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TAM BINH MUSHROOM AND FRESH VEGETABLE COOPERATIVE

Bac Ninh, Vietnam

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PART
1

INTRODUCTION

LIKE MANY OTHER MORNINGS, MRS TRAN THI BINH GOES OUT OF HER SMALL HOUSE IN LIEN BAO VILLAGE, TIEN DU DISTRICT, BAC NINH PROVINCE AND WALKS ALONG A SMALL ROAD LEADING TO HER COOPERATIVE, NAMELY TAM BINH MUSHROOM AND FRESH VEGETABLE COOPERATIVE.

It is time to harvest white oyster mushrooms. This will be another hard-working day. However, Mrs Binh has a great feeling which is hard to describe. As one of thousands of farmers living in the Red River Delta of Vietnam after the economic "renovation" (i.e. *Doi Moi* in Vietnamese), Mrs Binh has practiced her own mushroom cultivation farm model for nearly 10 years. In spite of the considerable effort she's invested in this business model, concerns still remain about the development of the Cooperative.

PART
2

MUSHROOM PRODUCTION AT THE NATIONAL AND PROVINCIAL LEVELS

2.1 National level

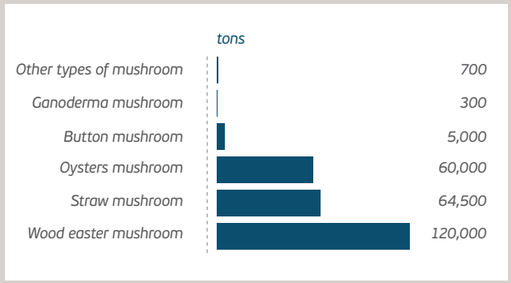
2.1.1 OUTPUT

Vietnam cultivates about 16 types of mushrooms with an annual yield of about 250,000 tons (Nguyen Nhu Hien & Pham Van Du, 2013). Straw mushroom is grown mainly in the Southeastern provinces and the Mekong Delta (Dong Thap, An Giang, Soc Trang, Tra Vinh, Dong Nai and Can Tho City) and accounts for 90% of the national production. Wood ear mushroom is grown mainly in the Southeastern provinces (Dong Nai, Lam Dong, Binh Phuoc), accounting for about 70% of the national production. Button, oyster and shiitake mushrooms are grown mainly in the Northern provinces with an output of about 3,000 tons per year. Medicinal mushrooms (Ganoderma, Yunzhi and Monkey Head mushrooms) have been newly developed and grown in some provinces and cities (Hanoi, Ho Chi Minh City, Hung Yen, Vinh Phuc, Ninh Binh, Dong Nai), with around 300 tons per year. Other types of mushrooms such as Pearl, Enokitake, Chicken Leg, Big Cup, and White Beech, are piloting successfully in some areas, with an output of 100 tons per year (Hy, 2015).

2.1.2 SUPPLY AND DEMAND

Vietnam provides each year 250,000 tons of all kinds of fresh mushrooms for both domestic and foreign markets. The total export turnover of mushrooms reached USD 100 million in 2014, mainly in the form of salted mushrooms, canned mushrooms, dried wood ear mushrooms, shiitake and straw mushrooms. The export output is as follows: 120,000 tons of wood ear mushroom, 64,500 tons of straw mushroom, 60,000 tons of oyster mushroom, 5,000 tons of button mushroom, and 300 tons of Ganoderma. Other types of mushroom such as yunzhi, monkey head, Enokitake and white beech contribute about 700 tons (Hien & Du, 2013).

Figure 1 *Export quantity of mushrooms, 2014*



Global demand for mushrooms amounts to more than 20 million tons per year, reflecting an annual increase of 3.5%. The biggest consuming markets are the United States, Japan, Taiwan, and EU. On the one hand, Vietnam's mushrooms are currently exported to more than 20 countries, even though the supply has not met the demand. On the other hand, the Vietnamese consume more mushroom in terms of both quantity and quality with an annual increase of over 10%. Vietnam therefore also imports from China and Taiwan tens of thousands of tons of mushroom a year, especially varieties like chicken leg, Enokitake, pearl, white beech, Ganoderma and Cordyceps.


Ganoderma mushroom


Button mushroom


Oyster mushroom


Straw mushroom


Wood ear mushroom


Yunzhi mushroom


Monkey head mushroom


Enokitake mushroom


Chicken leg mushroom


Pearl mushroom


White beech mushroom


Cordyceps

Figure 2 *Mushroom types*

2.1.3 COMPETITION

On the one hand, the export price of Vietnam's mushrooms is only equal to 60% of the selling price of the same products produced in Thailand and China, due to poor and uncontrolled raw material quality and heterogeneous products. However, Vietnam's mushroom export price is also on the rise in most markets of the US, Italy, Japan, France, and Thailand.

Total mushroom export in 2009 was USD 60 million, which increased to USD 90 million (in 2011). Prices of salted straw mushroom exports in January 2009 was USD 1299/ton, rising up to USD 1790/ton (November 2009), and about USD 2000/ton in 2012 (Hue, 2012).

Vietnam's competitors have an advantage in the global mushroom market due to their long-term experiences in mushroom cultivation, use of the latest technology and modern facilities which meet the highest standards for mushroom cultivation.

2.2 Provincial level

As planed, Bac Ninh province will become a city under the Central Government in 2020, the provincial authorities thus continues the policy of maximizing investment capital to support localities to accelerate the implementation of the new rural construction program and the restructuring agriculture sector program focusing on hi-tech agricultural production. Accordingly, the province has a lot of resolutions and policies to support its agriculture and rural development. The focus of policies for agriculture is to support agricultural production in the direction of productivity, quality and high economic value, and to promote the application of mechanization, high technology associated with consumption and branding. Furthermore, models of production chain, safe food supply are gradually being built and developed (http://vca.org.vn/bac-ninh-tai-co-cau-nong-nghiep-gan-xay-dung-nong-thon-moi-a20122.html).

The list of key agricultural products is identified by the province in two fields: breeding (e.g. pig breeds, chicken breeds, and fish breeds) and commercial production (e.g. fruits and vegetables including mushroom, high quality rice, pork, meat and poultry, meat fish, fine art wooden furniture, rattan and bamboo products) (https://baoxaydung.com.vn/bac-ninh-xay-dung-danh-muc-nong-san-chu-luc-255268.html). In terms of vegetable and fruit products, Bac Ninh has established 66 concentrated vegetable production areas with a scale of 5 hectares or more, about 3,000 hectares of vegetable production towards safe direction, accounting for 32% of the total vegetable area, 14 establishments granted certificates of eligibility for food safety and vegetable certification VietGAP with a total area of hundreds of hectares.

Decree 147/2018/NQ-HDND on December 6, 2018 by the Provincial People Council on Regulation on Support for Development of Agricultural Production indicates that it will be financed 100% of VND 80 mil. funding for the first time for agricultural production facilities (including individuals, cooperatives, enterprises) that are granted a certificate of either eligibility for food safety or VietGap/GMP/GlobalGap locating in areas planned for agriculture. This money would be expected to cover costs of consultancy, verification, evaluation, sampling analysis, training, certification.

The Cooperative Law of 2012 states that:

§ *"Cooperatives are collective economic organizations, co-owners, have legal status, established by at least 07 members voluntarily formed and cooperated to support each other in production, business and job creation activities to meet the common needs of members, on the basis of autonomy, self-responsibility, equality and democracy in cooperative management"* (National Assembly, 2012).

According to the current law, the State issues policies to support cooperatives in: training and retraining of human resources; trade promotion, market expansion; application of new science and technology; access to capital and funds for cooperative development; facilitating participation in targeted programs, socio-economic development programs; preferential corporate income tax and other taxes in accordance with the tax law; preferential cooperative registration fee.

For cooperatives operating in the fields of agriculture, forestry, fishery and salt-making, in addition to the above preferential and supporting policies, these cooperatives also enjoy the following facilities: support and preferential policies in infrastructure investment; land allocation and/or lease to serve the activities of cooperatives in accordance with the Land Law; credit incentives; capital and varieties when facing difficulties due to natural disasters or epidemics; and processing products.

PART
3

TAM BINH COOPERATIVE

3.1 Development History

3.1.1 THE COOPERATIVE

The Cooperative was developed from an initial family business model on mushroom production. Mrs Binh hails from a rural family in Lien Bao village, Tien Du district in Bac Ninh Province. In 2011, the People's Committee of Lien Bao commune organized a series of vocational training courses for women, and as head of the commune's Women's Union, Mrs Binh proposed to organize a training course on mushroom cultivation techniques because she realized that mushrooms were popular and valuable products to consumers. Based on the knowledge gained from the training course, Mrs Binh started to grow mushrooms on her own. At the time, and because she had no land, she used the garden spaces of her relatives and friends, and even took advantage of abandoned houses to hang her mushrooms. She chose oyster mushrooms for the first cultivation phase.

Although she had learned cultivation techniques during training, when she started farming on her own, Mrs Binh realized the huge difference between theory and reality. She faced problems with fungi and with flies eating mushroom wings during the first production stages. After several spells of diseased crops, Mrs Binh decided to learn about the growth and development characteristics of each type of mushroom, and how to mix and process raw materials to aid mushroom growth while eliminating fungi. After several experiments based on the lessons learned, the fungi rate decreased. Oyster mushrooms produced by her cooperative are considered to be of higher quality compared to similar products. Since 2014, she has hired four of her relatives to work part-time with her.

Recognizing the high demand in the market for mushroom products and based on the experiences and production techniques that have been developed over the years, in 2014 Mrs Binh rented a duck-breeding area from her younger sister to expand her mushroom production. At the time, she not only had to spend a considerable amount of money to build the mushroom production facility, but also had to build a path connecting the production area to the district road. Since establishing a stable production base, Mrs Binh has developed many other mushroom varieties, such as straw and Ganoderma.

In 2018, after numerous visits to models of mushroom cultivation and high-tech agricultural products in Japan, Mrs Binh decided to change her family's business to a cooperative model to pursue her dream of expanding the scale of mushroom production and developing more organic vegetable products by utilizing waste from mushroom production. At that time, the Cooperative had only eight laborers including both family members and hired workers. One year after operating as a cooperative, there were still no real changes to Mrs Binh's production facility. There was no business plan, and all production decisions were based on the owner's experiences.

To operate as a new cooperative, what does Mrs Binh need to change in her management method? In order to realize the dream of expanding the production of organic mushrooms and vegetables, which internal control activities should Mrs Binh focus on?

3.1.2 SUCCESSES AND FAILURES

In the process of building and developing the cooperative, Mrs Binh experienced many ups and downs. There were times she thought that she couldn't pursue her passion, especially when she lost complete harvests due to fungi infestation. In addition, whenever she was sick, she had to stop work for a while. Nevertheless, Mrs Binh remains one of the few people in the district who has succeeded with this mushroom cultivation model. Now she is confident about mushroom cultivation techniques and about fungi control in production. Many people come to her for lessons and to learn useful techniques. Remembering the early days, she just smiles.

Participating in the trainings and drawing on experiences from her own study, Mrs Binh learned that nutrient ratios (i.e. milled corn and milled rice) in substrates play an important role in mushroom growth. The more milled corn and rice in substrates, the higher and more productive the mushroom. She accordingly used a large proportion of milled rice and corn to make substrates with the expectation that the mushroom quality would be better than similar products in the market. As a result, according to consumers, mushrooms produced by her cooperative are always fresh and nice, strong, sweet, and crunchy. From then on, the brand "Mrs Binh's Mushroom" became popular and established a firm foothold among consumers in Lien Bao commune and surrounding areas.

The fact is that mushroom growing requires high humidity, so if the nutritional content of the substrates is too high, fungi will have an ideal environment for growth. In the early days, Mrs Binh often lost all her production due to fungi infestation and to flies eating mushroom wings. She sometimes forgot to take care of her own family, ignoring them for many days as she spent time finding out solutions for fungi infestations. Based on information and techniques learned through training courses and obtained from the internet, she has personally tested different methods to find the right nutrient mix ratio that ensures high mushroom quality while reducing the fungi infestation rate.

During visits to her son in Japan, she had observed many cultivation models there and had learned the techniques of growing organic and high technology mushrooms. She currently produces many kinds of mushrooms, growing varieties that are suited to weather conditions all year round and ensuring a regular supply of mushrooms for sale in terms of quantity and quality.

3.2 Resources

3.2.1 INITIAL INVESTMENT

In 2014, Mrs Binh invested a lot of money in a mushroom production facility of about 2,000 m². She rented a duck-breeding area from her younger sister, leveling and building a path connecting the production area to the district road. The total initial investment amounted to VND 700 million. The rent was 1 quintal of paddy/crop/sao (1 sao = 360 m²) multiplied by two crops per year (the market price of paddy is VND 90,000 per kg). In other words, on average, Mrs Binh pays around VND 10,800,000 to rent land each year. Despite these difficulties, she has put considerable effort and enthusiasm into pursuing her passion.

3.2.2 LABOR

After many ups and downs, tasting both successes and failures, Tam Binh Cooperative gradually came into effective operation. At first, Mrs Binh was involved at all stages of operations, from sourcing raw materials, selecting mushroom pots, implementing planting techniques, to consumption. Since 2014, however, she has had to hire more workers. She has created jobs for eight full-time workers, most of whom are relatives, paying them an average monthly salary of VND 3,000,000 per person.

Labor in mushroom production is also seasonal. The busiest times are during the processing, compost mixing, and harvesting stages. Mrs Binh always presides over these activities. She also transfers her knowledge and techniques in mixing materials to her workers, especially when she needs to be away from home (sometimes she has to stay in hospital for a few months).

3.3 Input management

Materials for mushroom production are now mainly taken from cellulose-rich agricultural wastes such as straw, cotton waste, sawdust, wood stalks and additives (corn flour, rice flour). Each type of input has its own characteristics, efficiency and productivity. In order to make good use of these sources of raw materials, the Cooperative has experimented and learned many lessons in input material selection.

Normally, after each rice harvest, farmers often burn straw to use the ashes to fertilize the plants. However, this type of ash has very little nutrient content and the burned straw often pollutes the environment. Instead of burning, many farmers now take advantage of the straw itself as a raw material for mushroom production. Straw is a rich raw material that is easy-to-find, cheap and readily available throughout the country. And Tam Binh Cooperative makes use of straw in mushroom production, often buying the straw from family members of its workers or obtaining it from surrounding households. Straw for mushroom production needs to be clean and not mixed with sand, gravel or dirt. However, collecting straw before harvest time can sometimes be difficult.

Besides rice straw, sawdust is also a common material used in mushroom production and is most suitable for this purpose when taken from woody plants without essential oils or toxins. Sawdust is purchased from local wood factories. The cooperative also buys a variety of sawdust and through practical experience, the sawdust from soft woody trees like acacia or jackfruit produce the best yields and quality. However, compared with straw, sawdust is more expensive at about VND 1 million per ton. Currently, the Cooperative buys sawdust from wood-processing units in the area.

Furthermore, the Cooperative has tested and found that cotton is also a good material for mushroom production. Compared with straw or sawdust, mushrooms produced from cotton are less likely to get sick, give beautiful mushroom forms and produce 1.5 to 2 times higher yields than mushrooms grown using other materials. The Cooperative buys cotton directly from the Thai Binh Cotton factory at a price of about VND 3.5 million per ton. Despite the high productivity and high profits, growing mushrooms from waste cotton or chemical-soaked cotton presents many problems in terms of food hygiene and safety. In addition, at the beginning of 2019, the Cooperative experienced many difficulties in obtaining waste cotton (the distance from the Cooperative to the Thai Binh Textile factory was about 200 km). Due to these difficulties, the factory could not provide enough raw materials.

3.4 Mushroom prodution process

Mushroom growing has many stages. For example, if the raw material used is sawdust, the producer must make decisions about:

1. choosing the type of sawdust
2. the time of composting the sawdust with lime water
3. the time of nutrient mixing (rice bran, cornmeal, etc.)
4. the proportion of ingredients
5. the time to disinfect sawdust bags
6. the time of mushroom culture, filament culture
7. the time to incubate the bags, and
8. humidity of the storage room.

All these decisions need to be taken to prevent mold and disease and to ensure that mushroom crops produce the highest yield. The procedure for oyster mushroom cultivation can be divided into the steps below.

Thanks to the experiences gained over many years of mushroom cultivation, Mrs Binh is very confident about her Cooperative's technical processes which have proved suitable for both the factory and for the climate of Tien Du region. Mrs Binh has realized that different input materials produce different quality and productivity of mushrooms. Generally, straw generates the highest quality while waste cotton allows the highest productivity. Secondly, the best technique in nutrient mixing will produce high yields and big and thick stem mushrooms. Along with the knowledge from the training courses, Mrs Binh also learned useful Japanese techniques for reducing fungi, such as spraying ginger juice and garlic water on cotton buds and putting these in each bag of mushrooms every month. Also, spraying mosquito repellent monthly around mushroom-growing houses helps to prevent the appearance of fruit flies adhering to the wings of the mushrooms.

Despite the progress made so far, Mrs Binh wonders whether the production areas, such as the raw material processing zones, pasteurization autoclaves and packaging should be separated. And as mushroom harvesting and packaging is still mostly done by hand, she is concerned about meeting the VIETGAP standards.

What are the difficulties that lie ahead when converting the Cooperative's production processes to meet these standards?

Oyster mushroom cultivation's steps

1 *The first step is preparation or procurement of spawn. The material to make the substrates include straw from paddy, millets and cotton, sawdust, jute and cotton waste, dehulled corn cobs, peanut shells, dried grasses, discarded wastepaper and synthetic compost of button mushrooms etc. These materials are treated with lime water and composted before mixing with corn flour, rice bran powder, light flour and other materials. The substrates material is also processed through the radiator to eliminate harmful microorganisms. The prepared substrates must be packed and mushroom spawn added and steamed immediately, not later than eight hours. This step can take 8 to 12 hours.*

2 *After the steam pasteurization process, the substrates are transferred to the inoculation room to cool for 24 to 48 hours and then mushroom spawn is added to the prepared substrates. The inoculation and incubation room should be cleaned by covering the wall with solid lime, applying lime powder on the ground and covering it with formol mixture two days before use.*

3 *The next step is waiting for the spawn mycelium to spread entirely throughout the bag so that the straw is then fully colonized, and then using a knife to cut five to six holes in the bag before hanging it up. To care for the mushrooms, every day the environment and surrounding space need to be keep moist. When mushrooms are 3 cm to 5 cm, they are ready for harvest. When harvesting, ensure the whole cluster is collected instead of leaving the root.*

3.5 Efficiency

3.5.1 PEOPLE

Since the establishment of the Cooperative, its organizational structure has not changed much. Mrs Binh takes the main production and sales decisions. She has received support from her younger sister and brothers in raising capital and managing labor. The Cooperative has eight employees, four to six of whom are regular workers. These laborers are local farmers and have a close relationship with Mrs Binh. She instructs them in the procedures for mushroom cultivation to ensure they practice the proper techniques. The average salary that cooperatives pay their employees is VND 3 million per person per month.

3.5.2 PROCESS

With a total area of about 2,000 m², the production facility – including storage, material handling, the packing house with a pasteurized boiler system – has been methodically designed. Every day, the Cooperative provides the market about 70 to 80 kg of fresh mushrooms. Based on market demand, weather conditions and other factors such as raw materials, capital and labor, Mrs Binh will take decisions related to the production of different kinds of mushrooms at different times. When she started growing mushrooms in 2011, the oyster mushroom was the first variety that Mrs Binh grew because it was easy to cultivate and the price was affordable for most consumers. Nowadays, she has developed and diversified into other varieties such as lingzhi, shiitake, Kim Phuc, and wood ear mushrooms to meet market demand and increase the Cooperative's profits. However, expanding production requires facing various difficulties due to the scarcity of raw materials, as well as other factors such as land policies and dealing with local authorities.

3.5.3 TECHNOLOGY

Mrs Binh uses a combination of traditional techniques and high-tech production methods from the Japanese model that she learned during the frequent visits to her son in Japan. In fact, Mrs Binh took several training courses in mushroom cultivation: the Women's Union and Farmer's Union courses, as well as trainings given by other Provincial Agriculture Extension Units, i.e. about two to three training courses a year on average. Consequently, this level of experience in mushroom planting meant that mushrooms produced by her Cooperative were always of a higher quality and more competitive compared to other similar products in the market. The quality of her mushrooms has been confirmed by the provincial agricultural experts during visits to the Cooperative, and through customer satisfaction with the products. Her confidence and her mastery of all the steps in the mushroom production process over the years has translated into successful yields with no loss of mushrooms to fungi or flies, and sold-out products after every harvest.

Mrs Binh is confident about the efficiency of the technology she has put in place. The Cooperative's technology is much more professional compared with traditional methods, both in terms of effective treatment against fungi and the set-up of machinery and equipment in accordance with mushroom production practices. The farm is fitted with a rigid suspension system, using a semi-automatic sprinkler system that is convenient for adjusting humidity. Varieties such as white oyster mushroom is produced mainly from sawdust, cotton, cornmeal and other nutritious ingredients to ensure exceptional mushroom quality that is valued by the market.

3.5.4 SOCIAL EFFICIENCY

Mrs Binh said that she discovered her passion for mushroom cultivation after a Women's Union training course. Her children were already grown up at that time, and as a very hard working person, she took an interest in the topic and started to learn about how to set up her mushroom cultivation model. Back then, the abundance of agricultural waste in her village made the process of preparing raw materials much easier. Using straw to grow mushrooms also meant less environmental pollution as farmers did not have to burn the straw. And though the laborers who worked on her farm were seasonal, the wages they earned helped to supplement their incomes in a poor agricultural commune like her home town.

Furthermore, in view of the increasing price of meat and fish and the concerns about food safety and hygiene, customers can safely consume mushrooms. Amongst the cooperative's regular customers are kindergartens and factories in Tien Du district, Bac Ninh. And even though some of these customers sometimes settle their accounts late, their orders are always given priority because the mushrooms are sold to them at a higher price compared to the traders in the traditional wholesale market.

3.6 Profitability

3.6.1 PRODUCTION COSTS

Mushrooms are cultivated seasonally and the cost of producing them is usually calculated for a crop of about three months. Apart from the initial fixed investment, the materials needed for mushroom production typically include mushroom seedlings, substrates, labor and electricity. Cooperatives are currently buying mushroom seedlings at about VND 20,000 per kg from the Genetic Institute. The substrates can be straw, sawdust, or cotton waste from textile factories. During the crop harvest, the Cooperative pays VND 200,000 per day for workers to collect straw from their homes and surrounding areas. It also hires people to collect sawdust within the province at a price of VND 1,000,000 per ton. Waste cotton prices usually range from VND 3,000,000 to VND 3,200,000 per ton. For substrates, apart from straw, sawdust, or waste cotton, a combination of nutrients is needed like milled rice and corn for mushroom production. These kinds of nutrients are easily bought from private retailers. There are a total of eight workers who are paid an average monthly salary of VND 3,000,000. The electricity and water used for mushroom production is estimated to be VND 500,000 per month.

Different substrates result in different mushroom yields and quality. For example, using straw usually produces high quality mushrooms (eye-catching colors, thick mushrooms, large mushroom clusters) but the yield is not as high as for other types of substrates used. Substrate selection varies according to the seasonality of mushroom production, because it depends heavily on material availability. For example, straw is not always readily available and the Thai Binh Textile Factory is currently the only partner from whom the Cooperative buys waste cotton. Meanwhile, with a large number of wood factories in the region, there is sufficient supply of sawdust that can be purchased throughout the year.

3.6.2 OUTPUT

The characteristic of mushrooms is that they can be harvested daily, one month after planting. On average, for a three-month crop, with 1 ton of material/substrates, the Cooperative is able to harvest 1000 bags of mushrooms, equivalent to 1 ton of mushrooms or up to 1.3 tons if the weather is favorable. Harvested mushrooms can keep their quality for four to five days if stored properly in a cooler.

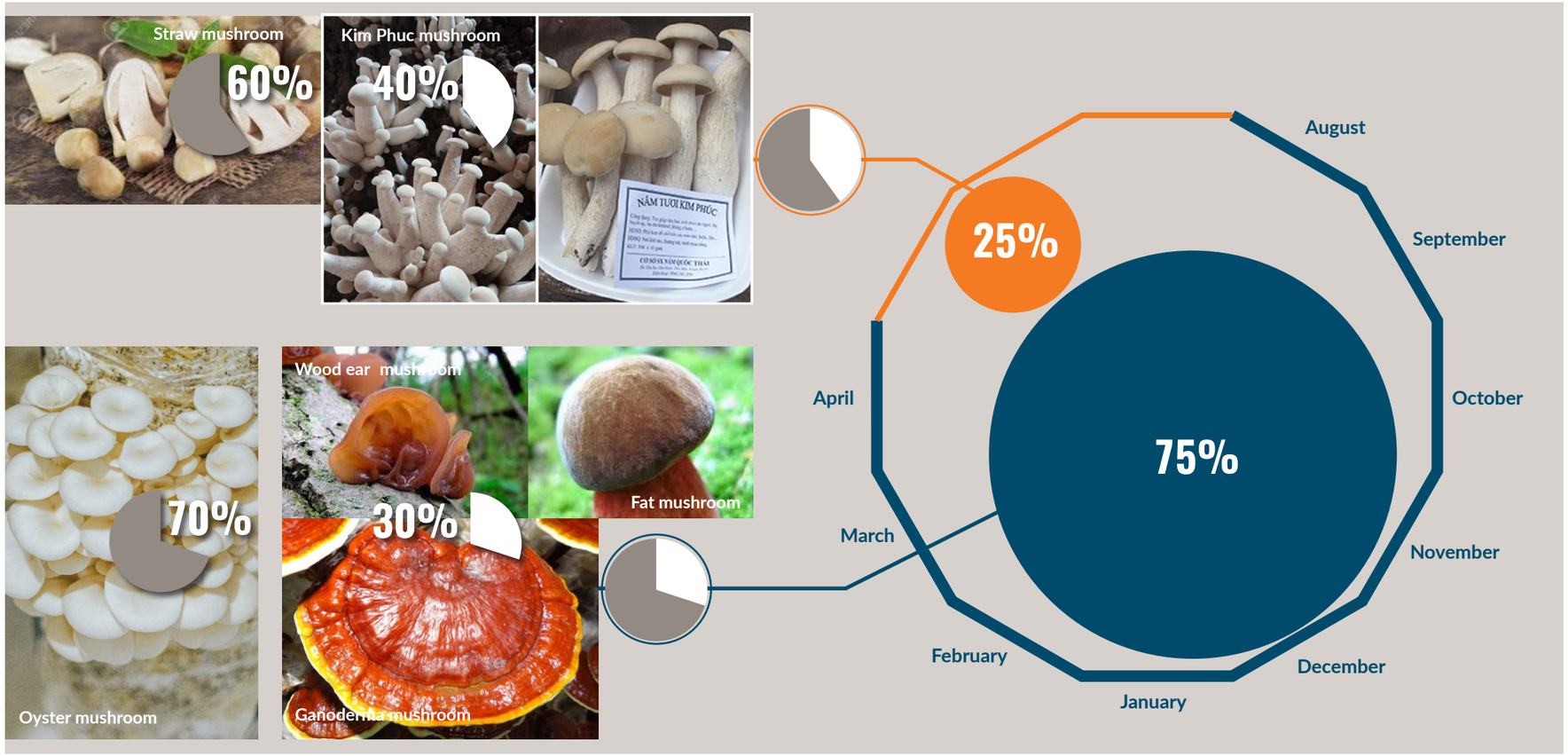
3.7. Marketing activities

3.7.1. SEASONALITY AND VARIETIES

Cooperatives produce different varieties of mushroom. The main crop is from August to April of the following year for varieties like oyster, lingzhi, wood ear and fat mushrooms.

Meanwhile, straw mushrooms and Kim Phuc mushrooms (*Macrocybe crassa*) are produced in the remaining period, from May to July.

The main crop lasts 9 months and its output accounts for 75% of total volume per year. As the summer crop only lasts 3 months, the yield accounts for 25% of the total annual production. In the main season, the most produced variety is oyster mushroom (including white, purple, and brown oysters) which accounts for about 70% of the total mushroom production for the season. This type of mushroom is popular and familiar to most consumers, and widely used in Vietnamese cuisine. Compared to other mushrooms, oysters are also much cheaper. Ganoderma mushroom is produced in limited quantities as it is a medicinal variety that is not used daily despite its very high selling price of around VND 1.5 million per kg. In the summer season, the main product – straw mushroom – accounts for 60% of the total production, and Kim Phuc mushroom accounts for 40%.



3.7.2 MARKETING CHANNELS

After harvesting, mushrooms are packed into plastic bags and sold. The Cooperative's products are currently sold through three channels:

1. the majority of products (accounting for 70% of total produce) are sold to collectors and wholesalers in wholesale markets;
2. about 21% is sold to collective kitchens of companies and schools;
3. the remaining 9% is sold to clean vegetable shops.

During harvest time, Mrs Binh's day starts at 2 am. Mushrooms are packed in plastic bags right after harvesting and transported immediately to the collective kitchens and vegetable shops. The remainder is sent to the wholesale markets.

In traditional markets, prices may vary from day to day, depending on the availability or scarcity of mushroom products. For example, it is possible to observe the number of sellers and the quantity of produce in the market to see whether mushrooms are scarce. When there is scarcity, the collectors and traders themselves can push up the prices in order to buy mushrooms from Mrs Binh's Cooperative.

Mushrooms are sold at a higher price to collective kitchens and vegetable shops but the consumption is uneven. In fact, the kitchens use mushrooms just once or twice a week. There are currently three kitchens that regularly buy mushrooms from the Cooperative. In addition, mushroom consumption in safe vegetable stores requires adhering to a series of procedures in terms of quality control. The typical way of doing business with collective kitchens and vegetable stores is by verbal contracts, meaning that buyers use mobile phones to pre-order the amount of mushrooms they want a week in advance.

Mrs Binh claims that with the current production scale, her mushrooms are always sold out.

However, is the Cooperative's current marketing strategy effective? How could it be further improved?

3.7.3 SELLING PRICE

The selling price of mushrooms varies from day to day, and by product category, as well as by consumption channel. The price of mushrooms sold at wholesale markets is usually lower, i.e. VND 5,000 to VND 7,000 per kg, compared to when sold to collective kitchens and vegetable stores. For white oyster mushrooms at wholesale markets, the average selling price ranges from VND 35,000 to VND 40,000 per kg.

3.8 The mushroom-growing sector

The growing trend in mushroom production is shifting to agricultural countries including Vietnam. These countries have abundant sources of raw materials from agriculture and light industry sectors. In addition, labor is abundant and cheap. According to the Department of Crop Production of the Ministry of Agriculture and Rural Development of Vietnam, the national agriculture sector generates annually about 40 million tons of waste such as straw, sawdust, woody stems, corn stalks, waste cotton, and bagasse. If 15% of waste is used for mushroom cultivation, Vietnam can generate over 1 million tons of mushrooms per year at a value of about USD 1 billion. In addition, Vietnam's weather conditions are favorable for growing many types of mushrooms year-round. Therefore, the Government has included mushrooms in the National Product List, which encourages the cultivation of mushrooms with high economic efficiency.

Demand for fresh and dried mushrooms in domestic and international markets, especially in the US and EU, has increased rapidly in recent years, at about 3.5% per year. Supplying mushrooms to the world markets will bring larger profits and create more jobs and income for farmers.

Currently, mushroom production has been increasingly mechanized and automated, and has become a strong economic sector globally. Korea, Japan and Taiwan have applied advanced technology and industrialized the mushroom industry, significantly improving the growing rate hundreds of times over the past 10 years. South Korea and Taiwan import sawdust, straw and corn stalks from Vietnam and also produce mushrooms worth nearly USD 10 billion per year, with mushroom exports to more than 80 countries (Korea Mushroom Council, 2010). China is the world's largest mushroom producer. Nearly 30 million tons of mushrooms are produced in the world every year, and of this, China is responsible for over 20 million tons (National Bureau of Statistics of China, 2011). In the 1960s, Taiwan promoted the development of mushroom production as a breakthrough in its agriculture.

Japan, Taiwan, South Korea and China have been promoting and investing in Vietnam's mushroom industry with nearly 20 production plants in operation from the North to the South of the country.

The price and quality of Vietnamese exported mushrooms compete with those from China and other countries. More importantly, Vietnam does not have to spend dollars to invest in mushroom production.

Currently, in the southern provinces of Vietnam, there are a few dozen to a few hundred establishments growing button, straw and wood ear mushrooms. Handling a stable amount of raw materials, i.e. a few tons a day, for producing mushroom for export, is challenging. Some foreign importers have placed orders to local businesses, but due to the lack of long-term raw materials, the enterprises only provide 30% of the orders. According to the Department of Crop Production, Vietnam's mushroom export industry is lacking a stable supply of raw materials in large quantities.

Currently, large mushroom growing and exporting companies only have a maximum of 0.8 hectares, while the rest are only 0.4 hectares, and households growing mushrooms in the southern provinces are only a few dozen meter square. The northern provinces also have small-scale mushroom farms. Furthermore, Vietnam still has no standard mushroom processing factory, so the country's mushroom export is still modest compared to South Korea and China.

Recognizing the outstanding problems for the development of mushroom products and the benefits that mushrooms bring to the economy, the Conference "Current situation and solutions to develop mushroom production" concluded that the common goal in the coming years is to develop mushroom production as a commodity-oriented activity:

- to focus on scaling the use of technology;
- to gradually apply advanced technologies;
- to create a Vietnamese mushroom brand on the international arena;
- to contribute to job creation, increase income for farmers;
- to create sources of high value goods, serving domestic demand and exports.

A group of agencies have drafted a project on developing edible and medicinal mushrooms for 2020 to concretize the above objective. Since then, the mushroom industry development plan has been carried out in the country, integrating the mushroom cultivation training plan for farmers into the national priority program of vocational training for rural labor. The plan also caters for building a seed supply system, establishing professionalism in mushroom cultivation and ensuring sufficient supply of inputs – in terms of quantity, type and quality – for production throughout the country.

Following the outstanding performance of her Cooperative at the 2018 Entrepreneurship Contest organized by the Vietnam Women's Union, Mrs Binh wishes to continue expanding and scaling their production. She is confident about the quality of mushrooms they produce and strongly believes in their products which fetch much higher prices compared to similar products in the market. Mrs Binh looks forward to expanding her mushroom production operations by another 1,000 m^2, and a further 1,000 m^2 devoted to growing clean vegetables. The estimated investment for all this is VND 1 billion.

The main challenges with expansion are investment capital and land. Regarding investment capital, Mrs Binh worries about the complicated procedures she needs to go through when borrowing money and there is not much hope to borrow from official sources. With some of the proceeds from the business and funds from relatives and friends, Mrs Binh believes that she can easily overcome these challenges. The biggest concern remains the issue of leasing land, in particular whether or not the cooperative can afford to rent more land for its expansion.

Expansion will enable the cooperative to scale its mushroom cultivation and expand its product range to provide diverse products to customers. Alongside this is the plan to grow clean and safe vegetables, an idea which had been conceived for some time but not yet implemented due to limited land.

In addition, the Cooperative still sells its mushroom products without labelling them. Three years earlier, the idea of product stamping was proposed by a district unit. However, this idea was developed but not implemented, because the unit requested an advance of 50% of the contract value, equivalent to VND 25 million, at a time when the Cooperative was not ready for this expense.

What are the strengths and weaknesses of the Cooperative? What are the opportunities and threats for the Cooperative's business? How can the Cooperative take full advantage of its strengths and opportunities while eliminating its threats and disadvantages/weaknesses in developing its mushroom production?

PART
4

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