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Harnessing local underused crops to improve household nutrition and income opportunities in Vietnam: case of Hoa vang sticky rice in Red river delta

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Abstract

The project 'Coalition to Diversify Income through Underused Crops' (CoDI) operates in Vietnam and India since 2008. The project supports local communities in the production, processing and marketing of neglected crops – local grains, fruits and vegetables. Those varieties have close relation with local territory. An evaluation of the situation of previous activities in India and Vietnam showed that the key weaknesses were:

- Demonstrations were not enough and too far away and too far apart.
- Post-harvest handling and processing methods suggested were too complicated.
- No financial support was provided.
- Not enough training courses were offered and access to information was limited.

The main question was how to help farmers to produce indigenous species on a larger scale in a localized area for a marketing purpose. The CoDI project has chosen the Innovation System Approach to realize action-research for development with four main activities, owned and managed by the communities:

1. Food Processing Parks (FPPs), to which people are coming for training, information and business development services, processing, grading and other post-harvest activities and for wider support on available market opportunities, credit advice and links to other value chain actors at local, national and international levels.

2. Village Crop Fairs, during which local fruits and plants are being evaluated and the best ones selected by the communities.

3. Community Germplasm Orchards (nurseries), which then receive planting material from the selected lines for further propagation and which also serve as training grounds for plant propagation and nursery management skills.

4. Annual Knowledge Fairs, to communicate and discuss the experience with wider stakeholders from the public and private sector. The coalition builds upon in-depth experience of each of the partners in Vietnam on making markets work for the poor by facilitating links between rural cooperatives and urban quality distribution, focusing on women farmers who form the majority of vegetable and traditional crops producers, in an increasing urban environment where many men move to the towns for off-farm employment.

Key words: farmer association, traditional products, market access

I. INTRODUCTION TO THE CODI PROJECT

Rural communities in India and Vietnam rely on a small number of crops for food security and income generation. The effects of the green revolution in sacrificing species diversity for higher production of the main staple crops (mainly wheat and rice), is felt in both countries. Especially in degraded areas, diversification of farm options is necessary to provide sustainable income. Small farmers have the advantage of crop diversity in their locality, but have limited opportunity to upgrade this produce as a commodity. For successful uptake, efforts to increase or maintain on-farm diversity must be linked to market options and the opportunity for poor rural people to maximize their income from limited resources. However, small farmers are facing a severe challenge in raising and maintaining product quality for more discerning and demanding urban consumers, caused by lack of up-to-date processing, packaging and marketing skills.

The Coalition to Diversify Income from Underused Crops (CoDI) is a group of organizations in India and Vietnam led by the International Centre for Underutilized Crops. Following an evaluation of recent research projects in both countries, the coalition decided to improve uptake of research results through the provision of community services for production, post-harvest and marketing of traditional (underused) crops, to help disadvantaged people in India and Vietnam to have better market access to generate sustainable income, and to have more options for better land husbandry. The project thus provides both technological as well as institutional innovation. It also provides learning opportunities for partners through continued internal monitoring cycles [1].

Operating in four locations in India and four locations in Vietnam, the coalition's

interventions centre around four main activities:

1. Food Processing Parks, to which people are coming for training, information and business development services, processing, grading and other post-harvest activities and for wider support on available market opportunities, credit advice and links to other value chain actors at local, national and international levels. Food Processing Parks have been set up with local communities at each of the project intervention sites. Ultimately, they will be owned and managed by the communities

2. Village Crop Fairs are organized with the communities, during which local fruits and plants will be evaluated and the best ones selected by the communities. This material will then be used for further distribution and sale.

3. Community Germplasm Orchards (nurseries) are set up to multiply the selected lines further. CGOs also serve as training grounds for plant propagation and nursery management skills. The project thus provides sustainable empowerment, especially of women and tribal communities, and income generation at a significant scale.

4. Annual Knowledge Fairs are a major element of the communication strategy and are being organized in each country, to communicate and discuss the experience with wider stakeholders from the public and private sector. In addition, novel audio-visual information and training materials are being developed.

The coalition builds upon in-depth experience of each of the partners; in India on integrated rural development especially for tribal and marginalized farm communities; in Vietnam on making markets work for the poor by facilitating links between rural cooperatives and urban supermarkets, focusing on women farmers who form the majority of vegetable and traditional crops producers, in an increasing urban environment where many men move to the towns for off-farm employment.

The project has a comprehensive Monitoring, Impact & Learning system (MIL) to capture impacts on the beneficiaries' household income, skills development and related parameters. The MIL includes a communication strategy to facilitate dialogue and influence policy. This monitoring and learning component contributes to broader efforts, beyond the immediate countries involved, to develop mechanisms for spotting 'future winners' at an early project development stage.

Country - State/Province	Locality	Target group	CoDI intervention and main underused crops
India – Gujarat	Valsad	Tribal groups	Processing/marketing of underused crops: amla (<i>Emblica officinalis</i>), beli (<i>Aegle marmelos</i>), cashew apple (<i>Anacardium occidentale</i>), chironji (<i>Buchanania lanzan</i>), custard apple (<i>Annona reticulata</i>), finger millet (<i>Eleusine coracana</i>), horse gram (<i>Macrotyloma uniflorum</i>), jackfruit (<i>Artocarpus heterophyllus</i>), jamun (<i>Syzygium cumini</i>), karondi (<i>Carissa carandas</i>), kartul (<i>Momordica dioica</i>), kokum (<i>Garcinia indica</i>), niger (<i>Guizotia abyssinica</i>), mahuva (<i>Madhuca longifolia</i>), little millet (<i>Panicum sumatrense</i>), and tamarind (<i>Tamarindus indica</i>)
India – Karnataka	Dharwad	Tribal groups	
India – Maharashtra	Thane	Tribal groups	
India – Madhya Pradesh	Betul	Tribal groups	
Viet Nam – Bac Kan	Cho Don	Ethnic minorities	Developing a market chain for the indigenous vegetable 'Bo khai' (<i>Erythralium scandens</i>)
Viet Nam – Hai Duong	Kinh Mon	Small farmers	Processing/marketing of Hoa vang aromatic glutinous rice (<i>Oryza sativa glutinosa</i>) or "Golden flower" sticky rice, ceremonial and cultural crop
Viet Nam – Ha Noi	Quoc Oai, Hoai Duc	Medium-sized farmers	Selection and marketing of varieties of late longan (<i>Dimocarpus longan</i>)
Viet Nam – Thua Thien Hue	Thuy Bieu, Huong Van	Medium-sized farmers	Marketing and certification of selected Thanh tra pomelo (<i>Citrus grandis</i>) varieties

Table 1. Main activities in the CoDI project

In this article, we focus on the experience from a case study in Vietnam with Hoa vang sticky rice in Hai Duong province.

II. CASE STUDY OF HOA VANG STICKY RICE IN KINH MON DISTRICT, HAI DUONG PROVINCE

A. Objectives

The objectives of this part of the project were to:

- Restore and develop the Hoa vang sticky rice and by so doing, preserve an important Vietnamese cultural characteristic.
- Help the small farmers to approach the market efficiently through supporting:
 - Farmers to re-organize their production and increase the scale of their operation. Considering sound production techniques as the basis to create consistent quality for individual farmers and farmers' organization as well. Increasing the product output and availability is key in order to meet customers' demand.
 - The development of protocols and specifications for planting, post harvest and marketing to ensure the expected special product quality to provide to consumers.
 - Collective activities in order to reduce production and transaction costs.

B. Methods

The main methods applied in research-action process were:

- Rapid value chain appraisal and consumer preference studies to diagnostic the constraints [2].
- Innovation system approach [3].

- Approach of value chain intervention to promote stakeholder linkages through the project's main tools: Food Processing Park, Community Germplasm Orchards, Village Crop Fair, Knowledge Fair and Collective marketing [4].
- Institutional analysis to help farmers have better access to inputs and market, farmer's association development based on small collaborative groups, raising economics of scale for specialty products [5].

C. Research results

1. Introduction to the territory and specialty products

Hoa vang ("Golden flower") sticky rice is one of the typical products of Vietnam, for many years, Hoa vang sticky rice has been used as material to make special foods such as wine, sticky rice cake or boiled sticky rice, that no other rice varieties can compare with. Until 1986, most of Northern farmers used to grow Hoa vang on their land to meet the household demand. But in recent years, due to limited productivity and output, the area for Hoa vang was sharply reduced. In 2009, the area under Hoa vang sticky rice in Vietnam was 14,094 ha, and accounted for only 0,02% of the total rice area of the country [6].

Kinh Mon district, Hai Duong province is quite famous for growing Hoa vang sticky rice in the Red River delta. The district cultivates about 700 ha of Hoa vang sticky rice with the best quality in Hai Duong province. Kinh Mon has 16,326 hectares of natural land area, in which agricultural land area is 8,929 hectares (accounting for 54.7%). The district is surrounded by four big rivers which cause a lot of difficulties for transport system development. When the An Thai bridge was not yet constructed, people had to travel to Kinh Mon by ferry, therefore, Kinh Mon was considered as "island district" of the Northern delta. Maybe, due to this inconvenient condition

Kinh Mon is still one of the remaining important sticky rice production areas. On the other hand, the rivers and mountains have created fertile alluvial land. The farmers in the area have a long tradition of growing rice and in some families they are preserving the Hoa vang sticky rice variety.

Hoa vang rice has some typical characteristics: this variety can be grown only one crop per year (winter crop). It requires a long time of cultivation of about 150 days from sowing. The rice plant is high and can bend down easily. It is famous for its good flavor. Due to its long growing time, this rice variety is often harvested late. For this reason its aroma is attributed to be attractive to rats, pests and diseases. Hoa vang sticky rice has a low productivity (60% of hybrid sticky rice variety 415). If the cultivation practice is not based on the correct production protocol and is attacked by stem borer, Hoa vang sticky rice may even become impossible to harvest. The shape of Hoa vang grain is round and not broken. The rice has good flavor, especially after cooking, with stickiness and shine.

It has become difficult for consumers to find the real Hoa vang rice in the market. They complain that the stickiness and aroma of Hoa vang is not as good as it was in the past. Through a survey of sticky rice commodity chain [7], we can see that currently, Hoa vang rice is often mixed with other low quality sticky rice. The mixing rate may be about 30 – 50 % depending on the commodity channels.

So in this complex situation, in order to preserve the Hoa vang sticky rice in production, the CoDI intervention approach was necessary because it combines technological and institutional innovation.

2. Establishment and development of the farmer's association

Key factors for linking farmers to markets: Selling a product with special quality aroma and stickiness, packaged with information about the farmers' organization.

Before the CoDI project, in 2006, the first Hoa vang sticky rice commercialization and production farmer group was established with 36 members and cultivated an area of 2.3 ha under the research–action result of the Centre for Agrarian System Research and Development (CASRAD) in the framework of the ‘Superchain’ project with IFAD/Malica funding. By the end of 2007, there were three farmer groups with 131 members covering an area of 10 ha [8]. The CoDI intervention in 2008, assisted the groups to overcome the organization limitation of the farmer groups, as well as to promote its marketing activities by assisting the three farmer groups of Kinh Mon district to gain a legal form of organization. However, deciding which formation of organization, association or cooperative was most appropriate was a big challenge for the groups. This work needed time to search and discuss with the members and the local authorities. In the locality, the idea to develop a cooperative of Hoa vang production and distribution was not agreed by the communal agricultural cooperative. They felt that it was not good to establish another cooperative in the commune (though it is not restricted by the law). After many discussions, the farmer groups decided to develop into an Association of Hoa vang producers and traders.

The ‘Association of Hoa vang Production and Distribution in Kinh Mon’ was officially established according to Decision No.3651/QĐ–UBND of Hai Duong provincial people’s committee on 14 October 2008. The first meeting was organized on Dec 13, 2008. By 2010, the association had grown to 305 members and an area of 20 ha in the three communes of Kinh Mon district including: An Phu, Pham Menh, Long Xuyen communes. And the potential members in the district are still important, but they have to learn for respecting technical and organizational conditions to participate in the Association.

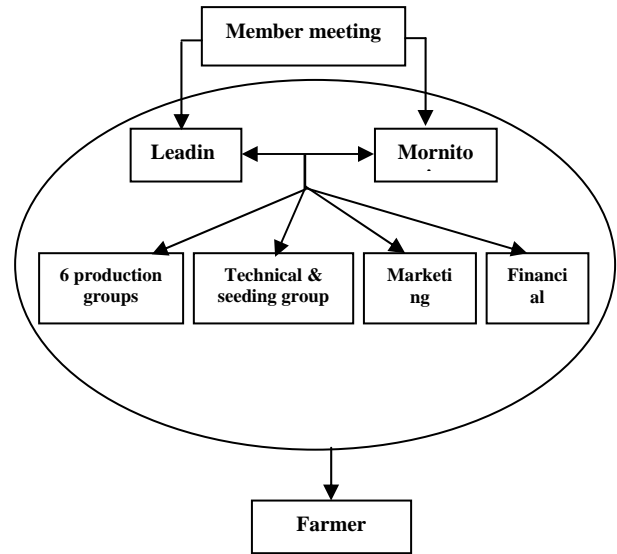


Figure 1: Organizational chart of Hoa vang sticky rice production and trade Association of Kinh mon.

The structure of the association includes the leading board and specialized groups like rice commodity production group, technical group in charge of selecting and producing seeds, monitoring the member’s practice; marketing group in charge of finding buyers and control quality of product sold to the association; accounting–financial group.

The process of development of farmers’ organization in producing and trading Hoa vang in Kinh mon district is shown in Table 2.

Table 2: Farmers’ organization development

Year	Farmer organisation	Household number	Area (ha)
2006	1 group	36	2.3
2007	3 groups	131	10
2008	Association	131	10
2009	Association	253	20
2010	Association	363	23.4

Criteria for selecting members: Due to its special biological characteristics, Hoa vang sticky rice needs to be grown in one

concentrated area for appropriate protection and treatment. Therefore, farmers should from the same village for easier clustering. To become a member of the group, the household must grow Hoa vang rice in the planned area, be willing to join and follow the group's regulation. The group appoints its head and vice-head. The head of the group is responsible for designing the production plan: area, seed demand and guidance on the following of the technical protocol. The group also designs the regulations and orientations for operation. The members' meeting has the highest authority in order to approve and make decisions regarding the group's organization, regulation and activities.

Before establishing the association, the three farmers' groups had linked up to organize joint selling and use the quality seeds from the first group to give to the members of new groups. They established one marketing group of three members to be responsible for trading.

Collective Action of Association: technical considerations (cultivation technical protocol, processing, preservation) are the key factors that help the product of the association to reach the desired quality standard and meet the demands of the urban market. The members were trained on general technical protocol before joining in the association. Some compulsory factors to ensure the product' quality include: using the quality variety selected by the association, using organic fertilizer, putting down equally between organic and inorganic fertilizer. The micro-organic fertilizer can be used to replace entirely or partly. The association organized some input services for the members, such as fertilizer and plant protection drugs.

Table 3: Some group collective activities

Criteria	2006	2007	2008
Percentage of households using the group's seeds (%)	100	72	10*
Percentage of households using the group's microbial fertilizer (%)	0	28	80
Percentage of packed paddy with assessment note (%)	100	0**	100
Collective processing and distribution (Percent of members selling to the association)	70	70	50***

Source: Released by the association's leading board

*In 2008, the farmers used the seeds provided by the project in 2007

** In 2007, the marketing group did not organize the control

*** In 2008, many farmers kept rice to wait for higher price due to bad harvest.

3. Reorganization of production and post-harvest process for quality improvement

1. Implementing collective production protocol

Building the technical protocol based local knowledge - Village Crop Fairs: To build the technical protocol for Hoa vang production and processing, a survey on rice production and processing was conducted within 50 households who had production experience. The result of this survey was the basis for the design of the technical protocol for Hoa vang sticky rice production. This protocol has been used to train the member farmers and was improved with the opinions gained after the annual workshop and field workshop with the village crops fairs approach.

One of biggest constraint to farmers in following the protocol was that they did not have enough manure. Only 10% of members used manure. Therefore, a test was carried out to partly use microbial fertilizer instead of manure. The result showed that using microbial fertilizer has good result, high productivity and good quality.

Regeneration and Preservation of basic seeds at local level - Community Germplasm Nurseries: The farmers had the

habits to select and preserve seeds themselves, therefore, after many years, the seeds degenerated. To help farmers provide themselves their quality seeds, we consulted and helped farmers to restore the traditional Hoa vang rice according to the protocol required by Ministry of Agriculture and Rural Development (MARD). The result can be seen in the crop 2008, when the association restored successfully the traditional Hoa vang rice.

Hoa vang sticky rice seed production: To ensure that all the members of the association use the good general seed, the association founded one group within the association specialized in producing seeds (4 members). The group have the task to produce and provide seeds for the association. The seed production protocol of the group was monitored by the leading board of the association. At each harvest, the association can produce 1,000 kg of high quality seed.

Production of Hoa vang commodity rice: With good seed resource and collective technical protocol, the member households have started to produce Hoa vang sticky rice in their own fields. To help the members follow the protocol closely, the association developed an internal quality control system. This system defines clearly the stages to be inspected, criteria for inspection, method of inspection and the person taking the duty. The leaders appoint people to visit and evaluate the protocol practice in the field of each household over each rice growing period. The information from that will be used to assess and classify the quality of household product later. If the product is not qualified, the association will not purchase.

Nowadays, the association produces about 80 tons of quality Hoa vang sticky rice paddy.

Processing and packaging improvement – Food processing park.

Collective processing: In order to guarantee the output quality of rice the CoDI project and communal authority have

supported the Association to build a Food Processing Park specialized for Hoa vang sticky rice. In the past, sticky rice was often mixed with other rice varieties during the processing because they were processed in the same machine. An phu commune Committee has offered to Association 472,7 m2 of land for building an Association office and Food Processing Park. The Association and CoDI project have co-invested 78 millions VND (ca EUR3,200) for building the FPP in 2009. The FPP has started to operate in 2010 and is helping the Association to manage the sticky rice quality better through processing and packaging control. The FPP also contributes to a reduction of processing cost. The FPP and Association office became also the site for meeting, training and knowledge exchanges among farmers. This successful result in land allocation showing the great interest of local authority in the Association.



Packaging at food processing park: The products are packed with the association’s package, containing information relating to product’s characteristics and contact persons. Some information on the package are: Association’s name, name of product,

production address, production in tradition protocol, certified on food hygiene standard.

2. Capacity building for Association and member

Capacity building for the board of leaders and members of the Association through regular training in many fields include: (1) Training three farmers with good skills to become the association's technicians who are able to produce and restore Hoa vang rice variety in the future. (2) Training on technical protocol to produce commodity rice for members. (3) Training on improving capacity for the association leaders and inspectors in terms of planning, meeting chairing, monitoring the association's activities. (4) Training on recording of financial book to help the leaders and accountants able to note and follow the financial transactions. (5) Training on internal control to help members follow the technical protocol to ensure the quality.

4. *External quality monitor*

In order to bring the Hoa vang sticky rice product to the consumers, the association is implementing the external monitoring activities beside the internal quality control system.

The national fertilizer and seed experiment centre helped the association to check the seeding rice on the fields. The key criteria are seed quality and level of seed uniformity. At the same time, the centre also conducts some lab analysis on quality criteria such as seed uniformity, seed vitality and rate of seed sprouting.

Before packaging, the association's marketing group sends the rice samples for analyzing in Hai Duong Department of Health. After that, if the samples are qualified according to the regulation of Ministry of Health regarding quality and hygiene, the certificate on food hygiene will be issued for the product by the provincial health centre.

In addition, currently, the association is being in process to improve documentation

to submit to the Intellectual Property Department at the Ministry of Science and Technology to be awarded collective mark certificate "Kinh Mon Hoa vang sticky rice" for the product of Hoa vang sticky rice of the association. When the product is certificated, the problem of fake commodity in the market will be solved. According to the plan, in March of 2011, the Hoa vang sticky rice product will get the collective mark protection "Kinh Mon Hoa vang sticky rice", supported financially by provincial authority.

5. *Product commercialization process*

The association has implemented some commercial promotion activities so that the product of Hoa vang sticky rice can approach the market:

Stakeholder workshop: to introduce the product to the commercial agents, the association organized a stakeholder workshop with the attendance of the representative of supermarkets, companies, and wholesaling/retailing agents, woman consumer club (4 supermarkets, 5 food companies, 7 agents). This meeting showed that the stakeholders have a rather high demand for this product (about 10-30 tons/supermarket/year). And they are willing to pay a higher price for the product of Hoa vang sticky rice in comparison with same type products from other suppliers.

Annual Knowledge Fairs: The association participated in the yearly spring agriculture product exhibition. In March 2010, with the support of the project and 'Big C' supermarket, the association organized a tasting event in Big C Supermarket in Hanoi and Big C Supermarket in Hai Phong during 6 days. This activity shows that consumers highly appreciate the quality of the association's product (97% of 222 consumers in Hanoi and 100% of 74 consumers in Hai Phong gave good comment about the product quality).

Other type of advertisement: *information about the product of Hoa vang sticky rice is also promoted through posters,*

leaflets and means of communication such as radio, newspaper, television and internet.

Up to now, the association has reached agreement with 9 wholesale/retailer agents in Ha Noi, Hai Duong, Ho Chi Minh city, 2 wine companies, and 2 supermarkets in Ha Noi (Fivimart và Hapromart) with the consumption quantity of 25 tons of paddy each year.

6. Economic impact

To the association' members: Joining in the association, the producers increased their income through increasing the productivity (300kg/ha) and the association purchase of a price per kg of paddy of 500VND higher in comparison with the price in the free market. The interest of the association' members are 39% higher than the ones outside the association in 2008 (table 4).

Table 4: Production efficiency between the household inside and outside the association per ha

2008	Household inside	Household outside
Total of expenditure (VND/ha)	11,905	10,831
Seed	465	416
Fertilizer	7,194	6,798
Plant protection drug	2,872	2,244
Other expenditure	1,374	1,374
Total of gross income (VND/ha)	24,584	19,944
Profit (VND/ha)	12,678	9,133
Socio-economic impact	Increase the income for the farmers in the locality Keep the characteristics of production area	

Source: survey data of 50 households, in which, 30 households inside and 20 households outside the association, winter crop 2007

In 2009, the 253 members CoDI-supported producer association reaps VND 500-700 per kg of sticky rice, which is higher than the produce of other producers.

To the association: The activities of Association in sticky rice value chain have created a increasing commercial profit for all of their member (Figure 2). In 2009, with 20 ha of sticky rice the Association has

contribute to income raising a amount of 106,900,000VND for all of their members.

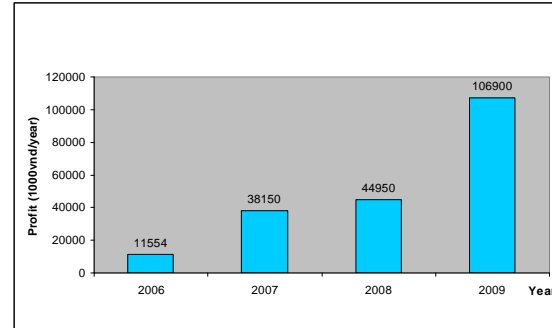


Figure 2: Commercial profits created by the Association for their members during 2006-2009

The successful story of Association has contributed to the change of agricultural development strategy of Kinh mon district with the recognition of the role of local varieties such as Hoa vang sticky rice as orientation for other communes in the district. This activity also promotes the changed vision for other local cultures such as garlic and onion as main culture for a diversification strategy. The Association has contributed positively to territory development of Kinh mon district.

7. Lesson learnt from activities

To help poor farmers link with the market, it is very important in the first place to help farmers select the product to be developed, with a potential to increase the value through an improvement in the quality/safety, especially for farmers in remote areas. This will really contribute to stabilize and increase the household's income

The market for the product should be identified and studied from the beginning before intervention in order to formulate a supporting strategy. Besides establishing new chains for quality products, to improve the current chains and diversify the product marketing outlets in order to avoid dependence on the retailers. Focus on farmers' priority crops and improving existing market chains (sticky rice, pomelo) helps to maintain farmer interest.

It is also important to identify the organization form best fit to facilitate the farmers' activities. The selection of the organization form should be based on the real conditions of farmers and the chain. Usually it should start from the lower level, training farmers and helping them to gradually adapt the coordination and organization of collective activities.

The production protocol is the basis for the linking process, thus, it is important to recognize the factors in implementing the common protocol. It is required to distinguish between those compulsory techniques which will ensure the expected quality and which farmers must be helped to follow, and other guiding factors which are less important.

Improving farmers' knowledge and capacity in cooperative economy and farmers' organization is a duty and should be undertaken right from the project beginning. It is recommended to choose carefully the priority training topics, in order to have high efficiency and to continue with training and mentoring.

D. Conclusions

The activities of the association has achieved initial results and contributed to improving the efficiency of rice cultivation/ha, increased the farmers' income and allowing local agriculture to develop sustainably, efficiently and diversified at the same time. It is thus concluded that the CoDI approach of supporting underused crops can contribute to the development strategy of a region.

The association is developing its strength in supporting farmers to produce the required product based on market demand. This type of production requires the supply of input services and the establishment of new quality chains to meet the market needs. Quality Hoa vang sticky rice has now entered the city market and has triggered increased demand for this quality product.

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