

SUSTAINABLE AGRICULTURE AND RURAL DEVELOPMENT - NINH THUAN
Proposed IFAD supported Programme
Operationalisation of New Rural Development Programme in Ninh Thuan Province

Working Paper No.

Value Chains Selection & Analysis
Ninh Thuan Province, Vietnam, 2010



Prepared by:
Tran Tien Khai
Hoang Xuan Truong
Le Thi Thu Huong

International Fund for Agricultural Development (IFAD)
Ninh Thuan, January 2010

Contents

1. Executive Summary	5
2. Background	6
2.1 Ninh Thuan Formulation Mission	6
2.2 Purpose	6
2.3 Methodology	7
2.3.1 Value chain selection	7
2.3.2 Value chain analysis	7
2.3.3 Information collection	8
PART I. VALUE CHAIN SELECTION	9
3. Value Chain Selection	10
3.1 Developing target-based selection criteria and weights	10
3.2 Listing potential products	11
3.3 Ranking of products	12
3.4 Select the promising products and their value chains	12
3.5 Final selection and rationale	13
PART II. VALUE CHAIN ANALYSIS	15
4. Product 1: Goat and Sheep	16
4.1 Overview of the goat & sheep value chain	16
4.2 Distribution of goat and sheep product in Ninh Thuan province	17
4.3 The diagram of the value chain of goat & sheep in Ninh Thuan	18
4.4 Agents in the value chain of goat & sheep	19
4.5 The activities of the value chain of goat & sheep in Ninh Thuan	20
4.6 Job opportunities and the ability of the poor to participate in the goat and sheep value chain ...	21
4.7 The price formation through agents	22
4.8 Business Opportunities	22
4.9 Competitive advantage and market opportunities for products of goat and sheep	23
4.10 The main issues to be concerned in the development of value chain of goat, sheep	24
5. Products 2: Grape	25
5.1 Production	25
5.1.1 Cultivated area and varieties	25
5.1.2 Yield and output	26
5.1.3 Investment	26
5.2 Market Trends	27
5.3 Value Chain Map	28
5.4 Market Actors, Their Roles, and Inter-Relationships	30
5.4.1 Input providers	30
5.4.2 Farmers	31
5.4.3 Traders	31

5.4.4 Wine-producing facilities and companies	32
5.5 SWOT Analysis & Possible Strategies.....	32
5.5.1 SWOT analysis.....	32
5.5.2 Possible strategies for grape value chain.....	34
6. Products 3: Garlic	35
6.1 Market Trends.....	35
6.2 Production and returns	36
6.3 Value chain map.....	37
6.4 Market Actors, Their Roles, and Inter-Relationships.....	38
6.4.1 Public sector	38
6.4.2 Input providers	38
6.4.3 Farmers.....	38
6.4.4 Traders.....	38
6.4.5 Constraints/opportunities and possible solutions	38
7. Recommendations for Further Action	40
7.1 Development activities for goat/sheep value chain.....	40
7.2 Development activities for grape and garlic value chain	41
ANNEXES.....	46
Annex 1. In-depth interviews	47
Annex 2. Local Partners.....	54
Annex 2.1 List of Participants in Value Chain Selection workshop held at DPI, 12 Jan 2010	54
Annex 2.2 List of actors participated in the analysis of goat and sheep value chain.....	55
Annex 2.3 List of participants in the private sector workshop, held at DPI, 20 Jan 2010.....	56

List of Table

Table 1. Criteria for value chain selection	10
Table 2. List of potential products and scoring results	12
Table 3. The final selected products.....	14
Table 4. Distribution of goat and sheep by district and city	17
Table 5. Distribution of grape area by important districts in 2009	26
Table 6. Grape yield and production.....	26
Table 7. Prices of imported grape from different sources, the first ten days of April, 2007 ...	28
Table 8. SWOT matrix for grape production	33
Table 9. Possible strategies for grape value chain	34
Table 10. Top Ten Garlic Producers — 11 June 2008.....	35
Table 11. A simplified calculation of production costs and income of garlic in Vinh Hai village, Jan 2010.....	36
Table 12. Conclusions and Recommendations for Further Action to Strengthen Goat and Sheep Value Chain	42
Table 13. Conclusions and Recommendations for Further Action to Strengthen Grape and Garlic Value Chain.....	44

List of Diagram

Diagram 1. Goat and sheep products through consumption channels - January 2010.....	18
Diagram 2. Grape Value Chain Map.....	29
Diagram 3. Garlic Value Chain Map	37

1. Executive Summary

IFAD's niche in Vietnam is to develop innovative methods for linking poverty reduction and market-oriented agricultural and rural development; maintaining its strong partnerships with Provinces; promoting Government ownership. As one of the three components of a larger IFAD programme entitled "*Programme Support for Sustainable Agriculture and Rural Development for Tuyen Quang, Gia Lai and Ninh Thuan provinces*", the New Rural Development Programme in Ninh Thuan Province has been started in the late of 2009. From 10-30 January 2010, IFAD fielded a Formulation Mission to Ninh Thuan for the design of the proposed project Sustainable Agriculture and Rural Development (SARD) for Ninh Thuan province.

One of the Mission activities is identifying potential agricultural products and their value chains for further support. The proposed value chains must meet target people of the programme, who are the rural poor in upland areas and ethnic minority groups in the province. Value chain approach of the Ninh Thuan programme aims at mainstreaming project innovations for improved livelihoods and overall economic capacity of the rural poor in upland areas and ethnic minority groups in Ninh Thuan.

Applying standardized methodology of value chain selection and analysis, the Mission team conducts several workshops, fieldtrips, focus groups and individual in-depth interviews to collect relevant information and data. Participatory approach is applied throughout the identification. The identification process composes two main phases: (1) Value chain selection; and (2) Value chain analysis. Because of time limit, the selection is just preliminary evaluation of promising provincial value chains. Further studies should be carried out to provide deeper understandings for project application.

Eighteen different products were proposed for selection, including cattle, goat, sheep, grape, garlic, rice seed, maize seed, cashew, cassava, sugarcane, local apple (*Ziziphus mauritiana*), water melon for eaten seed, "trom" or Java olive (*Sterculia foetida*), white-leg shrimp (*Penaeus vannamei*), salt, fish sauce, Cham's pottery and Cham's traditional brocade. Three products and their value chains of Ninh Thuan selected for further support of IFAD's programme are (1) goat and sheep; (2) grape and (3) garlic. Other evaluation for promising value chains of Cham's pottery and brocade will be continued.

The goat and sheep value chain has important effects to poor and near poor people in broad scale. Kinh, Cham and Raglai people in lowland and upland are direct beneficiaries.

The grape value chain concentrates mainly in irrigated lowland areas and serves the poor and near poor communities of both Kinh and Cham ethnics. Meanwhile, the garlic value chain is to help small farmers in coastal areas specialized into horticulture.

All three selected value chains have recognized as typical reputable products of Ninh Thuan province. Improvement of these value chains can create better and sustainable livelihoods of IFAD's target people.

2. Background

2.1 Ninh Thuan Formulation Mission

Since the Government has been operationalising its New Rural Development Programme, IFAD has been requested by the Minister of Agriculture and Rural Development to develop provincial-level models that demonstrate 'new rural development'. The goal is to develop, at the grassroots level, a higher level of socioeconomic development, as Vietnam becomes a middle income country.

IFAD's country programme in Vietnam has been developing innovative methods for linking poverty reduction with market-oriented agricultural and rural development. Through provincial decentralisation and promotion of government ownership, the country programme is integrating its project-promoted innovative methods into the policy and institutional framework of the provincial governments.

In line with the IFAD Strategic Framework and cumulative experience of operations in Vietnam, the starting point for IFAD's COSOP 2008-12 was the growing disparity in livelihoods between rural and urban areas and particularly the plight of the Ethnic Minorities (EM) in upland areas. IFAD's niche in Vietnam is to develop innovative methods for linking poverty reduction and market-oriented agricultural and rural development; maintaining its strong partnerships with Provinces; promoting Government ownership.

This project will be one of the three components of a larger IFAD programme entitled "*Programme Support for Sustainable Agriculture and Rural Development for Tuyen Quang, Gia Lai and Ninh Thuan provinces*". The goal of the Ninh Thuan project would be the successful application of sustainable livelihood approaches for the rural poor in upland areas and ethnic minority groups in the province for new rural development. The objective of the project would be mainstreaming of project innovations for improved livelihoods and overall economic capacity of the rural poor in upland areas and ethnic minority groups in Ninh Thuan.

Ninh Thuan is one of the poorest agricultural-based provinces in Central Coastal Region of Vietnam. Situated on the junction of three strategic transport routes, namely North-South railways, National Highway 1A and Highway 27 to the Central Highlands, Ninh Thuan has the potential to develop its energy, mining, agricultural and tourism sectors. The province is characterized by having three typical topologies, namely mountainous areas (63.2%), half-mountain half-plain (14.4%) and the coastal plain areas (22.4%), with the land gradually sloping from northwest to southeast. Despite of promising new economic sectors, at the present, Ninh Thuan economy relies heavily on agriculture. Although agricultural land occupies only 17.87% of arable land area, agriculture in general which account for 42.1% of the provincial gross output. Of which, cultivation contributes 65.33% of agricultural gross output whereas livestock occupies 27.64%. Agricultural products of Ninh Thuan are very abundant. Main farming products are rice, maize, peanut, grape, vegetable, cassava, sugarcane, tobacco, cotton, and cashew. Livestock concentrates in cattle, goat and sheep production.

The IFAD's project will concern to agricultural activities of poor, near poor people and upland minorities as Cham and Raglai, and the important agricultural commodities of the province.

2.2 Purpose

The purpose of this report is to apply the value chain approach and methodology to evaluate the main agricultural products of Ninh Thuan province. The expected result is identification of the promising value chains for IFAD's support and assistance.

2.3 Methodology

There are several applied methodology frameworks for value chain assessment and selection used in Vietnam by the international agencies as GTZ, ACDI/VOCA, and M4P. Despite of their variance in detailed applied methods, the frameworks remain similarly and meet the R&D in Vietnam rural context. However, the tools of value chain selection and analysis developed by M4P are chosen because it meets the same approach that IFAD has applied for the other previous projects.

In this report, value chain refers to the full range activities to produce a product and bring it to the final consumer. The value chain relates to different direct and indirect actors who involve to the production, transformation and distribution of a product. Certainly, in terms of agricultural production, the value chain concerns to direct actors as input providers, producers, local dealers, product processors, whole sellers and to indirect ones as public service providers and related private sector.

Applying participatory value chain assessment, the project team works closely with local people to identify promising value chains. Through workshops, key agricultural products and their value chains are identified and selected basing on target people-based criteria. Afterwards, several fieldtrips are organized to collect on-field information for further analysis. The applied value chain methodology is broken down into two phases: (1) value chain selection and (2) value chain analysis.

2.3.1 Value chain selection

The first phase aims at selecting promising products and their value chains for further analysis. The selection must satisfy the IFAD's framework, the Project Concept Notes, Project's possible geographic area for intervention and target group. Adapted the value chain framework and tools developed by M4P, the team decides to set a series of activities for a participatory value chain selection. The specific steps are as followed:

- Step 1. Developing target-based selection criteria, determine criteria, and build understanding of priorities
- Step 2. Weighting of criteria
- Step 3. Identifying potential products and listing
- Step 4. Ranking of products
- Step 5. Select the promising products and their value chains
- Step 6. Final selection

2.3.2 Value chain analysis

The next steps are to realize the preliminary value chain analysis. These activities focus in mapping value chains and do qualitative analysis. In order to clarify key factors affecting the selected value chains, the team organizes several fieldtrips to collect more relevant information related to production and commercialization activities.

- Step 7. Mapping the value chain
 - Mapping the core process of value chain
 - Identifying and mapping the main actors involved in the process
 - Mapping the flows of the products
 - Mapping the volume of products, numbers of actors

- Mapping the geographic flow of the products
- Mapping relationships and linkages between value chain actors
- Mapping services that feed into the value chain

Step 8. Identifying key factors affecting to the value chain and collecting on-field information

Step 9. Value chain analysis

2.3.3 Information collection

Secondary and primary data are two main sources of information. Secondary data will base on statistical year book 2008 of the province and various annual reports as well as plans at provincial and district levels.

Primary data will be collected through workshops, focus groups and individual interviews.

Workshops:

For value chain identification, participatory approach will be applied. The team opens a whole-day workshop to work with 33 participants coming from 11 provincial organizations (12 persons) and six districts (21 persons). Local experts specialized in agronomy, animal husbandry, veterinary science, water management, forestry, extension center, statisticians, commodities processing and trade, natural resources and environment, and credit.

The related local governmental offices are Dept. of Agriculture and Rural Development (DARD), DARD's bodies as Sub-Department of Agriculture, Sub-Department of Animal Health, Agricultural Extension Center (PEC), Sub-Department of Forest Management, Sub-Department of Rural Development, Dept. of Planning and Investment (DPI), Dept. of Industry and Trade (DIT), Dept. of Natural Resource and Environment (DONRE), Dept. of Science and Technology (DoST), Dept. of Statistics (DoS) and Bank for Agriculture and Rural Development (BARD).

Focus groups:

At every district visit, local experts and staff are divided into sectoral groups of 10-12 persons to exchange information and ideas concerning the agricultural production, market as well as potential products and value chains in local level.

In-depth interviews:

During the fieldtrip, the team directly visits and discuss to several farmers, traders, processors and relevant private sectors to understand real situation of production and activities, constraints, difficulties and opportunities.

PART 1. VALUE CHAIN SELECTION

3. Value Chain Selection

3.1 Developing target-based selection criteria and weights

It is necessary to emphasize that the value chain selection must meet the Project's possible geographic area for intervention and target group as given in the Project's Concept Note. Poverty density, economy of scale, accessibility to market, high competitiveness are main key points for choosing appropriate geographic area for intervention. Moreover, the primary target group would be the upland poor and ethnic minorities with a particular emphasis on women. In the Ninh Thuan context, poor and near poor people can be divided into two main categories: (1) the upland poor minority is Raglai community; and (2) the lowland poor consist of mainly Cham, Kinh and Raglai ethnics.

The team has built a set of 4 critical criteria (Step 1) which are as followed:

1. Potential of the value chains to improve livelihoods of the poor people
2. Market potential
3. Natural resource and environment
4. Within framework of national and provincial socio-economic development strategies

Table 1. Criteria for value chain selection

Criteria	Item	Max score
1. Potential of the value chains to improve livelihoods of the poor people		30
	A lot of poor and near poor can participate in the value chain activities (production, trading)	6
	Potential to reduce poverty	6
	Potential for labor intensive technology	6
	Low risk for the poor and near poor	6
	Low barriers to entry for the poor (capital, knowledge)	6
2. Market potential		30
	Have large markets and possibility for scaling up	8
	Potential for leveraging public investment through infrastructure and public service provision	7
	Potential for leveraging private investment, esp. processing and trading	8
	Possibility for scaling up in maintaining specific characteristics of products	7
3. Natural resource and environment		20
	Natural resources are available for value chain scaling up (land, water)	10
	Environmental sustainability	10
4. Within framework of national and provincial socio-economic development strategies		20
	Within framework of national and provincial strategies	10
	Inclusion of upland minorities	5
	Inclusion of gender	5
Total		100

Basing on the same above principles, the criteria are weighted (Step 2). The weights reflex the relative importance of each criterion. The first and second criteria are considered most important, so they compose 30 percent of total score for each one. Meanwhile, the third and fourth ones just account for the remaining percentages (table 1).

3.2 Listing potential products

A short training is organized as an activity of the workshop. Its purpose is to provide local participants the basic understandings of value chain concept, selection and analysis. The definition of criteria, the mechanism to weight criteria are also reported and discussed for getting common understanding.

The next activity taken is listing the potential candidate products (Step 3). Eighteen potential value chains are defined and proposed by the workshop's participants. They consist of cattle, goat, sheep, grape, garlic, rice seed, maize seed, cashew, cassava, sugarcane, local apple (*Ziziphus mauritiana*), water melon for eaten seed, "trom" or Java olive (*Sterculia foetida*), white-leg shrimp (*Penaeus vannamei*), salt, fish sauce, Cham's pottery and Cham's traditional brocade.

Through carefully discussion of production scale, importance of products to local economy and people and market potential the number is reduced to 12 for the second round of selection. The excluded products are local apple, water melon for eaten seed, "trom", white-leg shrimp, salt and fish sauce. The key points to exclude the first six products are described in the following paragraphs.

Water melon for eaten seed: its production area is so small in comparison to the other products. It's just grown in some small areas in coastal sandy hills in a very short rainy season. It's not the basic crop of the province, and can not compete to seeds produced in Binh Thuan province, and imported from China.

Java olive or Trôm (Sterculia foetida): that tree is for extracting gum from the trunk. Gum is used in beverage purpose through traditional or industrial processing. Java olive is appropriate for agro-forestry system. However, it is a new tree for the province, therefore, being tested through pilot production at very small scale of 30 ha only.

Local apple (Ziziphus mauritiana): the product now emerges as a new cash crop, in replacing for degraded grape areas. There is no exact and reliable data of its area. Local apple can be harvested during years. However, its fruit is considered an ordinary good with low price for southern local market. Local apple might have potential market, but market size remains unknown. It can be grown easily in the other southern provinces. Quick expansion can create high risk for poor farmer.

White-leg shrimp (Penaeus vannamei): In Ninh Thuan, shimp production areas concentrate only in some coastal villages of Ninh Hai, Ninh Phuoc and Thuan Nam districts, with total water surface area of 780 ha, supplying an output of 5,821 tons in 2008. Shrimp is quickly excluded out of the list because its production is not suitable for the poor and near poor. Besides, shrimp production can probably harm environment, especially the scarce underground water resource in coastal line.

Salt production is one of specific products of Ninh Thuan. The province has 1,088 ha of land under salt production, mainly in Ninh Hai district. Thanks to dry, high temperature and sunny condition, product quality is well recognized. Salt is produced at industrial scale by companies for chemical industry. At farm level, it's is to consumption in domestic market. It is excluded because of fixed output, market and unavailable to be expanded.

Fish sauce is a typical food of Vietnamese. Along the coastal line, it's produced at home and at small companies for domestic consumption. However, Ninh Thuan fish sauce is not a recognized product,

and production output mainly for local use. Since the marine products are on over-exploited, raw material can be reduced, and results in environmental and market risk.

3.3 Ranking of products


Participants are asked to score each product through district groups mixed with provincial experts. In order to avoid bias in product selection, the participants are also required to score the potential products for provincial-scale importance, not only for district benefit.

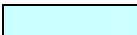
Basing on the principles of IFAD, selection criteria given the local experts, 12 products are as well as scored. The group and average scores are showed in table 2.

Table 2. List of potential products and scoring results

	Products	Districts					Average
		Ninh Hải, Ninh Phuoc	Ninh Sơn	Bắc Ái	Thuận Nam	Thuận Bắc	
18	Traditional brocade	100		90	92		94.0
17	Pottery	98		90	92		93.3
1	Cattle	91	90	86	76	82	85.0
2	Goat	100	80	79	77	78	82.8
3	Sheep	100	80	87	61	78	81.2
5	Garlic	100		56	91	88	83.8
9	Cassava		90	83	53	84	77.5
8	Cashew		91	88	53		77.3
4	Grape	100	73	71	78	63	77.0
10	Sugarcane	60	84	87	53	84	73.6
6	Rice seed	80	76	71	82	37	69.2
7	Maize seed	80	57	64	82	37	64.0
11	Local apple						
12	Water melon						
13	“Trôm” or Java olive						
14	White-leg shrimp						
15	Salt						
16	Fish sauce						

Note:

 excluded in the first round of selection

 excluded in the second round of selection

3.4 Select the promising products and their value chains

The workshop continues discussion to reduce 12 potential products to 6 ones through detailed comparison basing on local experts' experiences (Step 5). The products excluded in the second round are cassava, cashew, sugarcane, rice seed and maize seed. The key points to exclude these above products are presented in detailed in the following sections.

Cassava is a cash crop grown in rainfed upland areas, mainly in Ninh Son, Bac Ai and Thuan Bac districts (2,362 ha; 292 ha and 163 ha, respectively). It's considered a crop creating soil degradation in upland regions and therefore, limited by Ministry of Agriculture and Rural Development. Cassava is

mainly used for tapioca and slice production by food industry. Its output in 2008 was 41.8 thousand tons. Production area and output heavily depend on processing companies. Market also remains unknown and depends on companies' business. It is high risky if processing companies fail in business.

Cashew it is commonly considered a cash crop in Ninh Thuan. The tree is grown mainly in Thuan Bac, Ninh Son, Ninh phuoc and Bac Ai districts (1,399 ha; 1,378 ha; 920 ha and 780 ha in 2008, respectively). Despite of large scale production (4,538 ha in 2008), its yield is very low (0.4 ton/ha only) in comparison to other provinces in Southeastern regions, where yield can be at 3-4 tons/ha. Cashew nut is bought and processed by a company in Phan Rang – Thap Cham City. Normally, cashew production in dry climate is not profitable because of low yield and bad quality nut. Therefore, it seems to be a good plant for afforestation in the province, not for benefit purpose.

Sugarcane is also an important cash crop of Ninh Thuan province. There is a sugar company being responsible for buying and producing sugar through contract farming. Sugarcane is mainly grown in Ninh Son district (1,283 ha equivalent to 69% of total provincial sugarcane area). Similar to cassava, its area depends on processing capacity of the factory. Therefore, it is risky for poor and can not be expanded easily.

Rice seed is mainly produced in Ninh Phuoc district, where irrigated low land is available. Rice seed production is a specialized activity of rich and advanced farmers, led by companies that buy seed through contract farming. One of main buyer is NhaHo Research Institute for Cotton and Agriculture Development. Main market is within province and neighboring ones as Binh Thuan and Dak Lak province. It is not suitable for poor farmers and raises high risk because of market uncertainty. If it can not be sold because of unstable market, farmers probably lose.

Similar to rice seed production, hybrid maize seed production depends totally on seed companies through contract farming. Competition among seed companies is very high. Market size remains unknown and leads to high risk. Hybrid maize seed production also required advanced techniques and investment. Therefore, it is not appropriate to the project target people.

3.5 Final selection and rationale

The last round discussion results in three groups of products, composing of (1) handicraft production including Chams' pottery and traditional brocade; (2) crops including garlic and grape and (3) livestock including goat/sheep as the same product's group (table 3).

The workshop prefers to get goat/sheep as the promising one for next in-dept assessment. Grape and garlic remain considering promising specific products of Ninh Thuan province. Further qualitative information of selected three products will be collected through on-field preliminary study in the continuing activities. Because there's no expert in the field of handicraft production, Cham's pottery and traditional brocade are decided to be assessed later, maybe in next months.

Livestock is very important for agricultural production in Ninh Thuan. Of which, cattle, goat and sheep are main grazing animals. The herds include 112 thousand heads for cattle, 71 thousand heads for goat and nearly 73 thousand heads for sheep. Thanks to natural pasture, production cost is not so high. Grazing ruminant is a main activity of poor, near poor farmers when semi-intensive production is appropriate to medium and rich people. Kinh, Cham and Raglai broadly joint to this economic sector. Goat and sheep is considered a good activity for both poor and near poor because of short business cycle, easily fattening and low investment. However, goat and sheep are sensitive to high moisture condition in upland areas of Ninh Son and Bac Ai districts. So that grazing goat and sheep is only

suitable in semi-arid low land region. Meanwhile cattle seem to be the best choice in upland area because of better adaptive.

Goat and sheep production is mainly for meet purpose and has large potential market in Ho Chi Minh City, and other provinces, even to the Northern region. There is also a potential export market in Islamic countries as Malaysia and Indonesia.

Because goat and sheep grazing is an important economic activity of poor and near poor people at large scale, and for all three ethnics Kinh, Cham and Raglai of Ninh Thuan, development of goat/sheep value chain probably help poverty alleviation and contribute to sustainable livelihood of such vulnerable people.

Grape is chosen because of its high productivity in comparison to other annual crops. Grape is a typical crop of Ninh Thuan as it can not be grown in other provinces. Besides, Ninh Thuan grape trademark is well recognized in the market since long history. Ninh Thuan farmers are familiar to grape production. At the present, Ninh Thuan grape faces more difficulties as pest damage, worse quality and high competition from imported grape. Nevertheless, these can be overcome using integrated cultivation techniques as Good Agricultural Practices (GAP).

Improvement of grape value chain can help to create more effective production, increase output value and benefit to communities of poor, near poor rural people, especially for Kinh and Cham ethnics in lowland. GAP application, trademark building and barcode application will increase product competitiveness, and contribute to sustainable livelihood of related people.

Garlic is also another famous product of Ninh Thuan. Despite of imported cheap Chinese garlic, it remains strong competition in Ho Chi Minh City and neighboring markets thanks to high quality. Although the production size is not so large (varying around 200 to 300 ha) but garlic is intensive and concentrated farmed by small farmers in three villages of Ninh Hai district. Chemical fertilizer and pesticide are applied at high level. Garlic is also a traditional crop in these villages watered mainly by underground water source. Therefore, development of garlic value chain must incorporate with underground water reservation and GAP application.

Cham's pottery and traditional brocade are less analyzed because of lack of experience. Nevertheless, land use plan for reservation of clay source and application of environmental-friendly burning system are considered.

Final selection results in the following table which shows the same understanding and agreement of all participants.

Table 3. The final selected products

Products	Note
Goat/Sheep	to get preliminary on-field study
Grape	to get preliminary on-field study
Garlic	to get preliminary on-field study
Traditional Brocade vs. Pottery	to be studied in the next time

PART II. VALUE CHAIN ANALYSIS

4. Product 1: Goat and Sheep

4.1 Overview of the goat & sheep value chain

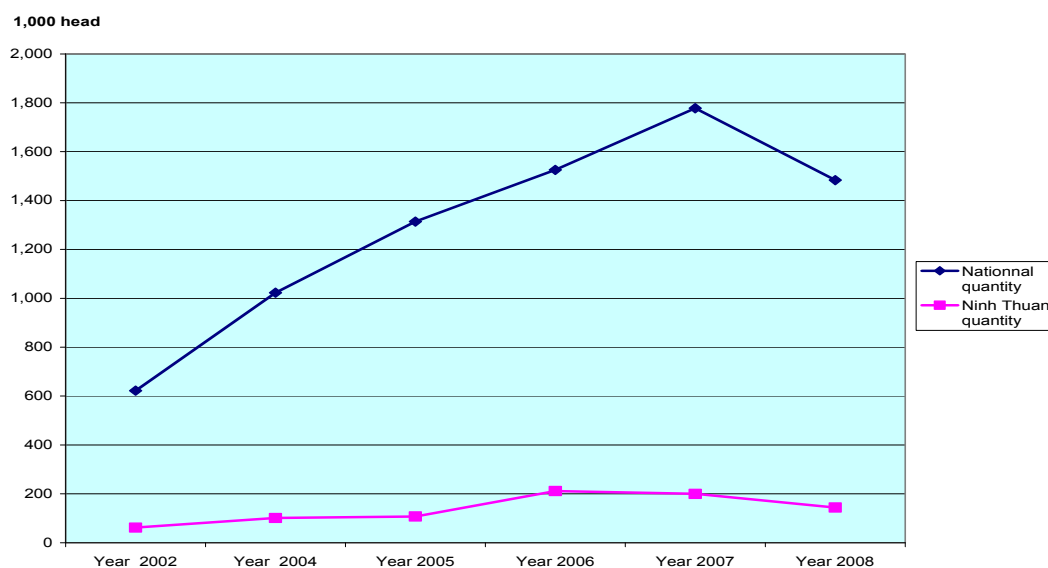
Goat and sheep meat of Ninh Thuan have been famous on domestic market and have potential of being exported. The total number of goat and sheep of Ninh Thuan was 211,235 heads in 2006, accounted for 13.8% the total number of goat and sheep of all the country. This number decreased to 144,040 heads of goat and sheep, accounted for 9 % of all the country in 2008. In the recent years, goat and sheep production of the province has been faced sharp fluctuation. Market uncertainty has been observed. The period 2002-2009 has witnessed many changes in both production and market. It can be divided into 3 stages, and each stage has specific characteristics as followed.

Period from 2002 to 2004 is the **"golden age"** period of the livestock sector of goat, sheep in Ninh Thuan. The specific features of this stage is that the price of sheep and goat breeding as well as meat price were quite high. A Bach Thao nanny goat breeding cost from 10-12 million VND (as high as a cross-bred ox in the reserve period), and the price of sheep breed was from 6.5 to 7 million VND. The breeders could get benefit. In 2004 there was a small-pox pandemic on goat and this caused many breeder households serious damage, some household had the total number of goat killed over 80%.

The period from 2005 to early of 2008 is the biggest **"crisis"** period to the livestock sector of goat and sheep in Ninh Thuan province. There are two distinctive features during this period. The first is the fact that number of sheep, goat increased rapidly from the 107.420 thousand in 2005 to 211.235 thousand in 2006 (an increase of over 96.64%). Secondly, goat and sheep price decreased to the lowest point, a record level. A goat or sheep only cost 100-200 thousand VND. Many breeder households of goat, sheep went bankrupt or left their career. The owners of bigger farms maintained a part of the number of goat, sheep, but the small breeder households could not afford to restructuring the drove due to lack of capital and they were afraid of lacking stable output. The massive development without control and forecast on demand made the supply exceeds demand, thereby led to low cost.

The period from late of 2008 until now, this is the **"rehabilitation"** stage of the livestock sector of goat and sheep in Ninh Thuan. The main characteristic of this stage is total number of goat, sheep are maintained stable, at level of approximately 144,040 thousand heads in 2008 and 143,910 heads in 2009. Goat, sheep price is stable at the level of 50,000 - 60.000 VND/kg live weight. The fluctuation number of goat and sheep in the province is shown through graph 1.

Three stages above show that, to develop sustainable value chain of goat and sheep, Ninh Thuan needs a limit on a reasonable scale of droves, and needs conducting market research to expand consumption market with a variety of product distribution channels of goat and sheep. Beside, the province needs to build capacity on the organization of production, the livestock and veterinary services, improving value for goat and sheep meat. The points which needed to be evaluated for improvement of sustainable development of value chain of goat and sheep in the province will be discussed in this study.



Graph 1. Evolution of goat and sheep herd of Ninh Thuan in comparison to the whole country

4.2 Distribution of goat and sheep product in Ninh Thuan province

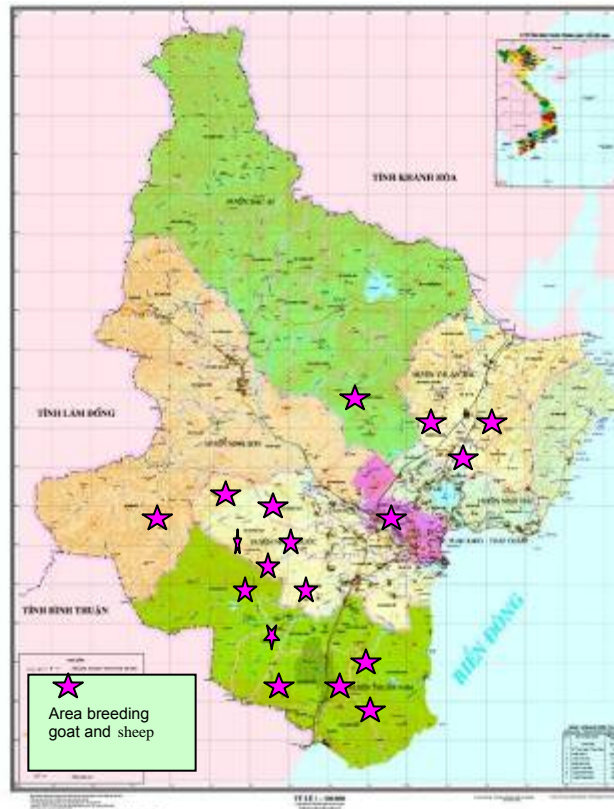
Not all areas of the province can raise goat, sheep. In some upland communes of Ninh Son and Bac Ai (e.g. Lam Son, and Ma Noi), cattle is primarily reared. Number of goat and sheep distributed by districts and towns is presented in table 4.

Table 4. Distribution of goat and sheep by district and city

Districts, Cities	Number of goat	Number of sheep	Total number of goat, sheep	Rate compares to the province
Total	71,280	72,760	144,040	100
Phan Rang - Thap Cham	4,130	4,195	8,325	5.8
Bac Ai	3,310	755	4,065	2.8
Ninh Son	10,770	13,610	24,380	16.9
Ninh Hai	15,850	17,180	33,030	22.9
Ninh Phuoc	27,500	32,280	59,780	41.5
Thuan Bac	9,720	4,740	14,460	10.0

Source: Ninh Thuan Statistical Yearbook 2008

Thuan Nam district was just divided in 2009, so there is no statistics on the number of goat and sheep separately, but the district has three commune breeding goat, sheep with the largest number of the province are Phuoc Nam, Phuoc Ha and Nhi Ha villages. We can see the distribution of areas which focus on breeding more goat and sheep on the map below.

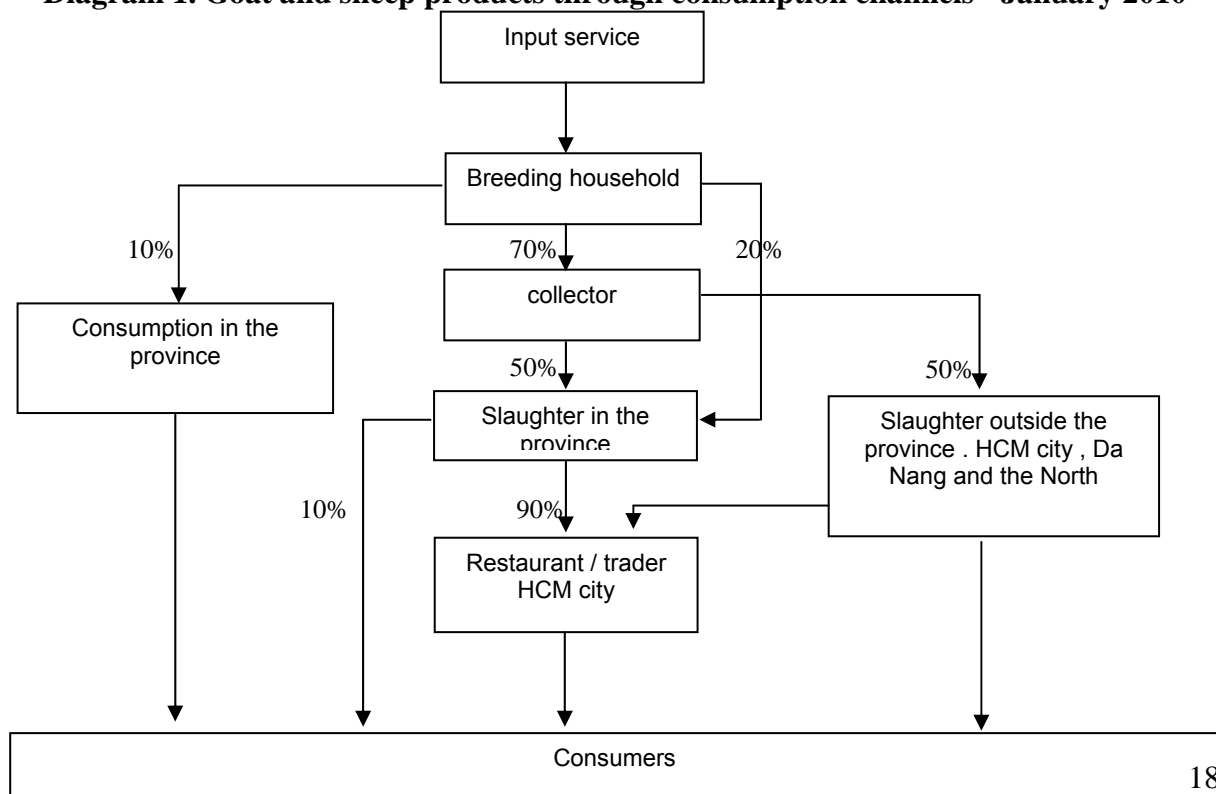


Graph 2. Distribution of goat and sheep herd of Ninh Thuan

4.3 The diagram of the value chain of goat & sheep in Ninh Thuan

The diagram is built on the practical results of the workshop of value chain analysis and is supplemented by agents in the value chain (breeder, collector, slaughterhouses owner, manager, and professional persons).

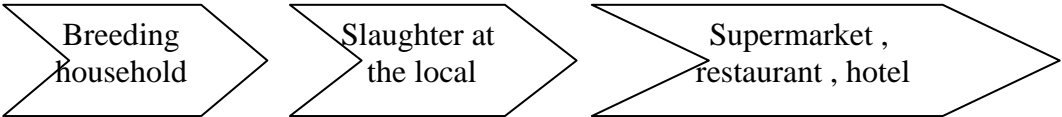
Diagram 1. Goat and sheep products through consumption channels - January 2010



The diagram shows the products of the value chain including live goat and sheep, breeding and meat. The largest consumption channel is from livestock household to local collectors, accounting for 70% of total number of goat and sheep. About 20% of goat and sheep are sold directly from livestock to slaughterhouses in the locality and about 10% sold to local consumers for Muslims people, tourists, and restaurant in the province.

Local collectors sell about 50% of goat, sheep directly to the slaughterhouse in the province and 50% to slaughterhouses outside the province, mainly sell to HCM city, Da Nang and the North provinces. The slaughterhouses in the province sell about 90% of the meat to restaurants system and traders in HCM City and 10% to consumers in the province. For the consumption channels from slaughterhouse outside the province to consumers, restaurants and merchants the percentage of products can not be estimated. Although supermarkets and hotel systems agent has not appeared in the list of commercial agents, they are still important potential actors. Their role in the goat and sheep value chain should be studied to capture the demand in the near future. They are also promising markets of the product with bulk quantity. Therefore, selling product through channel of supermarkets and hotel, restaurants system is probably able to improve value of goat, sheep meat of Ninh Thuan.

Thus, in order to develop sustainable value chain of goat and sheep in Ninh Thuan, it is necessary to maintain traditional consumption channels and build more new potential consumption channels: from the local slaughter-house to the supermarkets, the restaurants and hotels outside the province (Ho Chi Minh City, Da Nang and the North).



4.4 Agents in the value chain of goat & sheep

Restaurants, hotels in the province: there are very few restaurants which provide goat and lamb specialities in Ninh Thuan province. At the moment, there are 3 restaurants in the centre of Phan Rang – Thap Cham, of which Tam Tri restaurant serves goat meat the most usually with regular daily consumption of 2-3 goats. We also need to study to identify the demand of the private sector in expanding business and improving business capacity.

Slaughterhouse: the province has seven slaughterhouses. They can slaughter from 20 to 30 animals per day. Besides, there are other seasonal slaughter-houses with small capacity of 2-5 animals per day.

Collection system: the number of collectors is not exact, but collectors can be divided into two categories: (i) the ones who collect in large quantities and sell directly to the slaughterhouse in Ho Chi Minh City or to the North; and (ii) the ones who collect in small quantities and sell to slaughter-houses in the province. Small collectors need an amount of working capital from 10-30 million VND to serve the trade.

Breeders: Including livestock households in small scale and farm owners. Livestock households in small scale households (10-30 animals) are often of poor households, they have to borrow more capital from the bank and their relatives to develop livestock. Some poor households are hired by rich farmers to do animal grazing. For a herd of 200-300 animals, their annual activity worth 10 million VND. The rich breeders can own from 500 to 3,000 animals. In the period 2004-2007 there were about

2,000 farms, now this number decreases to only 200 farms. The farm owners often receive pilot project on the breeding and grass seeds.

Provider of veterinary drugs: the province has 26 outlets providing veterinary medicine. However, people are having the demand for vaccines for treating cassation enteritis in the market at the moment but they are not sold. This kind of vaccine is being tested by Son Tay centre of goat and rabbit, not yet sold on the market. Therefore, people have difficulties in treating these diseases, the rate of goat suffering from cassation is very high, every household have this problem.

4.5 The activities of the value chain of goat & sheep in Ninh Thuan

In goat and sheep breeding there are the main activities, namely: service input, process of livestock and final product consumption.

*** Input service for raising goat, sheep:** Input providers often supply breed, food, veterinary services, livestock pens, technical services / extension and market information to producers. Currently, the main source of the breed is supplied by local people to each other; a very small part is bought from the farms and national center or imported.

The breed: there are mainly goat breeds in Ninh Thuan namely Bach Thao goat, local grass goat, Saanen goat, Boer goat, Alpine goat and cross-bred goat between Boer goat with local goat, the cross-bred between Saneen goat and Bach Thao goat. Bach Thao goat accounts for more than 90% of the heard. This breed has a high adaptation to conditions in Ninh Thuan, and gives highly meat output. In the province there are also mainly local sheep accounting for 90%, sheep imported from Australia (ram) cross-bred with the local ewe sheep to create the F1, F2 (Dopper and White Suffolk) and the third breed is on breeding experiment (breed imported from Saudi Arab). Compared to 3 sheep breeds above, local breed has more advantages over the rest, then cross-bred sheep F1, F2. Arab sheep with the number of 3,000 animals have been eliminated over 90% due to the inability to adapt. Currently, goat, sheep droves in Ninh Thuan are suffering from being consanguineous due to free grazing, controlling breeds is not absolute even though people have also exchanged billy goat breeds themselves.

Food: In Ninh Thuan, goat and sheep grazing mainly bases on natural pasture. Planted grass area is very limited. Common cropped grass species are elephant grass (*Penisetum purpureum*), and agricultural by-products as leaves of peanut, grape and local apple, rice straw, peas and peanut stem. A number of grass species have been successfully tested such as VA-06, Sa or Guinea grass (*Panicum maximum*), Ruzi grass (*Brachiaria ruziziensis*), Keo Dau (*Leucaena leucocephala*), and smooth cactus, etc. However, these grass species are not widely replicated in broader area. The reason is that people lack of information of seed providers. Another problem is that demonstration results of grass pilot-cultivation are not fully disseminated; therefore number of people visiting and learning are limited. Furthermore, Agricultural Extension Centre has successfully implemented straw storage model for cattle and sheep; but they do not have model to keep green food to reserve for goat and sheep in dry season. In the province, there are also a number of households using food to fatten goat. For that case, sheep are reared and fatten fully in pens before being sold.

- *Epidemic diseases and veterinary services:* Diseases on goat, sheep are mainly worm diseases, estode worm, smallpox disease, caseation enteritis disease, and foot and mouth disease. Of which smallpox disease and caseation enteritis disease are the most dangerous diseases caused by virus and spread rapidly and cause great damage. Currently, people need the most two types of vaccines for smallpox disease and caseation enteritis disease.

Veterinary service in some communes is not fully provided. Vaccines for goat and sheep are often insufficient and therefore, some households have to use vaccines of cattle for goat and sheep vaccination (e.g in Phuoc Nam village, Thuan Nam district). Each town has 01 veterinarian and he can not afford to provide veterinary services (sale of drugs and treatment) for both cattle and poultry. Each hamlet has a network of veterinary collaborators, but the staff has no allowance. Normally, they participate in 2 spells of injection and disease prevention a year under the lead of hamlet and commune. They can not earn living on their veterinary profession.

To strengthen capacity and improve operational efficiency of the communal veterinarians, creating better linkages between their individual works and the project activities such as monitoring and deploying livestock demonstration, organization of and participation in training courses, study tours, consultation and monitoring breeding groups.

Breeding cages: people mainly use wood or tree-trunk to make cages with metal or fibro-cement roofing sheets. Cage floors are 50-80 cm above the ground. There's no biogas tank found in goat and sheep farms, might be due to water shortage for make use of biogas system. It is likely that local breeders are not fully aware of advantages in use of biogas system.

Technical services / extension: They play a very important role in development of goat and sheep value chain. Technicians and extension workers can participate in training and implementation of project activities. Capacity building for this staff will be the key to disseminate and provide innovative techniques to local breeders.

Information market services: it is likely that this service is not well aware at provincial and local levels. . Because of its importance, a new market information system (MI) should be established under the framework of the project.

* **Raising activities and product consumption:** There are currently two main types of breeding goat and sheep in Ninh Thuan. Small scale farms often keep less than 50 animals while large scale farms have more than 50 animals. These two types have different features. Small scale households rely mainly on freely grazing and have less concern about growing grass and invest on infrastructure for animal husbandry as breeding cage, building water tank for storage. They often sell goat and sheep for many different collectors that are subject to prices.

Large scale farms often do both freely grazing and semi-intensive production by growing grasses and storing water. Building trust to market actors is another characteristic of large scale farms. They always sell their products to a unique trustworthy slaughterhouse or collector.

To have a stable market for goat and sheep products and to reduce production risks, it is necessary to build relationships of traditional business and create beliefs with the partners. In addition, we need to develop consumption channels through export. We need the participation of private companies and the support from the project, state to learn about foreign markets for export. However, to participate in the international market, food hygiene and safety and trademark must be developed and ensured.

4.6 Job opportunities and the ability of the poor to participate in the goat and sheep value chain

The poor can participate in activities such as self-breeding, working for big farms, animal collection and slaughtering. Self-breeding and working for big farms can create more jobs in the value chain. Farm owners usually hire poor household to rear goat or sheep droves. For rearing a drove of 100-300 animals, hired people will be paid at level of 10 million VND/year. Collection phase create less jobs for

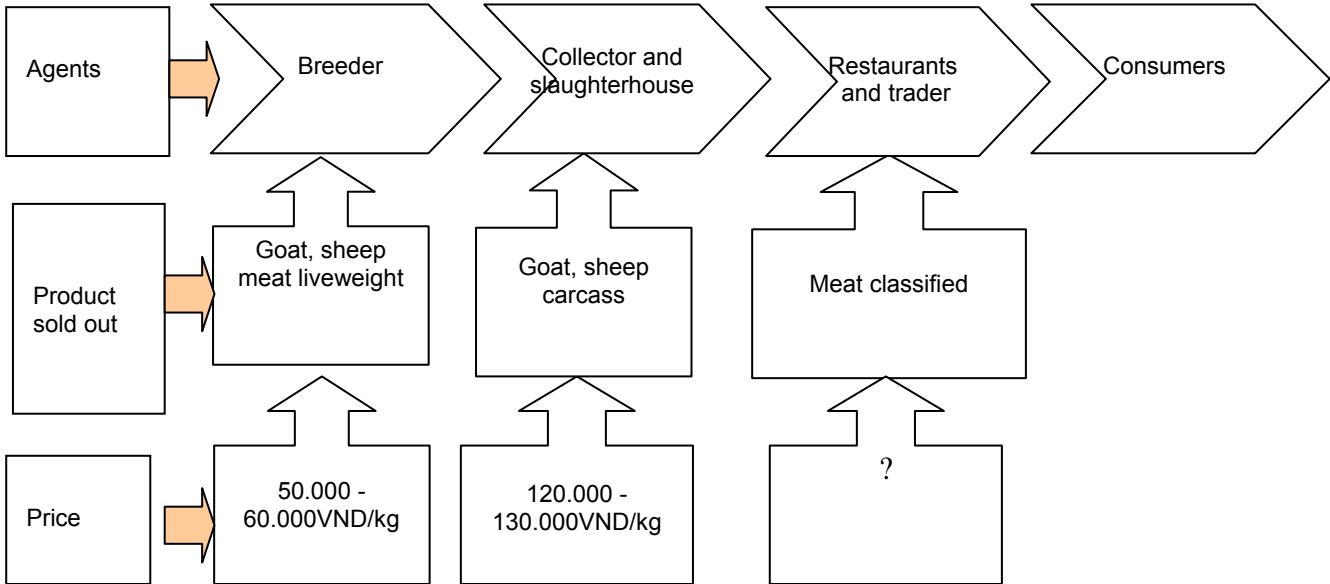
the poor because this work need capital and means of transport. Slaughtering phases creates a few jobs, but the jobs are quite stable and workers have stable income, an average 1.5 million VND per month. Each slaughterhouse concentrated around 20-30 workers working regularly

Some slaughterhouses have demand to borrow capital to expand production, slaughtering areas and additional equipment for slaughtering, the demand for loan from 100-500 million in period of expected time in 36-60 months, with the reasonable interest of 0.9% from the Agribank.

It is necessary to support to develop slaughtering system in local, because it is a key point in the value chain. The most critical supports are to deliver meat in time, to stabilize markets and then, to expand potential market. Local slaughterhouses have enough capacity to participate with the project to expand the domestic market and export.

4.7 The price formation through agents

The process of analyzing specific costs and profits through each agent needs to be studied in the near future by the project with technical assistance. In this report, we mainly describe the formation of prices of products through each agent.



A standard male goat, sheep has the meat rate at 50% of live weight.

Eg: A standard goat 30 kg live weight x 60,000 VND/kg live weight = 1,800,000 VND; carcass weight of 15 kg x 130,000 VND/kg = 1,950,000 VND; Slaughterhouse owner gets the margin of equivalent to 150,000 VND/a goat (1,950,000 VND – 1,800,000 VND).

4.8 Business Opportunities

Two phases which can create great business opportunities for companies or private enterprises in the province are slaughtering and distribution of products to the domestic market and export.

To create a favorable business environment for private enterprise, the project will have to coordinate with the management agencies, the functional units to built and promulgate regulations on land, the area of slaughterhouse as well as specific process to benefit the companies. In addition, the project

needs to establish farmer groups or groups of common interests in goat and sheep sector. It is necessary to carry out market studies for domestic and foreign market of goat and sheep products. Finding potential actors who can links with enterprises to develop trademark for Ninh Thuan goat and sheep meat must be done.

The project should also realize the activities to create a good business environment that can ensure information exchange and share between enterprises and other actors such as farm households, managers, supermarkets, restaurants and hotels through conferences, seminars, or visit.

4.9 Competitive advantage and market opportunities for products of goat and sheep

Quality of Meat: Goat meat and lamb of Ninh Thuan has been appreciated by consumers and prestige in the market for a long time. However there is no any study analyzing meat quality. This should be done in line with project's activities.

The production of meat to supply to the market: the annually average production of goat and sheep meat provided to the market is about from 1,800 tons to 2,000 tons. In 2006, production of goat and sheep meat marketed was 1,855 tons of which 1,424 tons of goat meat and 431 tons of lamb. In 2009, the number of sheep and goat production sold out of the province was 10,314 heads, equivalent to 206,280kg in live weight and 142,990 tons in carcass. This yield is the highest in nationwide.

Price of goat and sheep in Ninh Thuan: Goat and sheep price in Ninh Thuan is 1,000 – 2,000VND/kg lower than that in most other provinces raising goat in the country. At the present, price of a standard billy goat varies from 55,000 to 58,000 VND/kg live weight. For sheep, price is from 45,000 to 48,000VND/kg live weight.

Advantage of natural conditions and experience in raising goat, sheep:

Ninh Thuan has suitable natural characteristics for goat and sheep production. In specific, Ninh Thuan has suitable natural pasture for development of ruminant herds, especially in slope land and grasslands in the valleys. Low moisture and high temperature are good conditions for goat and sheep development. Average humidity was 75 -76%, relatively stable over the years while the annual average humidity of the country is over 80%. The Northern and Central area has the average humidity of more than 84%. The people have been breeding goat and sheep for nearly 100 years, so they have lots of experience in caring and treatment for goat, sheep.

Market opportunities: At the present, the domestic market is still expanding, especially the northern markets. Goat, sheep meat of Ninh Thuan province has exported to Arab countries, (10 tons exported in 2009). At the Hanoi market, the price of 1 kg type A-lamb at the restaurant is from 300-500 thousand VND/kg. Price of lamb imported from Australia is about 360 thousand VND/kg, equivalent 20 USD/kg. Currently, the supermarket system in Vietnam do not sell goat and lamb meat. This potential market need to be exploited.

Thus, the value chain of goat, sheep of Ninh Thuan has many opportunities to develop and bring income for many households, especially poor households and the minorities.

4.10 The main issues to be concerned in the development of value chain of goat, sheep

Links between farmers and market: In fact, the small breeder households can not initiatively participate in the market. They are lack of information on input services and marketing. Small households do not invest much on fodder and depend on the natural grasslands. In addition, the actors in the value chain do not have appropriate environment for regular meetings and discussion.

Raising production: Serious lack of green and reserved fodder for grazing is the main obstacle for producers. Natural pasture is reducing due to overgrazing. There is no drought-tolerant grass species cultivated in Ninh Thuan. Lack of water supply and reservation for animals and grass cultivation is severe. Veterinary service is not in time provided. There is a lack of qualified veterinarians at commune levels.

Environmental issues and policy institutions in the development of value chains: Over-exploitation of natural pasture leads to desertification. There is no reasonable land use plan for natural pasture protection. No regulation for commune grazing on natural pasture. Out-of-date slaughter-houses cause critical environment pollution and contaminate water source for home consumption. Good slaughtering practices are not issued and applied. Unofficial tax and fees are constraints of private sector.

These main issues are considered the priority areas to be taken into account.

5. Products 2: Grape

Grape is one of the important agricultural products of Ninh Thuan province. In the Central Coastal Region, Ninh Thuan is recognized as the unique province where grape can be grown at large scale for production and commercialization purposes thanks to dry climate.

Grape has been introduced to the province many years ago by French colonialists. Nowadays, grape is grown broadly in all low land districts of the province.

5.1 Production

Ninh Thuan has local specific climate and soil conditions suitable for growing grape. This is the unique crop of the province that can bring high income and efficiency for producers in comparison to other crops in the same land unit. In the period 1999- 2002, grape areas occupied only from 3-3.5% total sown areas but contributed 15%- 20% agricultural gross output value.

5.1.1 Cultivated area and varieties

Before 1992, grape area was only 500 ha. To the year 1995, its area increased quickly to more than 2,000 ha. However, since the year 2006, grape area has been reducing. The remained areas are only 1,650 ha to 2006 and 1,032 ha in September 2009.

At the present, grape is grown mainly at 30 villages belonging to 4 districts and Phan Rang – Thap Cham city, except Bac Ai and Thuan Bac districts. The main growing sites are Ninh Phuoc district and Phan Rang - Tháp Chàm city, where water resource and irrigation systems are available.

Almost grape areas are under red-skinned Red Cardinal variety adaptive to the specific climate of Ninh Thuan. This variety was released tens years ago. It dominates grape areas due to highly adaptive to local climate, short-time harvest (around 3 months from cutting to blossoming and harvesting), and ease in cultivation. However, Red Cardinal variety is now being degraded, giving low yield and worse quality fruit. Over-application of chemical fertilizer and pesticide can another cause of worse tasting quality.

In some recent years, NhaHo Research Institute for Cotton and Agriculture Development has released a green-skinned table grape variety, the NH01-48. In the period 2000-2005, this variety was grown in large scale, but after the heavy inundation in 2003, its areas started to be reduced. At the present, there are less than 30 ha under NH01-48. Many farmers indicate that NH01-48 variety is too sensitive to high moisture weather in rainy season, sensitive to *Ensiionoe ampelina* fungus-caused disease and has longer harvest (four months from cutting to blossoming then harvest). Other two new table grape varieties have been tested in pilot farm. These varieties (NH01-52 and NH01-53) are also released by NhaHo Research Institute.

At the present, wine grape is cultivated in very small areas in Ninh Thuan province. The estimate areas under wine grape is less than 10 hectares. There some wine grape varieties have been tested grown in small scale as Cyrah and Cabinet Sauvignon. Their fruits are bought by Vinh Tien Wine Company of Da Lat, with approximately 20-30 tons a year. Other varieties as Chenin Blanc and Chardonnay are tested at Mr. Nguyen Van Moi's and others' farms. At the late of 2009, MARD allowed Smart Asgard, a joint-stock company to import 14 wine grape varieties to test in Ninh Hai district. They include Cabernet Sauvignon, Merlot, Petit Verdot, Chardonnay, Sauvignon Blanc, Muscat Alexandre, Muscat BI Petit grain, Ugni Blanc, Roussanne, Viognier, Granache Noir, Mourvedre, Syrah and Carignan Noir.

Table 5. Distribution of grape area by important districts in 2009

Districts	Ninh Phước	Phan Rang- Tháp Chàm	Ninh Hải	Ninh Sơn
Total area	673.0 ha	179.5 ha	142.0 ha	47.0 ha
- Red Cardinal variety (red color)	664.0 ha	170.0 ha	137.0 ha	45.0 ha
- NH 01-48 (green color)	7.0 ha	9.5 ha	5.0 ha	2.0 ha
- Wine grape	2.0 ha	-	-	

Source: Dept. of Agriculture and Rural Development of Ninh Thuan, Jan 2010

5.1.2 Yield and output

Grape yield fluctuates very much depending on changes in local climate, especially sensitive to rainy condition at flowering and harvest. Dangerous diseases also occur seriously in high moisture condition.

Therefore, yield varies among years and seasons. The main factors affecting to yield variance are unexpected drought, heavy rains at flowering and harvest, floods and pests. Average annual yield, therefore, varies quite much in the range from 12 to 20 tons/ha.

Table 6. Grape yield and production

Year	Area	Yield (ton/ha)	Production (tons)*
1995	-	2,09	-
2000	-	14,11	-
2004	-	17,42	-
2005	1,615*	-	26,000
2006	1,511*	19,57	27,660
2007	1,292*	-	26,860
2008	1,145*	-	25,660
2009	1,032	12,77	-

Source: Dept. of Agriculture and Rural Development of Ninh Thuan, Jan 2010

* Statistical year book 2008 of Ninh Thuan

5.1.3 Investment

Grape needs high investment in terms of cash and agricultural inputs. In addition, it can not be grown in large-scale farms because of land fragmentation and limited land holdings. Besides, it requires specific soil and climate conditions and irrigation. Therefore, grape is produced in small-scale only, despites of rich, medium or poor producers, and locates in irrigated areas. As the results, grape is not concentrated grown in large-scale of each farm, but the whole available area for grape is rather large in Ninh Thuan province. It is estimated at the size of 4,000 hectares.

Normally, grape production cycle can be divided into two phases. The first phase is the investment year, as basic infrastructure as seedlings, wooden pillars, and iron wire must be invested. It costs around 100 millions VND/ha, equivalent approximately 5,400 USD/ha¹. That cost can be categorized as fixed cost, and hence, be depreciated during the production cycle.

¹ Calculated Exchange Rate: 18,500 VND/1 USD

Since the second year, farmers just only invest variable expenditures as fertilizer, pesticide, labor for taking care, and fuel for irrigation. The variable costs vary from 30 to 50 millions VND/ha/season. As farmers harvest twice a year, total annual variable costs can double at level of 60 to 100 millions VND/ha, equivalent to 3,200 – 5,400 USD/ha/year.

Because of limited land holdings, strict production condition and high production cost, normally, each farmer grows 0.2 to 0.5 ha only.

Gross profit of grape production is approximately 5,000 USD/ha/year, which is the highest in comparison to other crops.

5.2 Market Trends

Grape is one of the most imported fruits to Vietnam. Main imported sources are Australia, Chile, China, Peru, Arabian countries and U.S. Australia is the main seller, which occupied great market share in Vietnam market and the next imported source is from Peru (72.29% and 11.44% imported value in the first 10 days of April 2007, respectively). The grape imported from U.S. and China is also important.

There's no official updated data of imported volume and value for grape in Vietnam market. Only fragmented data are provided by website of Information Centre for Industry and Trade, Ministry of Industry and Trade. The recent data showed that grape probably occupied high proportion of vegetables and fruits imported. Only in the first ten days of April 2007, grape imported value was at 392 thousands USD. Similarly, the figure of the first week of September 2008 was at 662 thousands USD, only from the U.S. As grape import varies by season, estimated imported volume might be approximately 5 to 7 thousands ton a year which costs around 8-10 millions USD a year.

Through imported ports, it is obvious that the main inland market is Ho Chi Minh City, then Hanoi-based region. Although imported prices vary largely among the import sources but in the range of 700 – 1,800 USD/ton. The most frequent price is from 1,200 to 1,500 USD/ton.

Retail prices in Ho Chi Minh City market vary from 50 to 90 thousands VND/kg, equivalent to 3-5 USD/kg, all taxes and marketing margins included. Meanwhile, normal prices of Ninh Thuan grape are just around 10-15 thousands VND/kg in Ho Chi Minh City and neighboring provincial markets, equivalent to only 0.5-0.9 USD/kg.

The main markets of Ninh Thuan grape are the southern region, of which, Ho Chi Minh city remains the biggest market, then the other provinces as VND Nai, Binh Phuoc Ba Ria – Vung Tau, Binh Thuan, Khanh Hoa, Phu Yen, Lam Dong, DakLak, etc. The grape output entering to all domestic markets is approximately 20 thousand tons a year. From the available data, grape is able to contribute a significantly income for the whole province. Annual output value can be estimated at level of 200 billions VND, equivalent to 10.8 million USD (20 thousand tons at price of 10 thousands VND/kg).

It's obviously that market size for fresh fruits is increasing in parallel to the increase of per capita income and urbanization. Grape is considered a delicious and healthy fruits. However, medium and rich people prefer high quality imported grape whereas urban poor often choose cheaper domestic grape, mainly provided from Ninh Thuan province.

In the recent year, Chinese import raises more difficulties for Ninh Thuan grape because of cheap price at less than 1,000 USD/ton. Through DAF (Delivered At Frontier) mechanism, importers can avoid taxation, and then reduces retail prices in domestic market. Therefore, competition in grape market is obviously.

Beside fresh grape consumption, wine consumption in Vietnam has been increasing thanks to better income and economic globalization. An information source indicates that Vietnamese imports and consume 10 to 15 million liters of wine a year. Meanwhile, wine industry is still under-developed in Vietnam. There are some wine companies in Da Lat, the city of Lam Dong province, collecting grape in Ninh Thuan to produce wine. It is likely that Ninh Thuan table grape is not really suitable for producing wine. Nevertheless, new wine grape production at small-scale has proved that Ninh Thuan can grow and expand wine grape sub-sector.

Therefore, development of wine grape production and wine industry is not only the challenge but also the opportunity for Ninh Thuan province.

Table 7. Prices of imported grape from different sources, the first ten days of April, 2007

Exporters	Unit price (USD/ton)	Delivery condition	Port
Australia	1,200	CIF	Cát Lái Port (HCMC)
	1,250	CIF	Tân Sơn Nhất Airport (HCMC)
	1,800	CIF	Tân Sơn Nhất Airport (HCMC)
	3,500	CIF	Hải Phòng Port
Chile	770	FOB	Cát Lái Port (HCMC)
China	960	DAF	Tân Thành Port (Lạng Sơn)
Peru	1,200	CIF	Cát Lái Port (HCMC)
Saudi Arab	1,200	CIF	Cát Lái Port (HCMC)
Hoa Kỳ	396.73	FOB	Hải Phòng Port

Source: Website of Information Centre for Industry and Trade

5.3 Value Chain Map

Grape value chain can be divided into three main phases: (1) grape production, (2) local trading and (3) distribution in market place (diagram 2).

The production phase involves directly input providers, public agricultural services and farmers. In this phase, grape fruit is produced at farm. Farm's inputs are provided by local agents or by public service (seedlings only). The main inputs are seedlings, manure, chemical fertilizer, pesticide, and other materials as wooden pillar, iron wire, etc.

The second phase concerns to local grape trading. Key actors are small collectors at village level, local traders and whole sellers. Product flow is grape for fresh consumption.

The third phase is to distribute grape from Ninh Thuan province to market place. Main market is Ho Chi Minh City, and other provinces in southern and central coast regions.

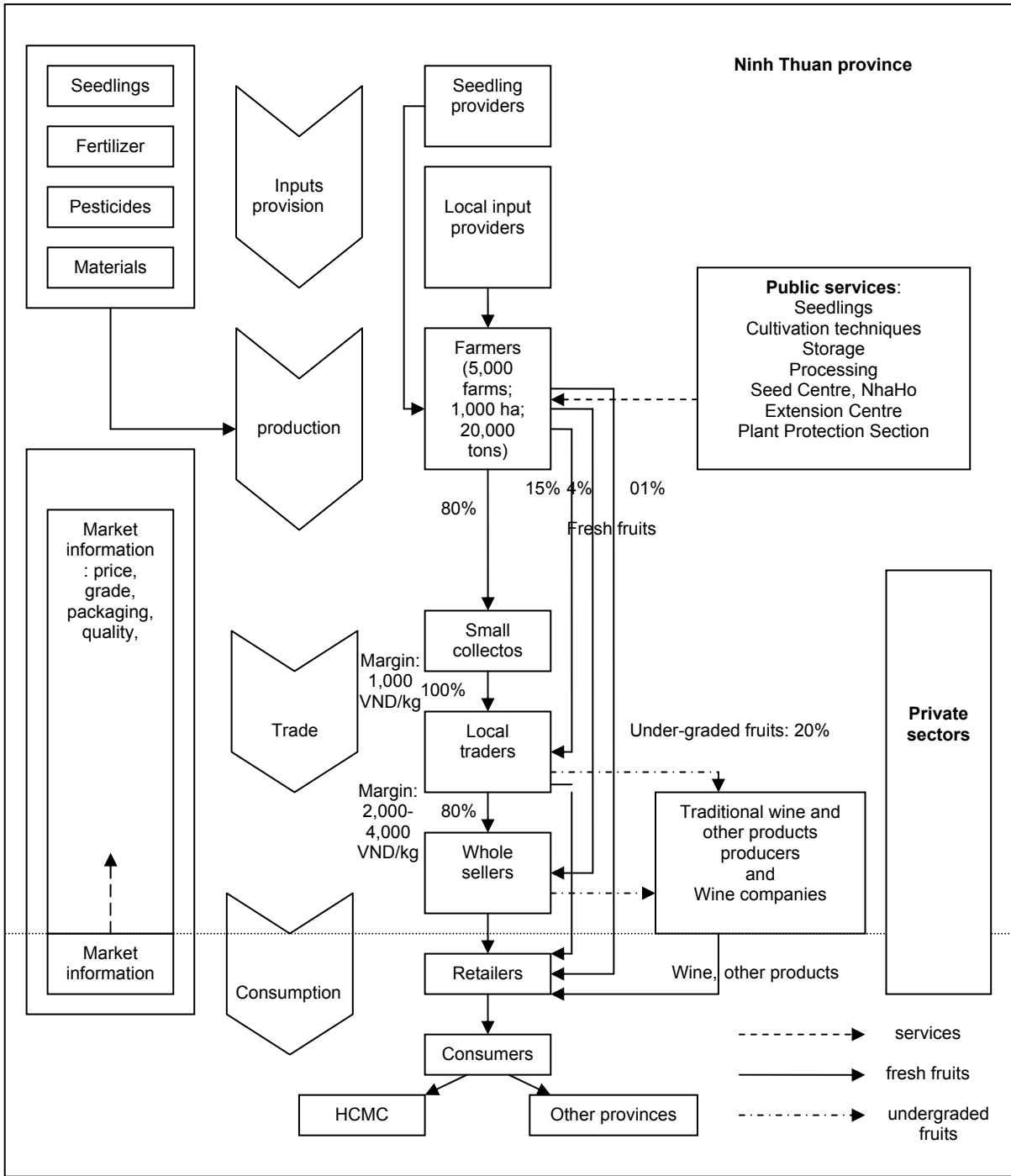


Diagram 2. Grape Value Chain Map

5.4 Market Actors, Their Roles, and Inter-Relationships

5.4.1 Input providers

Public service providers

Public service is mainly provided through line agencies belonging to DARD system. There several service providers concerning to grape value chain as Agricultural Extension Centre for introduction and training of cultivation techniques; Sub-Department of Plant Protection for application of GAP and food safety purpose; Ninh Thuan Centre for Agricultural Varieties and Breeds and NhaHo Research Institute for Cotton and Agriculture Development for R&D on grape varieties and seedling provision.

These above public service providers have closely linkage to grape farmer communities through direct technical assistance or through extended sections to district levels.

Department of Science and Technology has also its important position in providing research and application of new cultivation technology and diversification of grape products. In addition, it is the key actor providing geographical indication and band building and certification.

Agricultural R&D service provided by these public agencies contributes significantly to develop environment-friendly, safety and economic efficiency of grape production, and enhances sustainable development of the products. The inter-relationships among these public service providers are the key factor for success in case of value chain approach.

Investment for public service is the most constraint for grape value chain improvement. Lack of capital limits activities of related service providers. Another important constraint is limitation of human resource due to fixed allocation of staff number.

Input providers

Local input dealers play a very important role for grape farmer. Fertilizer and pesticide are the main inputs they provide to farmers. In addition, input providers also are the channel supplying environment-friendly chemicals as biological pesticides, organic fertilizers to grape producers, which are the core to build GAP and trademark name for the value chain.

At the same time, they also play a role as micro credit suppliers. Located in every hamlet and village, they are able to provide inputs in time to the farmer's need. Normally, they also provide micro credit to poor farmers under forms of late-payment input provision with acceptable interest rates of approximately 3%/month.

Misuse of credit line is a common problem of poor and near poor farmers. They often rely on official credits of Agri-Bank system and Social Policy Bank for home consumption and non-agricultural expenditures; they need financial support of input providers. In that case, late-payment input purchase becomes a vital capital source for them. That issue is very common in rural areas, especially for the poor and near poor farmers.

In brief, input providers are key actor for grape value chain in rural areas of Ninh Thuan as providing inputs and small credits to farmers. Through their activities, biological fertilizer and pesticide can be introduced to farmers under form of in-item credit.

5.4.2 Farmers

Grape production in Ninh Thuan relates closely to poor and near poor farmers in low land areas. In particular, both Kinh and Cham communities grow grape as an important income source of the household. Commonly, poor and near poor farmers grow grape at very small scale of 0.1 to 0.2 ha. Meanwhile, medium and rich farmers often cultivate 0.5 to 1.0 ha. Specifically, grape cultivation requires high investment. As lack of capital is commonly found for poor and near poor groups, they can not easily expand grape area.

Medium and rich farmers are also effective actors of grape value chain because advanced farmers who early apply new techniques and then, quickly transfer to neighboring small farmers. For group production in exploiting economy of scale and for GAP certification, medium and rich farmers will be the core of farmer groups. Medium and rich farmers are much better in market linkage and absorb new technologies and market information as well.

However, it is likely that creating farmers groups requires commune work that is Kinh farmer's weakness. Meanwhile the religious linkage and high community nature probably help Cham people work better in group.

In the value chain, grape farmer always sell their fruit to local small collectors and dealers. The first channel occupies estimably 80% of total output. Around 15% of grape is sold directly to local dealers through contract, trust or getting payment in advance for the whole harvest. Extremely few farmers can directly sell grape to retailers. A typical case is presented in the Annex 1.

It is likely that grape farmers have closely linkage to input providers than market. There's no market information channel available to directly transfer to grape farmers. As the consequences, it might create more risk in production.

5.4.3 Traders

System of local collectors and traders has an avoidable role in linking grape farmers and market. It seems that the system effectively acts when all grape output is quickly gathered and moved to market in time. The trading system includes at least three main types of actors: local collectors; local traders and whole sellers.

Local collectors are the ones who do small business at harvest time. Going to each corner of grape cultivation areas, they collect mature fruits at farms with low quantity, 100 – 200 kg/day, and deliver to local traders to get margin. Their marketing margin is estimated at level of 1,000 VND/kg, which ensures an income level of 100-200 thousands VND/working day.

Local traders are mainly located in village or town center. Since receiving fresh grape at business place, local traders have to trim and classify grape to different grades. For small local traders, they re-sell classified and graded grape to whole sellers. Bigger traders are able to deliver fruits directly to whole buyers at market place following daily order.

Whole sellers can be found in main market of district or grape areas. Collecting fruit from local collectors and from local traders, they package and re-sell to Ho Chi Minh City and other neighboring market to main distributors. For local trading system, they can be seen as representatives of market, when all market information as price, grade, packaging, and quality are feed-backed to local traders, local collectors and then, grape farmers.

In the grape value chain, local traders and whole seller keep power. The penetration of promising GAP certified grape should base on their market links for broad consumption.

5.4.4 Wine-producing facilities and companies

Wine grape is already grown at small scale in Ninh Thuan province. Located in dry and hot region, it seems that Ninh Thuan does not meet basic conditions for making wine. Therefore, wine is just ongoing produced at pilot scale.

Thang Long Wine Company was established in Ninh Thuan some years ago to create new channel for Ninh Thuan wine production. However, that effort failed due to lack of raw material and market uncertainty for local new trademarks. Now only remaining Vinh Tien Wine Company, a company in DaLat City of Lam Dong province, collects wine grapes in Ninh Thuan province with very small volume (20-30 tons a year only). It is necessary to emphasize again that table grapes grown in south central Ninh Thuan are not really suitable for producing wine. Meanwhile, the wine produced now are mixture of table grapes, fermented mulberry juice, and French wine extract or even premium-quality French wine. In particular, under-graded grape, most from Red Cardinal variety, is used for wine production. Its percentage is estimated at 20% of total output.

In recent years, a French person, Mr. Daniel Carsol has tried to develop new wine grape varieties in TaNung village, nearby DaLat City to produce wine. It is likely that Syrah, Merlot, Cabernet sauvignon and Caladoc varieties are suitable for climate condition in Southern Vietnam.

In Ninh Phuoc district, Mr. Nguyen Van Moi has invested in pilot wine production. Adaptive from wine-making technology of Dept. of Science and Technology, he installs small wine-making factory at capacity of 50 thousands-bottle a year and hires expertise. He also grows Syrah variety by himself and with some contractors to make wine. Due to lack of wine grape, he is able produce only 10,000 bottles a year. Wine production is still in pilot production despite the fact that he already registers his own trademarks (See Annex 1). His newly developed wine production faces several challenges as (1) lack of experience in wine making that leads to low wine quality; (2) lack of capital for building cold-storage; (3) lack of wine grape material; (4) uncertain market.

Wine industry is a new promising direction to diversify grape products and improve economic efficiency for grape products in Ninh Thuan. At the present, it is just pilot activity. More investment into pilot production is needed through private sector. Therefore, participation of private sector in this direction and success in pilot production will determine the establishment and expansion of wine grape cultivation in future.

5.5 SWOT Analysis & Possible Strategies

5.5.1 SWOT analysis

Integration of the above issues, the SWOT matrix is established to summarize grape production situation for further analysis.

Table 8. SWOT matrix for grape production

Strengths	Weaknesses
<p>Target people</p> <ul style="list-style-type: none"> - Grape is also suitable for poor and near poor Cham and Kinh people <p>Production</p> <ul style="list-style-type: none"> - Local climate is appropriate for grape production in large scale - Farmer has basic knowledge and techniques of growing grape - Large potential areas for grape (5000 – 6000 ha) - Red Cardinal variety is highly adaptive to local climate and cropping condition <p>Public service provision</p> <ul style="list-style-type: none"> - Public service in agriculture as R&D, extension, plant protection, GAP certification, geographic indication and trademark establishment is available <p>Market</p> <ul style="list-style-type: none"> - Trademark of “Phan Rang grape”, “Ba Moi green grape” are commonly recognized - Trader network is developed - Domestic market for fresh fruit is large, especially in neighboring provinces 	<p>Target people</p> <ul style="list-style-type: none"> - Small farms is lack of capital and market linkage <p>Production</p> <ul style="list-style-type: none"> - Fragmented production at small scale - Red Cardinal variety is degraded, low yield and quality, often affected by weather - Intensive cropping, heavily use of fertilizer and pesticide and diseases lead to difficulty in GAP application - Lack of high quality table grape varieties - Wine varieties are under-developed <p>Market</p> <ul style="list-style-type: none"> - Increasing input cost - Fluctuated price in market - Low competitiveness in comparison to imported grape fruits - Wine grape and wine is not developed - Pilot wine has low quality and Phan Rang wine is not recognized <p>Institution</p> <ul style="list-style-type: none"> - Fragmented activities of R&D agencies - Difficulty in creating cooperatives, farmers groups for Kinh people due to less commune attitude and activity
Opportunities	Threats
<p>Public service provision</p> <ul style="list-style-type: none"> - There is local R&D agencies, especially NhaHo Institute for gene bank reservation and exploitation - GAP can be introduced and implemented to farm groups and can be the core of geographic indication and trademark building <p>Production</p> <ul style="list-style-type: none"> - Grape production is considered important and reluctant - There are two promising varieties NH01-52 and NH01-53 - There are two promising wine grape varieties (Cyrah and Cabernet Sauvignon) - Availability of biological pesticides in input market to ensure production towards food safety <p>Market</p> <ul style="list-style-type: none"> - Large domestic potential market for table grape and wine 	<p>Production</p> <ul style="list-style-type: none"> - It is difficult to develop new grape varieties that are adaptive to local climate - It is difficult to apply new cultivation techniques which ensure high yielding, quality and food safety - It is difficult to develop wine because of local climate and lack of experience <p>Institution</p> <ul style="list-style-type: none"> - Farmers have no tight cooperation - Lack of acting programme that incorporates mixed local experts from different public service agencies and private sector <p>Market</p> <ul style="list-style-type: none"> - High competition of imported grape and local fruits - Local wine can not compete imported wine

5.5.2 Possible strategies for grape value chain

It is likely that there are several strategies that can be applied to improve and develop grape value chain in Ninh Thuan province. The strategies of pursuing competitive advantages and overcoming weaknesses are chosen.

Table 9. Possible strategies for grape value chain











Pursue competitive advantages (Strengths + Opportunities)	Overcome weaknesses strategies (Weaknesses + Opportunities)
<p>Production</p> <ul style="list-style-type: none"> - Re-projection and build appropriate land use for grape production at large-scale - Make use of public service as extension, plant protection and R&D to GAP certified production <p>Market</p> <ul style="list-style-type: none"> - Enforce the promotion of grape and grape products of Ninh Thuan - Support private sector to participation in introduce GAP certified grape to the market - apply and develop wine-making technology and other products - Support private sector to apply and develop wine-making technology and other products 	<p>R&D</p> <ul style="list-style-type: none"> - Increase investment to R&D, especially varietal research and advanced cultivation techniques - Revigorate variety Red Cardinal - Prioritize variety selection and development for both fresh eating and wine making - Apply GAP basing farmer group establishment as the core for trademark development <p>Market</p> <ul style="list-style-type: none"> - Create linkages to big retailers in main markets <p>Institution</p> <ul style="list-style-type: none"> - Establish of collective farmer groups or cooperatives for application of GAP as the core for trademark building. Medium and/or rich farmers will be the core of group creating - Mainstream and incorporate mixed local experts from different public service agencies and private sector into an acting programme for grape production development

6. Products 3: Garlic

6.1 Market Trends

According to FAO source, garlic is grown globally, but [China](#) is by far the largest producer of garlic, with approximately 10.5 million tonnes (23 billion pounds) annually, accounting for over 77% of world output. India (4.1%) and South Korea (2%) follow, with Russia (1.6%) in fourth place and the United States (where garlic is grown primarily as a [cash crop](#) in every state except for [Alaska](#)) in fifth place (1.4%). This leaves 16% of global garlic production in countries that each produce less than 2% of global output. Much of the garlic production in the United States is centered on [Gilroy, California](#), which calls itself the "garlic capital of the world".

Table 10. Top Ten Garlic Producers — 11 June 2008

Country	Production (Tonnes)	Footnote
 China	12,088,000	F
 India	645,000	F
 South Korea	325,000	F
 Egypt	258,608	F
 Russia	254,000	F
 United States	221,810	
 Spain	142,400	
 Argentina	140,000	F
 Myanmar	128,000	F
 Ukraine	125,000	F
World	15,686,310	A

No symbol = official figure, P = official figure, F = FAO estimate, * = unofficial/semiofficial/mirror data, C = calculated figure, A = aggregate (may include official, semiofficial, or estimates).

Source: [Food And Agricultural Organization of United Nations: Economic and Social Department: The Statistical Division](#)

Vietnam is not listed in top-ten garlic producers. In Vietnam, garlic is just cultivated in some coastal provinces with vary small output. Of which, Ninh Thuan garlic is well known in the domestic markets. Due to high quality Ninh Thuan garlic is commercialized to other provinces in Central Highland, Coastal Centre, and Southern region. Garlic dealers have the main business in Phan Rang – Thap Cham City and Ninh Hai district, the origin of Ninh Thuan garlic.

Ninh Thuan garlic has a promising market in Ho Chi Minh City, where medium and rich-class consumers prefer high quality products of agriculture and they are willing to pay high prices for what product they trust. Unfortunately, there is no official or unofficial information for spices consumption in Vietnam.

Observation shows that three main types of garlic are selling in main markets in Ho Chi Minh City and in Phan Rang – Thap Cham City. Domestic garlic is from Ly Son island of Quang Ngai province and from Ninh Thuan. Import garlic is from China. Ninh Thuan garlic is considered the best because of high quality and medium-size bulb. Meanwhile, garlic from Ly Son is losing its reputation due to small-size bulb. Garlic imported from China is seen as the cheapest with acceptable quality and big-size bulb.

Quick observation on garlic price at Phan Rang – Thap Cham market shows that price of Ninh Thuan garlic is twice much than that of Chinese garlic bulb. The retail prices are as followed:

- Dried, grade A: 70 thousand VND/kg of garlic bulb
- Dried, grade B: 60 thousand VND/kg of garlic bulb
- Fresh garlic: 40 thousand VND/kg of garlic bulb

Farm gate price in the middle of January 2010 is 50 thousand VND/kg in Vinh Hai village, unclassified. Meanwhile, retail price of Chinese garlic varies only from 30 to 40 thousand VND/kg.

6.2 Production and returns

Total cultivated area of garlic and onion in Ninh Thuan is about 1,170 ha and concentrates mostly in Ninh Hai district. Of which, sown area of garlic is estimated at a range of 200-300 ha. Annual output is estimated at from 1,500 to 2,000 tons. In particular, garlic can only be grown in costal sandy soil of Nhon Hai, Thanh Hai and Vinh Hai villages. It is cultivated as a cash crop in the main vegetable cultivation areas, where rotation between garlic, onion and vegetables is commonly practiced. In these villages, garlic is mainly grown by small farmers, whose farm size is very small, only from 0.2 - 0.3 ha/family.

The main cropping period of garlic is from September to December. Growth duration is about 4 months. Main water source for vegetables and garlic is underground water, which is around 8-10 m deep. Farmers use water-well system and pumping machine for their crops. At the end of dry season, underground water is often exhausted and slightly salinized.

Table 11. A simplified calculation of production costs and income of garlic in Vinh Hai village, Jan 2010
(unit: 1,000 m²)

Items	Unit	Quantity	Unit price (1,000 VND)	Cost (1,000 VND)
Garlic cloves (used as seedling)	kg	100	40	4,000
Compost	cart	2	1,800	3,600
Chemical fertilizers and pesticides		1	10,000	10,000
Total cash cost				17,600
Yield and gross income (fresh garlic)				
(1) minimum	kg	800	30	24,000
(2) maximum	kg	1,600	30	48,000
Yield and gross income (dried garlic)				
(3) minimum	kg	480	60	28,800
(4) maximum	kg	960	60	57,600
Gross benefit				
(1) minimum (fresh garlic)				6,400
(2) maximum (fresh garlic)				30,400
(3) minimum (dried garlic)				11,200
(4) maximum (dried garlic)				40,000
Gross benefit revealed by a farmer			10-20 million VND/0.1 ha	

Yield of fresh garlic bulb is estimated at 8 to 16 tons/ha, that is equivalent to 4.8 to 9.6 tons/ha for dried garlic bulb. The combination of yielding and price ensures high income for garlic producers despite of high investment (approximately 200 million VND/ha). Some main data of production costs and income is presented in the table 11 above.

Garlic in these three villages is considered the best and sold under two main types: for culinary use and for seed. While garlic bulbs for culinary use are mainly sold to other market, the remained output will be used for seedling purpose. Garlic bulb for seedling use is sold to other garlic production areas as in Ninh Son district, and even to Quang Ngai province.

6.3 Value chain map

Garlic value chain can be divided into two main sub-chains: (1) garlic for seedling use and (2) garlic for culinary use (diagram 3).

The production of garlic involves directly input providers, public agricultural services and farmers. Garlic is produced at small farms. Farm’s inputs are provided by local agents or by public service. The main inputs are seedlings, compost, chemical fertilizer, pesticide.

After harvest, garlic used for seedling will be kept in farm households for their own use and sell to other garlic areas. Approximately 20% of garlic output is used as seedling. Other 80% of total output is used for culinary. Of which, fresh garlic occupies a small proportion (10%), mainly for local consumption.

90% of garlic for culinary use will be dried and sold, mainly to other provinces in Central Highland, Coastal Centre and Ho Chi Minh City. Key actors are small collectors at village level and wholesalers. Most of wholesalers locate in Van Hai ward of Phan Rang – Thap Cham City. They collect, dry and distribute garlic to different markets.

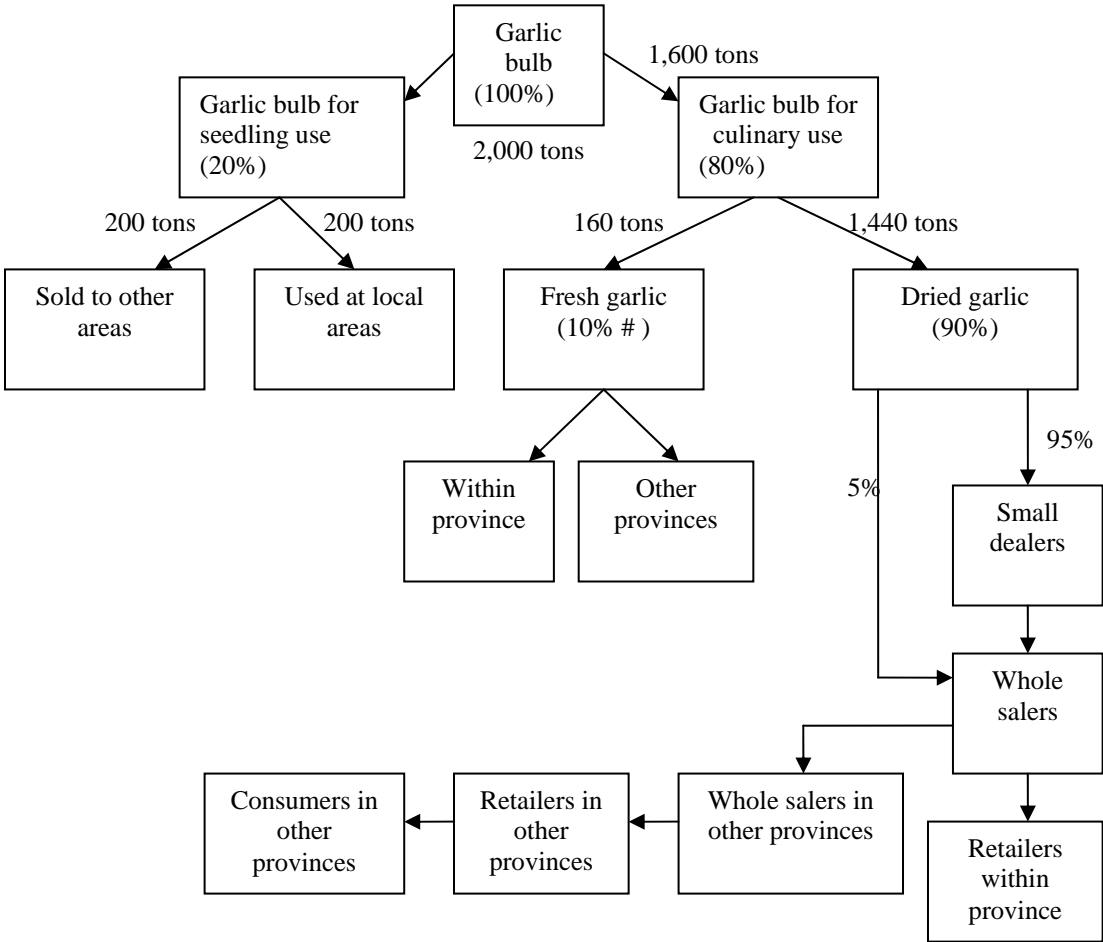


Diagram 3. Garlic Value Chain Map

6.4 Market Actors, Their Roles, and Inter-Relationships

6.4.1 Public sector

The main government offices that participate in the garlic value chain are Sub-Department for Plant Protection and Agricultural Extension Centre. The services delivered by these institutions for this value chain mainly focus on technology transfers and enforcement of government regulations regarding safe pesticides use or integrated pest management.

6.4.2 Input providers

The inputs needed for garlic production are mainly seedling cloves, compost, chemical fertilizers and pesticides. Input providers ensure their provision not only for garlic production but also for other crops as onion and vegetables. The input provider system covers widely from districts to communes or even to the villages with various services. Also at levels of district, commune, village there are many providers participating in the input channel of garlic and they also play roles of lenders of non-cash capital such as fertilizer or pesticides to growers.

6.4.3 Farmers

Garlic is grown as the cash crop in vegetable areas where farmers have very strong experiences in vegetable cultivation. They are applying many good indigenous experiences to create the special flavor for garlic, making the local products well known, also in other markets.

Farmers are often trained and guided by local extension officers. Main guidance is of safe pesticide use, pest and disease management in general. For garlic farmers, alternative use of chemical pesticides is a very important issue to reduce production cost and ensure better garlic quality. Non-chemical technologies related to pest and disease management is required. The protocol of GAP certificate application should be the guide for the training activities.

Garlic farmers have poor understanding about the trademark development and protection. There needs to be support from government institutions to train and develop the trademark for the garlic. This will create improved market opportunities for garlic linking with multiple market channels or even access to the big buyers such as Metro, BigC or other supermarket chains.

6.4.4 Traders

The local traders are playing an important role in the promotion of Ninh Thuan garlic in regional markets. The main actors participating in the garlic delivery systems are shown in diagram above. They are small collectors at village level and wholesalers in Phan Rang – Thap Cham wholesale market. They are responsible for pre-processing, packaging and distributing dried garlic to all domestic markets.

6.4.5 Constraints/opportunities and possible solutions

Garlic is quite a typical crop for coastal sandy soil only. It is sensitive to soil types and micro-climate. This crop has good harvest and good quality when it is grown in Ninh Hai district, especially Nhon Hai, Thanh Hai and Vinh Hai villages. It has got less productivity or even no harvest when it is grown in other areas. Garlic is also cultivated in some areas of Ninh Son district. Although the bulb develops very well in Ninh Son but the quality was very poor in comparison to Ninh Hai garlic. The products from Ninh Hai may be better due to the irrigation method where fresh water is being rotated with salty water for biomass development and nutrient enrichment. It could be a challenge to introduce garlic widely into other areas, where only fresh or salty water is available.

The seedling of garlic is simply the cloves derived from the harvested bulbs, which may be contaminated by diseases. Using the same source of genetic without strengthening or revigoration might lead to reduction the productivity of the variety. The local garlic variety has been used for many decades without any serious action plan to improve the genetic resource.

Garlic of Ninh Thuan is well known in domestic market. High quality creates its reputation and competitiveness despites of cheaper imported Chinese garlic. However, there is no any official trademark for Ninh Thuan garlic. The combination of GAP application and trademark development can be a promising solution to strengthen garlic value chain and improve livelihood of small farmers in coastal areas of Ninh Thuan.

The adaptability of various genetic strains for the different locations of Ninh Son and Thuan Bac districts should be tested. This will support the scaling up of production. It is important to maintain the quality which makes the local garlic attractive on the markets. This study should be facilitated by local staffs with the participatory of the farmers.

The study on market opportunities of garlic products in different channels should be done by the local staff members and key farmers. This study should focus on the new channels of supermarkets, or new local markets in Northern region.

7. Recommendations for Further Action

From 18 potential value chains of Ninh Thuan, three major value chains have been chosen following a careful selection and analysis process. They are Goat/Sheep, Grape and Garlic. In order to strengthen these value chains, several activities must be carried out under support of IFAD's SARD-NT project. The detailed proposed activities are described in the following sections.

7.1 Development activities for goat/sheep value chain

Area 1. Links between farmers and market

1. Realize market studies for goat and sheep consumption
2. Product marketing and creating linkage in the value chain.
 - Develop marketing tools
 - Organize workshops
 - Provide supports for marketing events and local annual trade fairs.
 - Support marketing activities and advertisement of goat and sheep products .
3. Establish market-information system
4. Building collective trademark for Ninh Thuan goat and sheep meat

Area 2. Raising production

5. Capacity building for better livestock production
 - Provide training and guidelines of fodder storage in dry season.
 - Establish farmers groups
 - Provide trainings and study-tours
6. Support establishment of demonstration for grass cultivation
7. Support poor households to construct water tanks

Area 3. Environmental issues and policy institutions in the development of value chains

8. Develop sustainable goat/sheep breeding, limit impact on the environment
9. Enabling environment for trade and investment
 - Issue regulations for commune use of natural pasture in a manner of prioritizing the development of goat and sheep grazing.
 - Issue standardized criteria of slaughter-houses and license business activities in line with conditions of Ninh Thuan.
 - Build transparent regulations for goat/sheep business
 - Build credit fund for the development of goat and sheep value chain.

7.2 Development activities for grape and garlic value chain

There should be four priority areas to focus into grape and garlic value chains. For each priority area, several existing problems can be defined. The further actions of any R&D project should solve these problems.

Area 1. Improve technical and economic efficiency of grape and garlic production.

The proposed actions would be:

- Apply innovative cultivation techniques to ensure technical and economic efficiency.
- Apply an acting programme focusing in grape and garlic production and development at the moment.
- Develop new alternative techniques for pest control using eco-friendly pesticides

Area 2. Enhance product value through improvement of quality.

- Apply new alternative techniques for pest control using eco-friendly pesticides
- Strengthen R&D for new varieties and support for introduction and expansion
- Apply VIETGAP certified product; enhance collective trademark development and ensure traceability

Area 3. Enhance market linkages

- Strengthen and develop tight linkages among value chain actors.
- Strengthen business and marketing capacity
- Establish farmer groups or groups of common interests to increase farmer power and position in market
- Improve competitiveness by through building specific trademark basing on VietGAP application

Area 4. Environment issues

- Test and apply innovative techniques of watering
- Apply new alternative techniques for pest control using eco-friendly pesticides

Area 5. Institution and policy issues

- Issue VietGAP standards for grape and garlic production
- Certificate to farmers groups which apply successfully VietGAP

The recommendations for further action are presented in the next table 11.

Table 12. Conclusions and Recommendations for Further Action to Strengthen Goat and Sheep Value Chain

Priority Areas	Affected Groups	Major Issues	Action Needed
Livestock: Goat and Sheep Value Chain			
Linkage husbandry farmers to market	All husbandry households; husbandry groups, cooperatives, slaughter-houses, distribution companies, etc., including all Kinh, Cham and Raglai ethnics.	<p>Farmers and other actors of the value chain lack of market information and have no tight linkages for production and commercialization.</p> <p>Goat and sheep meat of Ninh Thuan have no specific trademark and certification to enter big retailers as super market and export.</p> <p>Lack of capital to expand production scale. Owners of slaughter-houses need financial support to upgrade facilities and mobilized capital.</p> <p>Farmers have no enough information of input provision as price, grass seedlings, veterinary drugs.</p>	<ol style="list-style-type: none"> 1. Provide training of methodology to build up specializing farmers groups for core-farmers, trading actors (slaughter-houses, collection traders) and veterinary officers, and agricultural extension officers at commune level. (It is estimated 6 courses to be organized, each course lasting in two days including 20 to 30 trainees). 2. Realize market studies for goat and sheep consumption in some big cities like HCMC, Da Nang and Hanoi in order to identify marketing channels, costs and margins and potential trading actors to participate in goat and sheep meat value chain of Ninh Thuan province. 3. Develop marketing tools including posters, leaflets and video films to serve marketing and products introduction. 4. Organize workshops attended by actors in the value chain, and workshop for introducing ad tasting meat products at in cities such as HCMC, Da Nang and Ha Noi, etc. 5. Provide supports to restaurants, distribution companies to carry out marketing events for product tasting and introducing their supplying capacity at local annual trade fairs. 6. Support marketing activities and advertisement of goat and sheep products through making documentary films, and television reports done by leading media channel (e.g. NTV, VTV2). 7. Establish market-information system to provide information as price, meat availability, goat and sheep for sale, husbandry and veterinary services, breeding grass, etc.. 8. Establish 3 to 6 actors groups specializing in husbandry, slaughtering, and distributing products of goat and sheep meat. As for the first years, 1 to 2 groups shall be established. Based on the experience gained from the first year, this co-operative model will be replicated. 9. Establish technical practices for all grazing techniques, slaughtering, and meat storage. Transfer these practices to training for households and slaughter-houses by continuous training. 10. Finalize administrative and monitoring procedures to provide collective trademark. 11. Consult to make use of the trademark in an effective manner.
Husbandry activity	All groups	<p>Serious lack of green and reserved fodder for grazing. Natural pasture is reducing due to overgrazing. There is no drought-tolerant grass species cultivated in Ninh Thuan.</p> <p>Lack of water supply and reservation for animals and grass cultivation.</p>	<ol style="list-style-type: none"> 12. Import goat (Boer breed) and sheep (from Australia) to enhance genetic resource of local herds, rearing and reproduction. 13. Establish farmers groups including 3 pioneer groups in 3 districts Ninh Phuoc, Thuan Nam and Ninh Son in the first year; and scaling up to 20 to 30 such groups in the following years. Each group composes 20 to 30 households, including poor and non-poor households. 14. Support establishment of grass gardens to provide seedlings to local people. 3 pilot models will be installed in the first year in 3 districts Ninh Phuoc, Thuan Nam and Ninh Son, and scaling up the next years. New grass species as VA-06, Ruzi grass (<i>Brachiria Ruziziensis</i>), cactus, <i>Leucaena Laucocephala</i>, etc. can be tested.

Priority Areas	Affected Groups	Major Issues	Action Needed
		<p>Veterinary service is not in time provided. Lack of qualified veterinarians at commune levels.</p>	<ol style="list-style-type: none"> 15. Provide training and guidelines of fodder storage. 20 to 30 courses training courses to be organized, 20 to 30 farmers as trainees per each course². 16. Organize of study-tour for farmer groups within the province. 17. Support poor households to construct water tanks to be used for animal husbandry³. The costs to build tanks shall be contributed 50% by the households and the rest by the project. It is estimated that a household raising 30 goat needs approximately 15 cubic meters of water⁴ to be reserved in 8 months. 18. Provide training to help veterinarians working at village and commune levels to improve their abilities in diagnostic, prevention and treatment of animal diseases happened. 6 courses with 20 trainees per course shall be organized in 6 districts by the veterinary department.
<p>Issues of environment and institution and policy in the value chain development of goat and sheep.</p>	<p>All groups</p>	<p>Over-exploitation of natural pasture leads to desertification. There is no reasonable land use plan for natural pasture protection. No regulation for commune grazing on natural pasture.</p> <p>Out-of-date slaughter-houses cause critical environment pollution and contaminate water source for home consumption.</p> <p>Good slaughtering practices are not issued and applied.</p> <p>Unofficial tax and fees are constraints of private sector.</p>	<ol style="list-style-type: none"> 19. Develop a livestock development plan for next 10 years including issuing regulations for commune use of natural pasture in a manner of harmonization of livestock development and forest land protection. 20. Develop a land use plan for slaughter-houses 21. Issue the set of standardized criteria of slaughter-houses 22. Issue the set of standardized criteria of process of slaughtering, meat storage and distribution meet issued criteria 23. Institutionalize management of farm groups

² One grown goat or sheep needs food per day equivalent to 4% of its weight

³ One grown goat or sheep needs about 2 liters of water per day

⁴ Volume of water: 30 goat x 2 liters/goat/day x 8 month x 30 day/month = 14.400 2 liters of water = 14,4 m3

Table 13. Conclusions and Recommendations for Further Action to Strengthen Grape and Garlic Value Chain

Priority Areas	Affected Groups	Major Issues	Action Needed
Improve technical and economic efficiency of production and enhance product value through improvement of quality	Poor and near poor Kinh and Cham Different production scale farmers Local trading system R&D public service agencies in agriculture	Current applying cultivation techniques do not ensure technical and economic efficiency. There's no acting programme focusing in grape and garlic production and development at the moment. Difficulties in pest control. Overuse of chemicals and varietal degradation lead to low quality products. Lack of new varieties and support for introduction and expansion GAP certified product is not yet produced. There's no certified collective trademark. Traceability is not ensured.	24. Increase investment to varietal R&D for both table and wine grapes. Main beneficiaries are Seed Center and grape research section of NhaHo Research Institute. 25. Establish specified programme for improvement cultivation techniques through stable activities of local experts. 26. Piloting alternative technologies to control pests and diseases, and fertilization, irrigation following the GAP standard approach. 27. Support new varieties' tests and piloting production at farmers' farms 28. Establish 10 farmers groups in Ninh Phuoc and Thuan Nam for grape production; 3 farmer groups in Ninh Hai for garlic production and maintain groups' activities as workshops, and experience exchange 29. Provide GAP techniques training 30. Scaling-up pilot results to application in 13 groups in next second year 31. Support basic infrastructure for GAP application in 13 farm groups in next second year 32. Support basic infrastructure for wine pilot production 33. Establish farmer group responsible for garlic genetic improvement
Enhance market linkages	Poor and near poor Kinh and Cham Different production scale farmers Local trading system R&D public service agencies in agriculture	There are no tight linkages among value chain actors. People lack of business and marketing capacity. The production is breakup from product marketing and distribution. Individual farmer is powerless in price negotiation and can not provide massive and unified products in time. No specific trademark is recognized in main markets. Competitiveness is not improved.	34. Conduct market oriented and marketing training for farmer groups, staffs of local institutions (DARD, Extension, Farmers Union, Women Union) at all levels 35. In-depth market research at main markets and value chain quantitative analysis for grape and garlic separately (call for TA from universities or research institute) 36. Support the basic need (packaging equipment, plastic/net bag...) for grape and garlic at farmers groups and/or market sites. There will be 13 sites to be invested (might at the third year to fifth year). 37. Support building a warehouse for garlic at main local wholesale market 38. Advertisement of new product: leaflet, media as television film (might at the third year to fifth year) 39. Workshops for market, and product promotion (once a year from the fourth year) 40. Support the farmer groups to participate the regional/national agriculture trade fairs 41. Develop the trademark and code for products
Environment issues	Poor and near poor Kinh and Cham Different production scale farmers R&D public service agencies in	Overuse or misuse of water is commonly found. Overuse of harmful pesticides and chemical fertilizer result in high production costs, environmental and health problems.	42. Piloting the application of new water-saving techniques will be installed at 3 garlic pilot farms 43. Introduction of new biological fertilizer and pesticide by private sector

Priority Areas	Affected Groups	Major Issues	Action Needed
	agriculture		
Institution and policy issues	Poor and near poor Kinh and Cham Different production scale farmers Local trading system R&D public service agencies in agriculture	VietGAP standards are not applied broadly. GAP application and certification are still problems for both farmers and public agencies.	44. Develop a land use plan for grape production 45. Issue VietGAP standards applied for grape production 46. Issue VietGAP standards applied for garlic production 47. Issue VietGAP certification to farm groups 48. Institutionalize management of farm groups

ANNEXES

Annex 1. In-depth interviews

Case studies

Mr. Lê Hữu Thanh, Nho Lam hamlet, Phuoc Nam village, growing grape

Family structure: 4 members, two labours

Field: 0.2 ha grape and 0.2 ha of local apple

Experience in growing grape: 20 years

Varieties: Red Cardinal; Yield: 15-20 tons/year; Water source: river and water well

Price: 5-7 M VND/ton in low demand; 10-13 M VND/ton in high demand

He does not want to grow green-fruit grape NH01-48 due to highly sensitive to diseases, esp. fungus disease caused by *Ensiionoe ampelina* and long harvest and unfavorable price.

Production cost:

- Investment phase: 70-80 millions VND/year 1
- Harvesting years: 80-100 millions VND/ongoing year (including two seasons)

Credit: mainly from home capital and buying inputs in forms of late payment with 3-5%/month interest

Difficulties are mainly unstable price and grape disease

Local wage: 35,000 VND/6-hour manday



Interview at vineyard

Focus group workshop in Ninh Phuoc, for grape fruit production

Group composed heads of Plant protection section, Extension section, Farmer association, Agriculture Section of the district and a staff from Ba Moi plantation.

Ninh Phuoc is one of the main grape production areas of Ninh Thuan. Some years ago, grape area was approximately 700 ha, but reducing to only 420 ha at the current. The villages for grape fruit are Phuoc Hau, Phuoc Thuan, Phuoc Dan and An Hai. The dominant variety is Red Cardinal, an old one adaptive to specific climate condition of Ninh Thuan province. The new green fruit is NH01-48, released by the NhaHo Research Institute for Cotton and Agriculture Development since 5 years ago, which has only around 5 ha. Nowadays, two new released varieties NH01-52 and NH01-53 are just tested in very small scale.

Participants mentioned the main reasons accounts for the reduction of grape production in the recent years are unstable price and increasing production cost.

They also comment the performance of NH01-48 green variety. Despite of provincial effort to scale up the variety, but the area is just of less than 5 ha so far. Main reasons are:

- sensitive to diseases, especially in rainy season;
- pesticide cost is too high to treat disease;
- duration from pruning to harvest is too long in comparison to Red Cardinal (4 months vs. 2.5 months. It means more taking care needed, cost and risk increase.
- Some ones say that its price is not higher than that of Red Cardinal, so farmers are not willing to practice it.
- yield of NH01-48 is higher than Red Cardinal (normally, 15 – 20 tons/ha/crop), however, it gives low yield in rainy season.

The staff from Ba Moi plantation, where NH01-48 was tested in the first years and is still grown, indicates that its price is much higher than Red Cardinal. Ba Moi plantation can sell at the price of 25 -30 thousands VND/kg through contract with Coop Mart system. In free market, NH01-48 price is normally 1.2 to 1.5 times higher than that of Red Cardinal.

The investment is of:

- The first year: 100 millions VND/ha
- The next years: 60 – 100 millions VND/ha

It is likely that normal farmers do not want to change the traditional techniques for application of new cultivated one. In particular, they do not care the quality and safety problem, just sell what they have, not what the market wants.

For the potential solutions of grape production development, main ideas are:

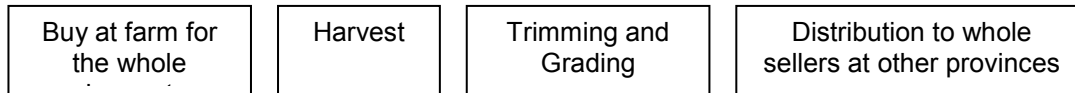
- Increase investment for grape research and application, especially varietal selection
- Revigorate the variety NH01-48 and Red Cardinal
- Apply cultivated techniques in right ways, e.g. lower density to reduce moisture content and then, reduce diseases; more use of manure; harvest at well maturity.

Interview Mrs. Le Thi Do, a grape dealer in Phuoc Dan, Ninh Phuoc

The business was organized more than 20 years. Every crop, she and her staff visit different farms to check the potential output, then open discussion and negotiation to farms' owners for the whole harvest. The price will be fixed basing on the output estimation and price negotiation. Once the agreement is made, she pays the sum of money and farmers have to stop all activities, except keeping watch the grape. Around ten days later, she and her staff will back to harvest by themselves.

She can buy 200 -300 kg/day. In good harvest, the volume can increase up to 400- 500 kg/day.

The way to do business can be illustrated as followed:



The under-graded fruits that occupy 10-20% total volume will be sold to enterprises that make local wine.

The price she collects grape fruits from farmers is 10 thousands VND/kg this day. After grading, she can resell and obtain the price of 11 thousands VND/kg for the second grade, 15-16 thousands VND/kg for the best. However, under-graded grape is very cheap, only 3 thousands VND/kg.

She also faces risk of:

- Loosing money for wrong estimation of grape output;
- Lost of harvest due to bad rain;
- Strong competition of Chinese grape imported with equal price, be kept in good condition (may be with unknown dangerous chemicals), nice-looking and sweet (normally from July to September)

She notes that many years ago, Red Cardinal gave sweeter taste and bigger size. From her point of view, her business is difficult because Red Cardinal variety can not do competition to Chinese grape. Many wholesalers in the town already stop their business.



Interview Mrs. Le Thi Do

Visit the Station for Varietal Trial and Production of Phu Son, Centre for Agricultural Variety and Breed of Ninh Thuan

Discussion to Mr. Nguyen Van Lam, the Station Head

This is the Trial and Production station, with 9 hectares of total land area. Of which, there's 0.5 ha of nursery, 3.6 ha of grape garden for gene reservation and 4.0 ha for rice seed production.

The remaining grape gene reservation has 54 grape varieties, of which there are 29 varieties for fruit purpose, 21 varieties for making wine and 4 other varieties, all imported many years ago.

The station has very low investment and in poor condition with simple infrastructure. The head does not know exactly the annual budget line, but I can guess it of around 100 millions VND a year as the whole. The station can find some extra money through rice seed production, grape seedling production and grape fruit sold to a wine company in Da Lat, Lam Dong province (Vinh Tien Company).

Human resource is scarce, including 1 agronomist, 1 technician and 1 worker for grape section.

The station has two promising grape variety for making wine, namely Cyrah and Cabinet Sauvignon. However, the station can not scale them up because there's vary limited market for wine grape fruit. Nevertheless, the station is trying to produce at the scale of 0.6 ha for each variety.

The good characteristics of these two varieties are:

- high yield: 20 tons/ha in spring crop; 10-12 tons/ha in other crops, 3 crops a year can be practiced;
- low investment, especially pesticides due to disease resistance;

The interviewer feels that the role of grape varietal research is not fully recognized. Low investment, little budget line and scarcity of human resource are evident.



Facilities of Phu Son Station

Visit farm of Mr. Nguyen Van Moi (Ba Moi), creator of the brand “Phan Rang Wine”

Mr. Moi thinks that the reducing situation of grape production is the consequences of several reasons as followed:

- Overuse of fertilizers and then, pesticides; incorrect techniques
- Untreatable dangerous disease caused by fungus *Ensiionoe ampelina* (called “Thán Thư” in Vietnamese)
- Bad quality and there’s no assurance for food safety; product does not meet market requirement; low price; poor competition

About the new NH01-48 variety, besides the good characteristic as good quality there are some reasons for not scaling up:

- late harvest in comparison to Red Cardinal
- suitable only in dry season; get bad disease in rainy season

Nevertheless, Mr. Moi is still growing 1.0 ha of NH01-48 in contract farming with Coop Mart system with the price of 25-30 thousands VND/kg. Note that he has got “Ba Moi Trademark” for fresh grape, practicing GAP, waiting for VietGAP certification. His trademark is recognized by consumers. He’s also testing two new grape varieties namely NH01-52 and NH01-53.

For wine grape, he thinks real wine can be produced in the Ninh Thuan climate condition. He is now growing in small scale wine grape with mainly Cabinet Sauvignon, Syrah, Chenin Blanc, and Chardonnay varieties.

He invested a chain of making wine equipment of 50 thousands-bottle capacity. From his own field (0.5 ha) and his farmer contractors (0.5 ha), he can produce only 10 thousands of bottles in this year.

He already registered the Trademark Vang Phan Rang (Phan Rang Wine).

Investment structure (roughly 1 billion VND):

- 600-700 millions VND for equipment;
- 300-400 millions VND for buildings;

Production rate: 1.2 – 1.5 kg of fruit to make 1 bottle of wine

Selling price:

- Wine of Cabinet Sauvignon: 90,000 VND/bottle (white wine)
- Wine of Chenin Blanc: 70,000 VND/bottle (white wine)
- Wine of Syrah: 70,000 VND/bottle (red wine)



Fruits of wine grape varieties



Vineyard of green-skinned table grape NH01-48



Green-skinned table grape NH01-48



Mr. Nguyen Van Moi is introducing his pilot wine-making factory



Chardonnay variety

Mr. Nguyen Ngoc Sang, Nho Lam hamlet, Phuoc Nam village, does sheep fattening

He usually keeps lambs for fattening because of low investment and the business cycle is short. He needs only two month to feed a lamb of 15 kg up to 30 kg. Using mainly agricultural by-products as grape, apple leaves, cropped grass and rice brain, now he has 15 lambs.

The selling price is around 50 thousands VND/kg live weight, similar to the price he bought. Therefore, he can earn a difference at 0.75 millions VND/head after 2-month fattening equivalent to 11.25 millions VND. Remaining costs are cage depreciation, fodder and veterinary medicament, which totally cost around 0.25 millions VND/head. Expectedly, he can get a gross income of 0.5 millions VND/head, equivalent to 7.5 millions VND during two months.

He mentioned that goat/sheep fattening is a good business, especially for the poor. Depending on season and his capital, he can keep fattening for a herd of 15-30 lambs, and do it three times a year.



Interview Mr. Sang



Mr. Sang and his fatten sheep



A sheep herd of 165 heads in Ninh Son district



A cattle herd free-walking in provincial road

Annex 2. Local Partners

Annex 2.1 List of Participants in Value Chain Selection workshop held at DPI, 12 Jan 2010

Organizations	Numbers	Notes
Bank for Agriculture	1	
Dept. Veterinary	1	
Dept. Forestry control	1	
Dept. Agriculture	1	
Dept. Science and Technology	1	
Dept. Industry and Trade	1	
Dept. Industry and Trade Promotion	1	
Dept. Environment and Resource	1	
Dept. Planning and Investment	2	
Dept. Minorities	1	
Extension Center	1	
District of Ninh Sơn	1	Water management
	1	Agriculture Section
	1	Resource and Environment Section
	1	Planning Section
	1	Veterinary Section
District of Ninh Phuoc	2	Agriculture Section
District of Ninh Hai	2	Agriculture Section
District of Bac Ai	1	Industry and Trade Section
	2	Environment Section
	1	Agriculture Section
District of Thuan Bac	5	Agriculture Section
	1	Veterinary Section
District of Thuan Nam	2	Agriculture Section

Annex 2.2 List of actors participated in the analysis of goat and sheep value chain

ID	Full name	Occupation	Address	Telephone
1	La Thị Kim Phượng	Slaughter house	Phước Nam, Thuận Nam communes	0909386437
2	Nguyễn Thanh Thoi	Slaughter enterprise Huỳnh Thiên	Xuân Hải, Ninh Hải communes	
3	Lê Thị Yên	Slaughter house	Thanh Sơn, Phan Giang	
4	Lê Thị Hoa	Slaughter house	Phước Vinh, Ninh Phước district	
5	Nguyễn Văn Thanh	Slaughter co-operatives		0944 344 259
6	Phạm Chiêu	Slaughter house	Nhơn Sơn, Ninh Sơn district	
7	Nguyễn Thanh Tùng	Slaughter house	Bắc Phong, Thuận Bắc district	
8	Dương Đình Thế	Farmhouse		0198 043 463
9	Nguyễn Tin	Management officer	DARD	
10	Phú Minh Tâm	Farmer	Văn Lâm, Phước Nam communes, Thuận nam district	
11	Kiều Diễm	Farmer		
12	Châu Văn Kỳ			
13	Từ Công Ban			
14	anh Mẹo	Farmer	Phước Ninh commune, Thuận Nam district	
15	anh Lai	Farmer		
16	Hữu Hải	Collection cum small slaughter-house	Văn Lâm 3, Phước Nam commune, Thuận nam district	
17	Thanh Hà	Farmer	Văn Lâm 1, Phước Nam commune, Thuận nam district	
18	Châu Thác	Farmer		
19	Bá Văn Tin	Chairman of Farmer Association	Phước Nam commune, Thuận nam district	
20	Trần Ngọc Bích	Management officer	Provincial Veterinary Department	0945 297 163
21	Trần Minh Châu	Enterprise + farmer house	Mỹ Sơn commune, Ninh Sơn district	0988682428

Annex 2.3 List of participants in the private sector workshop, held at DPI, 20 Jan 2010

	Name	Administrative Unit	Tel No.
1	Tạ In Nhữg	Mỹ Hiệp, Mỹ Sơn, Ninh Sơn	01688789130
2	Dương Ngọc Bích	Nha Núi, Mỹ Sơn, Ninh Sơn	0977055334
3	Trần Kim Bình	Hòa Sơn, Ninh Sơn	
4	Ngô Hòa	Hào Sơn, Ninh Sơn	0975843242
5	Trần Minh Châu	Mỹ Sơn, Ninh Sơn	0988682428
6	Nguyễn Việt An	Agro-business enterprise at Phước Bình, Bắc Ái	0979528538
7	Lê Hữu Thanh	Phước Nam, Thuận Nam	068-3506970
8	Trần Văn Lành	Nhị Hà, Thuận Nam	068- 3966078
9	Thiên Sanh Tiến	Phước Nam, Thuận Nam	0916971178
10	Bùi Hữu Mạnh	Công ty cung ứng vật tư NN và thu mua nông sản	01694959555