main season	At each delivery	Often	Occasionally	Never
Collector outside the village	23 (35,5%)	17	6	19
Local wholesaler in the provincial city	23 (53,5%)	9	4	7
Village collector	21 (63,5%)	3	5	4
Farmer group/ cooperative	4 (40%)	6	0	0
Processor	4 (40%)	4	0	2

Price information

Respondents, marketing mangoes during main and off seasons were asked about the average price in the main season and over the whole year as well as the lowest and highest prices and the month when these happen for each variety that they cultivate. Interestingly, there is a wide difference in the prices fetched by the farmers according to the variety sold as evident from table 41 below. Farmer selling Cat Hoa Loc fetch a much higher price than those selling the other two main varieties which is consistent with the study from Smith (2014) on the mango sector in Dong Thap province¹⁹.

Though the price difference between Cat Hoa Loc and the other main varieties is very high, the reason for this variety not being the most popular in the sample and more widely in Dong Thap and Tien Giang is likely to be related to its much lower productivity especially compared to the Cat Chu variety (Orozco Romo, 2016).

And as expected, selling mangoes during off season is much more remunerative than during the main season: with the lowest price off season for the 3 main varieties being higher than the average price during the main season according to respondents' statements.

Table 41

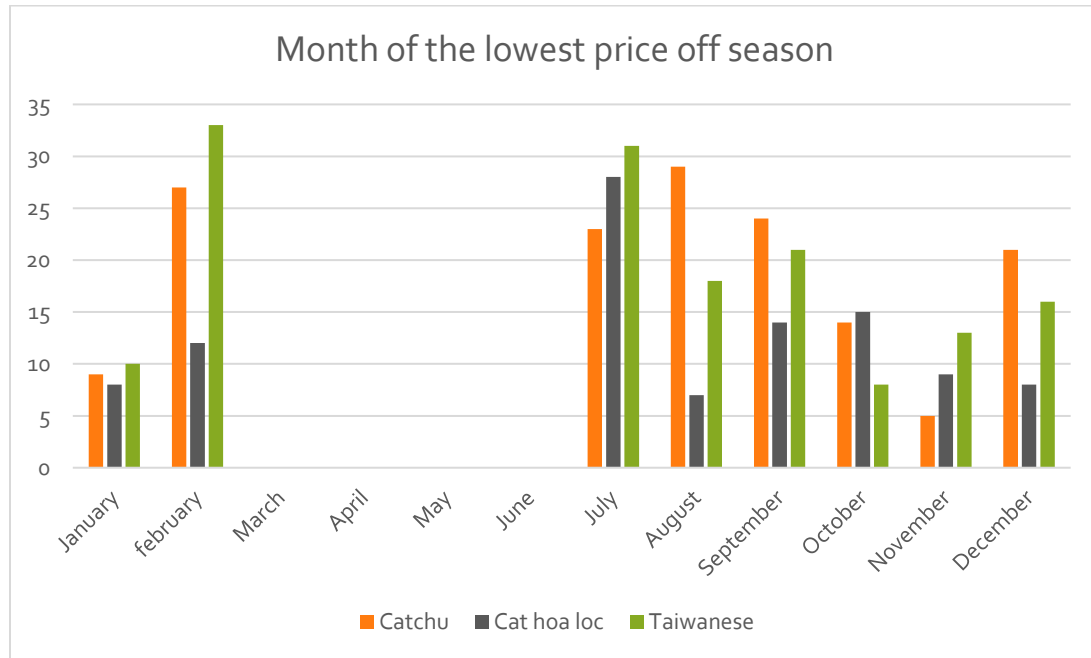
Farmer price fluctuation in VND for 2018	For Cat Chu	For Cat Hoa Loc	For Taiwanese variety
Average price during main season	10.300	31.000	16.200
Lowest price off season	15.300	41.300	18.400
Highest price off season	25.010	82.100	35.900
Average price over the season	18.450	55.100	25.000

Below in graphs 12 and 13 are the months during which the different respondents indicated fetching the lowest and the highest price for Cat Chu, Cat Hoa Loc and the Taiwanese variety in off season period in 2018. February and July appears to be the months where farmers fetch the lowest prices across varieties, which could be related to their closeness to the main season. Interestingly, February is less stated as a lowest month price for Cat Hoa Loc than for the other two varieties, which is in line with this variety of mangoes being considered as a highly valued gifts for festivals including the Lunar New Year,

¹⁹ This study indicated that the prices for Cat hoa loc mangoes were almost double those for the cat chu variety in 213.

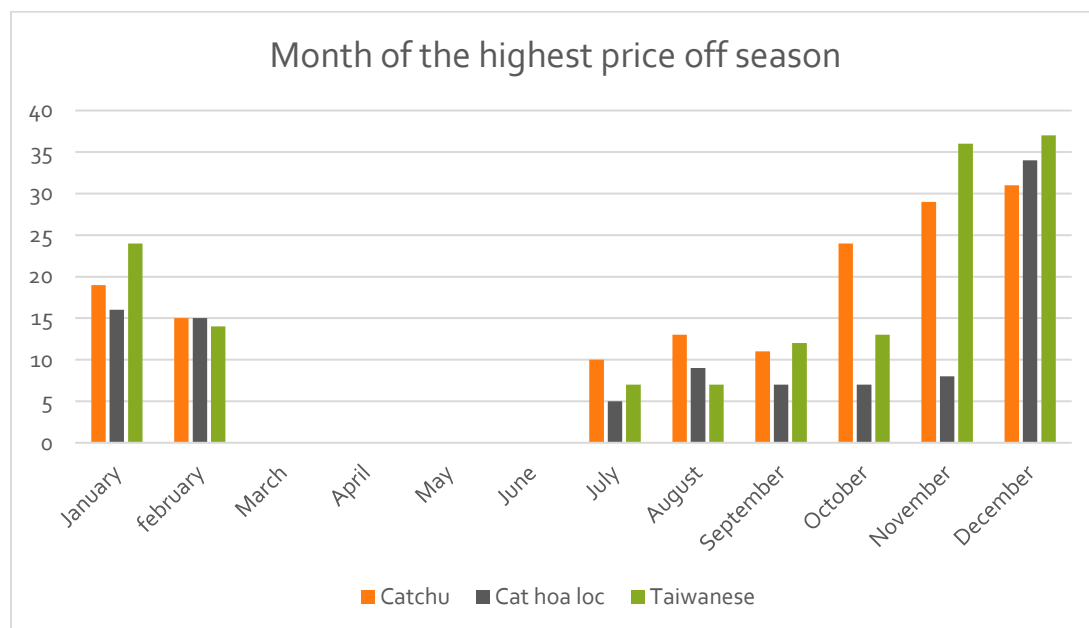
which falls in this period. This may be interesting to further look at these different price patterns with regard to the floral induction component of the project.

Graph 12



As expected November, December and January are more frequently stated as the months of highest prices. Interestingly again the price pattern for Cat Hoa Loc appears to be a bit different, with more marked difference between December and the other months, which may be related to the tension between high demand for this variety in this period as already mentioned above and limited supply (low successful rate of flowering manipulation).

Graph 13



As evident from table 42 below, farmers who indicated that color is an important criterion for their main buyer fetch a higher price for Cat Chu and farmers who indicated that bagged fruits is an important criterion for their main buyer fetch a higher price for the Taiwanese variety.

Table 42

Average annual prices (in VND)	Size of the fruits	Color	No defect	Bagged fruits	Ripeness	Average
Cat Chu ²⁰	18.600	18.900*	18.800	18.700	17.900	18.450
Cat Hoa Loc ²¹	55.700	54.900	56.400	55.400	54.100	55.100
Taiwanese variety ²²	25.300	25.300	25.100	26.100**	24.700	25.000

²⁰ Prices across criteria are not statistically different except when separating between those farmers which state that the color is important for their main buyer and those not ($P < 0,05$).

²¹ Prices across criteria are not statistically different.

²² Prices across criteria are not statistically different except when separating between those farmers which state that bagged fruits is important for their main buyer and those not ($P < 0,01$).

Use of quality standards

As evident from graph 14 below, the majority of the respondents indicate not being certified for quality standards. The first main reason stated for this is the lack of knowledge in applying standards (about 31% of the respondents not being certified). Conversely economic reasons do not drive behaviors toward certification at the moment: the cost of certification was only quoted by one farmer and no farmer did answer lack of premium. Cost consideration not being a concern is to be related to the fact that of these farmers selling certified mangoes, be it under Global GAP or VietGAP, most of the time the certification cost is paid by the local authority. Only one respondent indicated having paid for the certificate. Lack of access to adapted inputs and lack of demand appears in the same proportions, i.e. about 20%.

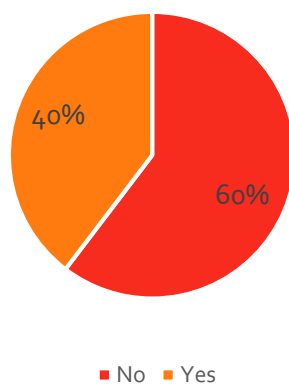
From the project perspective, if certification were to become a market requirement, the associated changes in the economic model of certification would have to be investigated together with the mechanisms for its diffusion; but it is worth point out that knowledge about certification and availability of local inputs could then be leverage points to explore with a view to improving farmer market access and value chain functioning.

As evident from graph 15, for those certified farmers, by far the most frequent standard under which they work is VietGAP; only 12% are certified for Global GAP²³.

Importantly, quite high proportion (60%) of the certified farmers did not actually sell certified mangoes in 2018. And the main reason for this has been the lack of demand, which will be worth investigating from a value chain and market perspective. Again, no farmer answered lack of price premium as the main reason for not selling certified mangoes and none also indicated certification being too costly here; while lack of access to adapted inputs was given as the main reason for 10% of the concerned farmers. According to Smith (2014), only cooperatives selling VietGAP or GlobalGAP certified fruits to export companies earned a real price premium and this represented a very limited channel in 2013.

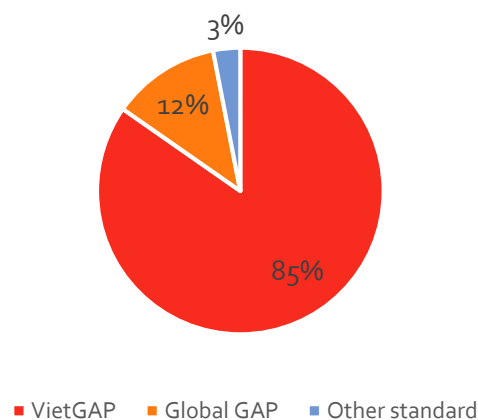
Graph 14

Proportion of certified farmers



Graph 15

Standards used by the mango producers



When looking at varieties, it appears that the proportion of farmers certified Global GAP and VietGAP is higher when they cultivate the Taiwanese variety (see table 43 below).

Table 43

²³ VietGAP, global GAP and other standard were the 3 options retained for the survey during the design workshop.

Standard Variety	Global GAP	VietGAP	Other standard
Cat Chu	10%	90%	4%
Cat Hoa Loc	5%	92%	0%
Taiwanese variety	24%	95%	5%

Table 44 below shows the average prices for the main varieties for those farmers certified Global GAP, certified VietGAP or not certified. Though it shows some differences, most of them are not statistically representatives. This confirms the widely shared statement that currently the VietGAP standards does not allow a price differentiation per se in general in Vietnam. It is interesting to note that farmers growing Cat Chu and selling it certified Global GAP earn a significant price premium compared to VietGAP farmers.

Table 44

Average annual prices (in VND)	Cat chu ²⁴	Cat Hoa Loc ²⁵	Taiwanese ²⁶
Global GAP	24.400**	62.600	22.500
Certified VietGAP	18.700	55.700	26.000
Not certified	18.300	54.100	24.300

Overall, VietGAP certified farmers have smaller costs of fertilizers and pesticides than non-certified ones as evident from table 45 below. However, only the differences in terms of costs of fertilizers are statistically significant²⁷.

Table 45

Cost in VND Variety	Fertilizers main season		Fertilizers off season		Pesticides main season		Pesticides off season	
	Total	Per tree	Total	Per tree	Total	Per tree	Total	Per tree
VietGAP	6.795.679	28.500	7.780.247	33.000	12.834.58	61.000	22.360.72	104.500
Not certified	6.564.275	36.500	7.604.122	46.000	13.534.82	72.500	20.290.29	124.500

4.0 Opportunities & constraints

²⁴ Only 7 observations for Global GAP but significant differences observed with prices for farmers certified VietGAP. Conversely no significant differences between VietGAP and non-certified farmers.

²⁵ No significant price differences between Global GAP and Viet GAP farmers, and between VietGAP and non-certified farmers.

²⁶ Only 2 observations for Global GAP. No significant price differences between VietGAP and non-certified farmers.

²⁷ At 10% level during main season and 5% level off season using ttest.

Overall, it is important to stress that the sampled mango farmers are not stuck into poverty traps and in logics of indebtedness. For most of them, the economic situation is quite healthy, with no critical financial constraints. Most HH actually indicated not having borrowed money in 2018 (as analyzed in page 11).

Economic incentives appear to play a more important role in driving practice changes than market requirements or regulatory constraints, which comforts the approach adopted in this project. Interestingly almost a third of the sample considers environmental impact as a driver for change, which could be further explored in engaging with farmers.

Insights into constraints and potential for value addition through value chain developments:

Our study points to the need to better consider the marketing potential of post-harvest practices in improving value addition at farm level. Almost a third of the farmers do not undertake post-harvest activities on farm. This is consistent with the current lack of marketing benefit out of it according to our price data analysis. Hence, there are only be slight differences, which are not statistically significant in the average annual prices fetched by farmers for the main varieties whether or not they undertake post-harvest activities on farm (see table 23, page 26). This is to be considered together with the criteria of the buyers within a whole of the chain approach. From our survey, appearance of the fruits (size, color and defects) are quoted as the most important criteria for buyers, then comes the fact that the fruits are bagged, and the maturity level (see table 37, page 36). The first position of the size of the fruits concurs with the current general grading system. However, it is important to stress that though quality is frequently controlled by buyers, there critically lacks price incentives and information sharing for quality management.

The different varieties are valorized differently according to the type of buyers and this is worth exploring further under the value chain component of the project. In particular, farmer groups/ cooperatives offer higher prices for the Taiwanese variety during off season, and processors provide consistent price for this variety across seasons. Conversely this variety is less valued at least during the main season by the collectors (from the village and from outside) who are the ones offering the best prices for Cat Chu mangoes. From a value chain development perspective, it is also important to point out that though farmers appear to have established some privileged relations with their main buyers, prices are still the main reasons for them to work with their main buyers both during main and off seasons. This is consistent with the fact that only few farmers indicate benefiting from services from their main buyer, the most quoted ones being advanced payment (8,5%) and technical advice (8%) (see table 36, page 35).

Regarding quality standard development, according to our survey, currently the majority of the respondents are not certified, which is consistent with the stated lack of demand for certified mangoes. 85% of the certified farmers in our survey are VietGAP and only 12%, GlobalGAP, and according to our analysis, only GlobalGAP farmers are currently in a position to earn significant price premium, which is consistent with previous studies (Smith, 2014). From the project perspective, if certification were to become a market requirement and/ or a proper path towards adding value at farm level, the associated changes in the economic model of certification would have to be investigated further together with the mechanisms for its diffusion as currently, according to our survey, knowledge about certification and availability of local inputs are the major constraints at farm level. Furthermore, the current lack of record keeping of about a third of the sample would also need to be addressed. And from a gender perspective, it is interesting to point out that this is currently almost only undertaken by men.

Besides, results show critical concerns in both production and market sides. First, pesticide application accounts for a vast majority of the production costs in off-season. This is mainly because mango farmers are overusing chemicals or poorly effective flowering manipulation (high failure rates). The other project activities focusing on on-farm production should carefully examine these problems to propose appropriate intervention for improving manipulation practices and reducing harmful chemical application. Second, mango producers are relying on informal contractual arrangements, poorly secured, with local collectors, traders, and wholesalers which can make their marketing position vulnerable and unstable. In addition,

so far this is not being addressed via cooperatives and farmer groups at local levels, with concerns existing regarding their governance and management. Project results in this regard would be worth being discussed with local authorities with a view to better understanding the potential associated with contract farming, which is considered as an important policy of Vietnam's government in agriculture. Third, as confirmed by the survey, the most important reason for farmers to change their practices is to earn a better profit. Therefore, future interventions must show or prove improved economic efficiency to stimulate mango growers to follow.

Price variation during the year and main and off season production patterns:

The price analysis confirms that February and July are the months where farmers fetch the lowest prices across varieties, which could be related to their closeness to the main season. However, it is interesting to note that February is less stated as a lowest month price for Cat Hoa Loc than for the other two varieties, which may be interesting to further look at with regard to the floral induction component of the project.

The vast majority of the surveyed farmers are producing both during main and off seasons. Indeed, only 8 respondents indicated not producing mango during off season. However, there are significant variations regarding the costs of pesticides and fertilizers between main and off season (see table 26, page 27). And this probably constitutes an important area for investigation in the project.

Gender constraints and opportunities:

Interestingly, at household level, the survey showed that though there are significant differentiation between men and women in the sharing of production activities and even more so in the use of agricultural equipment (as evident from table 24, page 26, and table 10, page 17), important decisions for the HH (long term investment and large purchases) are stated as being made together between men and women, and shared decision is even more pronounced with regard to decision on spending income from mango production, which would be worth exploring further (see graph 6, page 16). However, this should not be seen as sign of women being empowered in the HH. Indeed, except for groceries, respondents indicate that the spouse rarely decides by herself; and participation to social activities is mostly decided by the respondents in their own. The latter is a very important consideration when working with farmer groups and cooperatives in the project as already widely discussed during gender related activities with project partners. From a value chain perspective, it will also be important to explore avenues toward gender empowerment through whole of the chain approaches as the survey confirmed that marketing activities are less biased towards men than production activities (see page 33).

5.0 Conclusion

Overall, the surveyed farmers appear to be quite well-endowed in terms of equipment, social capital and they are not stuck into poverty traps and in logics of indebtedness. Most of them (80%) have savings and dedicate the higher share of their total income to investing in mango production (with surveyed farmers being highly specialized in mango production). It is important to note that a high proportion of sampled farmers have collective responsibility within collective organizations.

The vast majority of the surveyed farmers are producing both during main and off seasons. However, significant variations regarding the costs of pesticides and fertilizers between main and off season were found. While Cat Chu and Cat Hoa Loc were expected to be strongly represented in the survey, it is interesting to note that a significant proportion of the survey also cultivate the Taiwanese variety, especially in the district of Cao Lanh City (district in which all farmers also cultivate Cat Chu with these two varieties being found as the most common combination, (37% of the sample). Interestingly intercropping with other crops is a common practice. It is important to note that the price pattern for Cat Hoa Loc differs from the one for the other two most frequent varieties, which might be further considered with regard to floral induction activities.

So far, value chains appear to be quite rudimentary with unsophisticated quality management and commercial transactions at farmer level. It is interesting to note that under current value chain operations, village collectors appear to be controlling quality on a more regular basis than the other buyers (with criteria which are easy to check at the time of the transaction: size of the fruits and their color as well as the absence of defect and bagged fruits).

The use of certified standards is not a common practice though cost for certification are mostly incurred by local authorities, which is consistent with the most frequent standard being VietGAP (85%). There seems to be lack of market demand for it so far as well as a lack of adapted inputs and knowledge about these standards. And only GlobalGAP farmers are currently in a position to earn significant price premium.

The survey also provided concrete evidence of gender unbalances at household level with regard to production activities and decision making, and showed that these could be less marked at marketing level, with women buyers being a common feature of mango chains. This points out to the potential for using whole of the chain approaches in addressing gender concerns as part of the project intervention. Another important entry point for the project in this regard concerns the support and work with farmer groups and cooperatives. While cooperatives and farmer groups appear to play an important role for farmers to network with others and access more information, participation is very biased towards men. This coincides with the fact that, so far, participation to social activities is mostly decided by the men in their own. Furthermore, in the vast majority of the cases, only the men in the households are member of the collective organizations. This constitutes an important point of vigilance for project intervention. Proactive action from the project to ensure enhanced women participation in these collective organizations could act as a leverage point to improve the gender balance and empower women.

6.0 Recommendations

Regarding the potential for improving farmer livelihoods through improved marketing and recognition of quality along value chains, it is important to note that currently quality management at farm level and in the nexus between farmers and their direct buyers is very basic, and would be an important area for intervention. As reported above, there currently critically lacks price incentives and information sharing between farmers and buyers regarding quality management, and buyer criteria are still very much based on the appearance. If GAP certification were to become a market requirement, knowledge about certification as well as ensuring local availability of adapted inputs could be a leverage point to explore with a view to improving farmer market access and value chain functioning.

With regard to possible entry points, our study points to the need to better consider the marketing potential of post-harvest practices in improving value addition at farm level. From a production perspective, the significant variations in the costs of pesticides and fertilizers between main and off season probably constitutes an important area for investigation in the project.

With regard to gender recommendations, there appears to be a strong need and potential for women empowerment, with two avenues identified²⁸:

1. Making women more recognised and empowered for their roles and contributions in the mango value chains through whole of the chain approaches, taking advantage that women roles are already quite prominent in marketing activities contrary to production activities as evident from the survey, and engaging further with women in the different components of the project;
2. And providing women with skills and aspiration for information and communication skills with regard to production.

While cooperatives and farmer groups appear to play an important role for farmers to network with others and access more information, participation is very biased towards men. Enhanced women participation in these collective organizations could act as a leverage point with regard to the above.

²⁸ See also the report prepared by Care for the project in this regard.

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