

Socialist Republic of Viet Nam
Lam Dong Province People's Committee

Verification Survey with the Private Sector
for Disseminating Japanese Technologies
for Introducing Japanese Advanced
Sorting/Grading System and Marketing
Method to Improve the Postharvest
Management of Agriculture Crops in
Lam Dong Province

February, 2017

Japan International Cooperation Agency (JICA)
Nikko Foods CO., LTD.

1. BACKGROUND

In intergovernmental meeting “Japan-Vietnam agricultural cooperation” (Jun. 2014), Japanese and Vietnamese governments and private companies agreed to cooperate in developing Vietnamese agricultural industry. For the first step to develop Vietnamese agriculture industry, both governments are willing to create a successful model case. Then, they regarded Lam Dong Province as the most high-potential province of the candidate for the successful model-case, and decided to develop this province.

Since Oct. 2014, JICA has been conducting “Project For Supporting Lam Dong Province In Formulating Agriculture Development Model By Multi-sector Approach And Promoting Investment Environment In Agriculture Sector.” Lam Dong Province accepted the proposal from this project and decided to set clear goal and the strategy. To establish high-value added agricultural industry in Lam Dong, they regard constructing post-harvest center as one of the core strategies of their 5-year-development plan. Especially, introducing Japanese sorting/grading technology is the core function for constructing the post-harvest center.

Lam Dong Province is regarded as one of the most major agricultural provinces in Vietnam, owing to its tropic climate in Central Highlands. Da Lat, the capital city of Lam Dong Province, is famous for its established brand name as “Da Lat flower and Da Lat vegetable” in Vietnamese domestic market. In the project, weakness of post-harvest was identified as their bottlenecks for Lam Dong’s development. Even though consumers need high-quality and safety vegetables like “Da Lat vegetable”, they cannot judge the origin of vegetable in the market because of unsophisticated post-harvest function.

In this survey, Lam Dong Province introduced Japanese sorting/grading technology/machine and marketing method/know-how into local core agricultural company. By leveraging the core agricultural company which already had established sales channel in local sophisticated retailers, this survey demonstrated the effectiveness of Japanese sorting/grading technology/machine in increasing efficiency and profitability for producers. It affected not only core farmers but also surrounding farmers in Lam Dong Province.

During the precedent JICA project, Lam Dong province government had already visited Japanese sorting/grading machine company and believed those technology and machinery would help the development of Lam Dong Province a lot.

From a long-term viewpoint, Lam Dong Province is eager to assess cutting-edge Japanese technology such as sorting, grading, cooling and packaging to develop its agriculture sector. Therefore, the province hopes to leverage this survey to promote cooperation between Lam Dong province and Japanese small and medium sized companies.

2. OUTLINE OF THE PILOT SURVEY FOR DISSEMINATING SME'S TECHNOLOGIES

(1) Purpose

In the effort to create a Postharvest Center in Lam Dong Province, this project conducted verifications to assess the potential for using the proposed product and techniques to enhance the overall value of Da Lat Vegetables. The project also involved assisting in the formulation of a concrete plan for installing and expanding the use of post-harvest centers across the province. As the Department of Industry and Trade at the Lam Dong Province People's Committee continues to work on the plan, project members provided the policymakers with advice, set up a framework that helped the Province carry out its own installation procedures after the project is complete, and, as a result, establish a stronger platform for producing high-added-value vegetables.

(2) Activities

To achieve the purpose, activities were implemented below:

For Output 1. To establish sorting/grading system of tomato with Japanese advanced machines in target site of Lam Dong Province.

- 1-1) Collect information and analyze current issues on agricultural industry (especially postharvest management) in Vietnam, especially Lam Dong province, and investigate the budget plan and basic concept about the post-harvest center in Lam Dong province.
- 1-2) Investigate basic information of current tomato production in Lam Dong such as production volume, quality, distribution volume, sales route and sales price, etc.
- 1-3) Determine PT's income/revenues from tomato production
- 1-4) Survey the quality/prices of tomatoes in the market
- 1-5) Set the design specifications for the sorting system
- 1-6) Manufacture, transport, load, and install the sorting system
- 1-7) Use the acceptance process in Japan to implement basic training on mechanical engineering, computerized controls, and sensor technologies
- 1-8) Verify the sorting system and provide the user with technical guidance on running and operating the equipment
- 1-9) Check quality and volume of graded tomatoes
- 1-10) Preserve sorted and graded at warehouses until factory shipment
- 1-11) Give feedback to tomato farmers and strengthen the capacity of tomato production
- 1-12) Formulate manuals for operation and maintenance of sorting/grading machine and transfer its technologies to staffs of Lam Dong province and Phong Thuy
- 1-13) Establish a sustainable maintenance system for the sorting/grading machine with local mechanics

For Output 2. To increase sales of local core agricultural companies (target site) and surrounding farmers with well sorted and graded tomato.

- 2-1) Investigate potential markets to develop profitable tomato sales channels
- 2-2) Formulate a marketing strategy and a sales plan
- 2-3) Develop marketing channels to achieve the sales plan
- 2-4) Monitor volume and revenue by tomato sales in different markets
- 2-5) Analyze the correlation between tomato quality and revenue
- 2-6) Review and revise the strategy/plan
- 2-7) Give feedback to tomato farmers corresponding manual
- 2-8) Establish a suitable marketing strategy for Lam Dong Province and create a
- 2-9) Transfer technologies on the marketing method into the counter-part and Phong Thuy and establish a sustainable implementation structure to enhance marketing activities with the sorting/grading machine

For Output 3. To establish clear plan of spreading post-harvest center with the sorting/grading machines.

- 3-1) Analyze effectiveness of the function of the post-harvesting center
- 3-2) Organize seminars/workshops on the marketing approach
- 3-3) Identify other feasible sites with high business potential to realize the concept of the post-harvest center
- 3-4) Provide concrete advice on PHC implementation throughout Lam Dong Province
- 3-5) Develop new sales routes through "Lam Dong Vegetables" branding

(3) Information of Product/ Technology to be Provided

1) Marketing technique:

Marketing is consisted of 4 components; Product, Price, Place, Promotion. The 1st step for tomatoes in Lam Dong province to do advanced marketing activities is to improve Product by standardization and to have sophisticated Place by focusing on modern channel, including supermarket, minimart and CVS. To do standardization, sorting/grading machine (See below in detail) was installed and the most effective package designs were proposed. Also, to focus on modern channel, an optimal sales approach for each grade of sorted-vegetable quality—selecting the right sales destinations, defining distribution/packaging operations, negotiating prices in light of market rates, for example—in order to generate higher revenues, was advised by Nikko Foods, Japanese expertise, to foster added value for the products.

2) Grading/Sorting machine:

The installed machine was designed to mainly sort and grade tomatoes. It can sort/grade 54,000 units of tomatoes per hour and sort/grade them by size (4 levels) and colors (3 levels). It has 17 outlets. It has advanced AI vision sensors which can sort/grade products by visible lights. In addition, auto supply, auto washing, weight measurement functions were set. Moreover, to do periodical maintenance, technological training to Lam Dong Province People's Committee was done by Shibuya Seiki, the manufacturer of the machine, and maintenance framework was constructed by Lam Dong Province People's Committee.

(4) Counterpart Organization

The Survey is implemented in collaboration with the following 4 entities of Lam Dong province.

1) Lam Dong Province People's Committee

Lam Dong Province People's Committee is the highest decision-making body of this province. Lam Dong Province People's Committee is in charge of coordination between the Survey team and each organization of Lam Dong province.

2) Department of Industry & Trade (DOIT)

The department supervises distribution and trading of agricultural products. DOIT is the core partner of this survey because agricultural distribution is the key issue of the Survey. DOIT is expected to act as an execution partner.

3) Department of Agriculture Rural Development (DARD)

The department supervises planning and management of agriculture sector. DARD is also the core partner of this survey because they are in charge of enforcing post-harvest function. DARD is expected to cooperate with us in investigation and spreading of marketing know-how with Japanese sorting/grading machine.

4) Department of Planning & Investment (DPI)

The department supervises budgeting and investment management of this province. DARD is also the core partner of this survey because they are in charge of strategy planning of investment. DARD is expected to support us in making public-policy for financial viewpoint after this survey is finished.

(5) Target Area and Beneficiaries

Lam Dong province is the most famous agricultural province in Vietnam. This province is 200km to Ho Chi Minh City and suitable for producing vegetables with characteristic environment, high-land in tropic climate.

In this survey, we introduced sorting/grading machine into a core agricultural company "Phong Thuy" at Duc Trong District in Lam Dong Province. They have been regarded as the promoter of spreading post-harvesting center for Lam Dong Province. They have many contracted with surrounding farms. We intended to contribute not only to Phong Thuy but to surrounding farmers by this survey.

(6) Duration

January 2016 - April 2017 (1 year and 4 months)

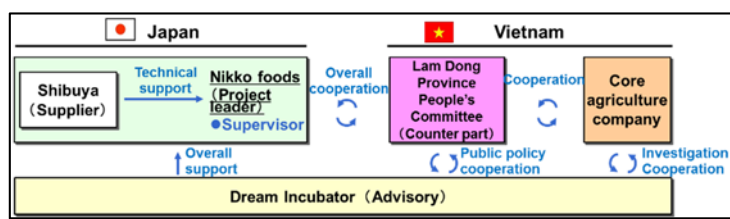
Item	2016												2017				
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	
1-1) Collect information and analyze current issues on agricultural industry (especially postharvest management) in Vietnam, especially Lam Dong province, and investigate the budget plan and basic concept about the post-harvest center in Lam Dong province.	■																
1-2) Investigate basic information of current tomato production in Lam Dong such as production volume, quality, distribution volume, sales route and sales price, etc.		■	■	■													
1-3) Determining PT's income/revenues from tomato production		■	■	■													
1-4) Surveying the quality/prices of tomatoes in the market		■	■	■													
1-5) Setting the design specifications for the sorting system			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1-6) Manufacture, transport, load, and install the sorting system			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1-7) Use the acceptance process in Japan to implement basic training on mechanical engineering, computerized controls, and sensor technologies					■	■	■	■	■	■	■	■	■	■	■	■	■
1-8) Verify the sorting system and provide the user with technical guidance on running and operating the equipment								■	■	■	■	■	■	■	■	■	■
1-9) Check quality and volume of graded tomatoes								■	■	■	■	■	■	■	■	■	■
1-10) Preserve sorted and graded at warehouses until factory shipment								■	■	■	■	■	■	■	■	■	■
1-11) Give feedback to tomato farmers and strengthen the capacity of tomato production									■	■	■	■	■	■	■	■	■
1-12) Formulate manuals for operation and maintenance of sorting/grading machine and transfer its technologies to staffs of Lam Dong province and Phong Thuy										■	■	■	■	■	■	■	■
1-13) Establish a sustainable maintenance system for the sorting/grading machine with local mechanics		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
2-1) Investigate potential markets to develop profitable tomato sales channels		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
2-2) Formulate a marketing strategy and a sales plan			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
2-3) Develop marketing channels to achieve the sales plan				■	■	■	■	■	■	■	■	■	■	■	■	■	■
2-4) Monitor volume and revenue by tomato sales in different markets								■	■	■	■	■	■	■	■	■	■
2-5) Analyze the correlation between tomato quality and revenue								■	■	■	■	■	■	■	■	■	■
2-6) Review and revise the strategy/plan									■	■	■	■	■	■	■	■	■
2-7) Give feedback to tomato farmers									■	■	■	■	■	■	■	■	■
2-8) Establish a suitable marketing strategy for Lam Dong Province and create a corresponding manual										■	■	■	■	■	■	■	■
2-9) Transfer technologies on the marketing method into the counter-part and Phong Thuy and establish a sustainable implementation structure to enhance marketing activities with the sorting/grading machine											■	■	■	■	■	■	■
3-1) Analyze effectiveness of the function of the post-harvesting center											■	■	■	■	■	■	■
3-2) Organize seminars/workshops on the marketing approach											■	■	■	■	■	■	■
3-3) Identify other feasible sites with high business potential to realize the concept of the post-harvest center											■	■	■	■	■	■	■
3-4) Providing concrete advice on PHC implementation throughout Lam Dong Province											■	■	■	■	■	■	■
3-5) Develop new sales routes through "Lam Dong Vegetables" branding											■	■	■	■	■	■	■
On-site meetings																	
Kick-off (meeting/on-site inspection)	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Interim report								■	■	■	■	■	■	■	■	■	■
Final report (meeting/on-site inspection)													■	■	■	■	■
Report materials																	
1. Monthly report	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
2. Progress report									■	■	■	■	■	■	■	■	■
3. Monthly work-in-progress report	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
4. Work completion report (draft)													■	■	■	■	■
5. Work completion report															■	■	■

■ In Japan or HCMC
■ In Lam Dong

Role	Name	Company	'2016												'2017				Total		
			1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	In Lam Dong	In Japan or HCMC	
Survey Leader/ Project management	Atsuhiko Sato	Nikko Foods Co., Ltd.,	Planned	5	20				10			20			20	5	10			0.3	4.0
			Actual	5	5	10	8	5	1	1	5	3	5	6	5	7	3	3			0.2
Chief advisor/Market analysis/ Strategy formulation	Makoto Miyauchi	Dream Incubator Inc.	Planned	4	10					3	19	6	3	6	2	9	4	1		0.8	2.2
			Actual	7	3	2	9	7	3	1	1	1	3	5	7	5	4	2	1	1	0.3
Establish production formulation	Vu Thi Thuy Hang	Dream Incubator Inc.	Planned	4	18	22					13	3	15	3		4			1.2	2.3	
			Actual	7	3	2	10	8	5	1	1	3		5	6	2	10	5	3	0.2	3.3
Establish Sales formulation	Vuong Van Anh	Dream Incubator Inc.	Planned	4	6	3						29	18	6	22	4			1.3	2.7	
			Actual	7	2	3	8	7	1	1	5	1	2	5	15	1	10	6	2	1	1
Lead project (Japan side)	Tatsunori Oshiba	Dream Incubator Inc.	Planned							3					2		1		0.0	0.3	
			Actual	1		1				1				1			1	1		0.0	0.3
Ordered company person · monthly total (Planned)																		0.3	4.0		
Ordered company person · monthly total (Actual)																		0.2	3.1		
External human resources person · monthly total (Planned)																		3.2	7.5		
External human resources person · monthly total (Actual)																		0.6	9.2		
																		3.6	11.5		

In Japan or HCMC
 In Lam Dong

(9) Implementation System



Japan side:

1) Nikko Foods Co., Ltd., (Survey leader:)

Nikko transferred marketing method/know-how and installed a sorting/grading machine into target site with Shibuya as a leader of this survey. Nikko has rich experiences of import and export of vegetables in South East Asia countries and has know-how to spread agricultural products into demanding market like Japan. In particular, Nikko has rich know-how of establishing appropriate logistics, packaging and giving suitable feedbacks to farmers. Nikko gave advices to target site from installation of machines to transferring marketing know-how with Dream Incubator Inc.

2) Dream Incubator Inc. (Consulting company)

DI supported Nikko comprehensively. DI has subsidiary in Vietnam and has led the JICA project since Oct, 2014. DI has strong relationship with Lam Dong Province People's Committee and led investigation of local market and negotiation with local private companies and government.

3) Shibuya Seiki Inc. (Supplier)

Shibuya Seiki, which has 60% market share in domestic Japan market, gave technical and practical advice to our team.

Vietnam side (Lam Dong Province People's Committee):

1) Steering Committee:

The Steering Committee (hereinafter referred to as the 'SC') on the Survey was formed to facilitate the progress of the Survey and provided necessary advices and supports to solve issues.

2) Operation Structure:

- Lam Dong Province People's Committee commissioned the services of the sorting/grading machine operation and marketing/sales of tomato to a core agricultural company as the pilot company based on the decision by the Steering Committee;
- The pilot company was responsible for the operation and maintenance of the sorting/grading machine, securing garages and marketing/sales of tomato;

- The service fee of the sorting/grading machine operation and marketing/sales of tomato paid to the pilot company by farmers belong to Lam Dong Province People's Committee, while Lam Dong Province People's Committee redeemed the commission fee to the pilot company.

3. ACHIEVEMENT OF THE SURVEY

(1) Outputs and Outcomes of the Survey

Through this project, 3 outcomes were achieved below.

Outcome 1) Installing an advanced sorting/grading machine at the target site to establish a quality-categorization/grading method for tomatoes

Through interviews with local MTs and producers, we confirmed that high-grade tomato is a great added value for HCMC's premium MT. Reflecting their needs, 12 quality categories by color and size (3 kinds of color × size 4 types) were determined, and a grading system was established as below.

Firstly, we decided specifications of the grading/sorting machine according to the determined classification, and exported the machine from Japan to Vietnam. The machine was successfully installed in PT, which was designated by Department of Industry & Trade (DOIT) of Lam Dong Province People's Committee, and it has been in operation since August 2016. At the time of installation, the operation time was around 2 hours a day, but as of December 2016, the operation time increased by 4 hours a day. Along with the increase in tomato yield, by mid-2017 the uptime will be extended to 8 hours a day.

In addition, thanks to the engineers from Shibuya Seiki, the manufacturer of the machine, technology was transferred to Lam Dong Province People's Committee and periodical maintenance system was set up though there had been concern about maintenance after installation.

Outcome 2) Boosting tomato sales for the target site by selling categorized tomatoes in markets with matching quality/grading characteristics

With the installation of equipment, there were two major contributions in terms of profitability.

Firstly, due to the successful introduction of the machine, the tomato quality within the package goods were standardized and this resulted in a significant increase in orders and in sales. As to orders, existing customers ordered to PT 1.5 times more than before installation, and PT gained several new customers as well.

Secondly, the labor productivity has been significantly improved, it became possible to deal with greatly increased orders with the same personnel as before the installation, and the ratio of labor cost to sales was reduced. Compared to before installation, the labor productivity has been greatly improved to 6 times (the throughput of grading/sorting has improved from 0.1 t / person hour to 0.6 t / person hour), so the workers who had been in charge of grading/sorting became possible to perform other post harvesting related tasks, and PT was able to deal with a large increase in orders.

In addition, in this project, as Japanese marketing technology, we implemented and proposed two items, improvement of products and improvement of sales channels. First one is standardization of tomato quality within packaged goods by introducing machine. Second one is improving packaging. We have repeatedly discussed with PT, where the equipment is installed, and the local MT, and have proposed a new method of packaging (appearance and label of the package). PT is now preparing for introduction.

Outcome 3) Formulating a plan for establishing a Postharvest Center in the Province and working to expand new markets

In this project, we have repeatedly discussed with DOIT and formulated an action plan for 2020 to promote the post-harvest center. Nikko Foods and Dream Incubator suggested that the action plan should include three viewpoints; introduction technology, expansion target candidate, and policy support. In the current plan, policy support is defined, and the introduction technology and candidate for expansion are not clarified. Therefore, we proposed the direction of consideration, and it resulted in that, as to introduction technology, provincial government committed to introduce optimum combination of Japanese and Vietnamese technologies, and, regarding to the candidate for expansion, the number of candidate was narrowed down to 3 producers.

(2) Self-reliant and Continual Activities to be Conducted by Counterpart Organization

Sorting/Grading machine will be handed over to Lam Dong Province from JICA at the same time with project completion. To continuously use the machine for adding the value of agricultural products of Lam Dong Province after hand-over, maintenance/control system will be established with cooperation between the public and private sector. Final adjustment is in progress by allowing the PT, the installation site, to have priority use right and allowing peripheral producers to use it if they pay the fee. To implement this, the division of roles of operations such as maintenance, etc. and the proportion of earnings allocation for use of the machine between Lam Dong Province People's Committee and PT will be determined in near future.

4. FUTURE PROSPECTS

(1) Impact and Effect on the Concerned Development Issues through Business Development of the Product/ Technology in the Surveyed Country

The project had two primary development effects below:

1) Adding higher value to Vietnam-grown fruit and vegetables

The implementation of a Japanese sorting/grading machine and advanced marketing techniques will improve the quality of the home-grown fruit and vegetables that Vietnamese farmers produce, which will naturally appeal to consumers. Increases in quality translate to increases in retail prices and, as a result, lead to higher-value-added products.

2) Expanding exports of fruit and vegetables to neighboring nations

With the sorting/grading machine, the user will be able to categorize fruit and vegetables by quality level and thus ensure that consumers get the quality they pay for. In addition to boosting consumer confidence, the user will also be able to sell its products in more diverse, efficient ways: It could select high-quality items to market as premium products, for instance, and separate certain quality categories out for use in processed products. Japanese marketing techniques, meanwhile, will allow the user to showcase their product value to consumer audiences more efficiently and effectively through new, compelling packaging styles and product segmentation approaches. Thanks to these types of marketing adjustments, local growers will see growth in their fruit and vegetable sales totals.

(2) Lessons Learned and Recommendation through the Survey

There are two issues when Lam Dong Province spreads the post-harvest center using advanced technology, produces high value added vegetables and carries out marketing.

1) Determination of introduction technology

The installed sorting/grading machine were very highly valued from PT, the installed site, in terms of robustness and throughput, but this machine is expensive, about 60 million yen. For this reason, in the future spread, it is necessary to downgrade so that producers of Lam Dong Province can afford. For example, one conceivable downgrading direction, is that the sensor, the most important technology in sorting/grading machine is manufactured in Japan, and the other parts such as the frame are manufactured and assembled in Vietnam. This issue was already brought up to Lam Dong Province, and they committed to combining Japanese and Vietnamese technologies by finding a point of compromise.

2) Cooperation with other priority strategy

In addition to management and improvement of post harvesting, in the long term, it is essentially to raise added value significantly through branding activities and R & D activities using public budgets. Since the formulation activity of branding strategy is proceeding with support from JICA now, it is thought that Lam Dong Province should deeply study, plan and execute R & D in future.

Vietnam

Verification Survey with the Private Sector for Disseminating Japanese Technologies for Introducing Japanese Advanced Sorting/Grading System and Marketing Method to Improve the Postharvest Management of Agriculture Crops in Lam Dong Province

Nikko Foods Co., Ltd. (Tokyo)

Development Needs in Vietnam

Techniques/products from the proposing company

Anticipated outcomes for Vietnam

Agriculture is the country's primary industry, but the industrial structure hampers added value

- 60.4% of the total population lives in rural areas
- Rural areas account for 21.3% of the Vietnamese GDP

The Japanese and Vietnamese governments are working together to create a model case for agricultural development

- Lam Dong Province, with its solid agricultural makeup, is a promising site for potential development

Product/technique names

① Japanese sorting/grading machine

- Sorting and categorizing agricultural products by seize, color, and other characteristics
- ② Marketing expertise one high-quality vegetables
 - Selling sorted products via the optimal channels

Business Overview

Local agency responsible for the project:
Lam Dong Province People's committee

Project period: January 2016 – April 2017

Project site: Lam Dong Province

Enhanced post-harvest operations will add value to agricultural products

- By enhancing post-harvest operations, the project will help establish the "Da Lat Vegetables" brand and add value to products

Higher-value-added vegetables will boost revenues across the Provincial agricultural sector

- By ensuring a stable supply of high-value-added agricultural products, the project will boost income levels among farmers and growers

A sharper competitive edge will expand the Province's export potential

Dissemination/verification project details

Outcomes for Japanese companies

The main issue facing the agricultural industry in Lam Dong Province is the vulnerability of its post-harvest framework

- Despite the good quality of the vegetables themselves, the lack of proper marketing methods prevents producers from selling items at higher prices

Post-harvest is a major focus of the Province's five-year plan. The project aims to install, utilize, and expand the use of a sorting/grading machine (the core device for the center).

- ① Localize/install sorting/grading machines
- ② Provide marketing assistance for sorted products
- ③ Create a framework/plan for popularizing the use of the sorting/grading machine

Now

- Vietnam exports dragon fruit (Rongan Province, etc.) and mangoes (Dong Thap Province, etc.) to Japan
Companies farm in Thailand

Future

- Companies market products from Lam Dong Province (tomatoes, etc.) to local MT and export to nearby nations, including Japan
- Companies establish in-house crop-production frameworks in Lam Dong Province and develop their efforts to cover everything from production to export