

Country Name	<b>Project for Standardization and Quality Control for Horticulture Products of Indonesia (Improvement of Thermal Treatment against Fruit Flies on Fresh Mango)</b>
Republic of Indonesia	

**I. Project Outline**

Background	<p>Despite the great potential of mango as one of the major fruits for export from Indonesia, less than 0.1 percent of its total production (2.1 million tons) was actually exported in 2011. Although an export volume of mangoes from Indonesia had been increasing to markets in the Middle East and East Asian countries, they could access only to the countries that did not impose any quarantine requirements on fruits infested with those flies due to the existence of various types of fruit flies attacking mangoes produced in Indonesia. In order to address the issue and thereby further increase export of mangoes to overseas markets including Japan, the Government of Indonesia requested the Government of Japan a technical cooperation project aiming at disinfestation techniques by vapor heat treatment (VHT) against fruit flies on fresh mango.</p>				
Objectives of the Project	<p>Through strengthening the capacity of technical staff of the Directorate General of Horticulture (DGH) and the Pest Forecast Institute (PFI) on rearing test fruit flies in laboratory, disinfestation techniques by VHT and building data system which stores examination data and analysis results, the project aimed at the establishment of disinfestation technique by VHT against fruit flies on fresh mango, Gedong variety, thereby contributing to establishment of the disinfestation techniques by VHT against fruit flies on other tropical fruits.</p> <ol style="list-style-type: none"> <li>Overall Goal: The disinfestation techniques by VHT against fruit flies on other tropical fruits are established.</li> <li>Project Purpose: The disinfestation technique by VHT against fruit flies on fresh mango, Gedong variety, is established.</li> </ol>				
Activities of the Project	<ol style="list-style-type: none"> <li>Project Site: PFI in Jatisari District, Karawang Prefecture, West Java Province</li> <li>Main Activities: 1) improvement of the capacity of counterparts to rear test fruit flies successively in laboratory, 2) improvement of the capacity of counterparts to disinfest test fruit flies by VHT, and 3) establishment of the data system which stores examination data and analysis results.</li> <li>Inputs (to carry out above activities) <table border="0" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> <p>Japanese Side</p> <ol style="list-style-type: none"> <li>Experts: 14 persons</li> <li>Trainees Received: 18 persons</li> <li>Equipment: vehicle, incubator, VHT machine, Biotron and related equipment, etc.</li> </ol> </td> <td style="width: 50%; vertical-align: top;"> <p>Indonesian Side</p> <ol style="list-style-type: none"> <li>Staff Allocated: 15 persons</li> <li>Land and Facilities: Office space, land for new VHT laboratory building</li> <li>Local cost: Cost for utility (electricity, water and telephone charges), purchase of test mangoes, etc.</li> </ol> </td> </tr> </table> </li> </ol>			<p>Japanese Side</p> <ol style="list-style-type: none"> <li>Experts: 14 persons</li> <li>Trainees Received: 18 persons</li> <li>Equipment: vehicle, incubator, VHT machine, Biotron and related equipment, etc.</li> </ol>	<p>Indonesian Side</p> <ol style="list-style-type: none"> <li>Staff Allocated: 15 persons</li> <li>Land and Facilities: Office space, land for new VHT laboratory building</li> <li>Local cost: Cost for utility (electricity, water and telephone charges), purchase of test mangoes, etc.</li> </ol>
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Project Period	October 2009 – April 2013	Project Cost	(ex-ante) 280 million yen, (actual) 287 million yen		
Implementing Agency	Directorate General of Horticulture (DGH), Ministry of Agriculture (MOA) Agency for Agricultural Quarantine (AAQ), MOA Pest Forecast Institute (PFI), Directorate of Food Crops, MOA				
Cooperation Agency in Japan	Ministry of Agriculture, Forestry and Fisheries of Japan (MAFF)				

**II. Result of the Evaluation**

I Relevance
<p>&lt;Consistency with the Development Policy of Indonesia at the Time of Ex-Ante Evaluation and Project Completion&gt;</p> <p>The project was consistent with the development policies of Indonesia stated in the Horticulture Development Plan (2005-2009) at the time of ex-ante evaluation and the DGH Strategic Plan (2010-2014) at the time of project completion. Both of plans aimed at the improvement of quality of horticulture products and plant quarantine for export.</p> <p>&lt;Consistency with the Development Needs of Indonesia at the Time of Ex-Ante Evaluation and Project Completion &gt;</p> <p>At the time of ex-ante evaluation, although an increasing volume of mangoes had been exported from Indonesia, due to the existence of various types of fruit flies attacking mangoes, they could access only to the countries that did not impose any quarantine requirements on the fruits infested with those flies. Therefore, in order to achieve the full potential of agribusiness as an exporting country, it was necessary to promote the capacity of DGH, AAQ and PFI who played major roles in plant quarantine and pest control in Indonesia. The situation was not significantly changed at the time of project completion. Therefore, the project was consistent with the development needs of Indonesia.</p> <p>&lt;Consistency with Japan's ODA Policy at the Time of Ex-Ante Evaluation&gt;</p> <p>The project was consistent with Japan's ODA policy for Indonesia since the "Country Assistance Program for the Republic of Indonesia (November 2004)" aiming at the development of agricultural and fishing industries by focusing its assistance on strengthening the operation of farmers/fishermen organizations, building and managing related infrastructure, improving productivity, and securing processing and distribution system.</p> <p>&lt;Evaluation Result&gt;</p> <p>In light of the above, the relevance of the project is high.</p>

## 2 Effectiveness/Impact

### <Status of Achievement for the Project Purpose at the time of Project Completion>

The Project Purpose was achieved by the time of project completion. By the end of 2012, the VHT standard was established for complete disinfestation of test fruit flies without critical damage to test fruits, and large-scale mortality tests of more than 30,000 flies have been properly implemented for the most heat tolerant stage among all the target species. The data system for storing examination data and analysis results was completed by the end of the project.

### <Continuation Status of Project Effects at the time of Ex-post Evaluation>

The project effects have been continued. PFI staff has continued VHT test standardized by the project with the institutional support from the DGH. The head of the Research and Development (R&D) Institute of DGH officially assigned a functional team in PFI as the VHT Team with the ongoing budget support.

### <Status of Achievement for Overall Goal at the time of Ex-post Evaluation>

The Overall Goal was partially achieved by the time of the ex-post evaluation. VHT has been applied on Arumanis variety of mango and melon but limited to the preliminary test stages, i.e. the small-scale mortality and fruit injury tests leaving the large-scale tests and residue analysis undone. While further extension of the full-stage test to other export fruits is expected, it is not realized because the agreement among DGH, PFI, AAQ on the post-project action plan has not been achieved due to insufficient coordination among them, and insufficient budget for purchasing larger scale VHT machines to accommodate larger fruits. The decision making and administrative procedures of Indonesian Government for exporting tropical fruits were pointed out by the terminal evaluation in 2012 as the challenge for the Overall Goal's achievement. However, at the time of ex-post evaluation in 2017, the Government's negotiation with other countries are still ongoing and not yet settled.

### <Other Impacts at the time of Ex-post Evaluation>

DGH conducted a socialization meeting for introducing VHT techniques in cooperation with PFI inviting provincial and municipal officials of MOA related organizations. Besides, PFI has been accepting students from vocational training schools and universities in internship programs and introducing them laboratory works including VHT disinfestation techniques and computer data management system established by the project. No negative impact on natural environment has been observed.

### <Evaluation Result>

In light of the above, through the project, the Project Purpose was achieved at the time of project completion, positive effects by the project have mostly continued, and the Overall Goal was partially achieved at the time of the ex-post evaluation. Therefore, the effectiveness/impact of the project is high.

Achievement of Project Purpose and Overall Goal

Aim	Indicators	Results
(Project Purpose) The disinfestation technique by VHT against fruit flies on fresh mango, Gedong variety, is established.	The VHT standard for complete disinfestation of test fruit flies without critical damage to test fruits is established for the most heat tolerant stage among all the target species in large-scale mortality tests of more than 30,000 flies.	Status of the Achievement: Achieved. (Continued) (Project Completion) Large-scale mortality tests were conducted in 2012 for the most heat tolerant stage among all the target species. As a result, more than 30,000 flies were disinfested with the mortality rate of 100%. The VHT standard was thus established. (Ex-post Evaluation) PFI staff has continued VHT test standardized by the project with the institutional support from the DGH.
(Overall Goal) The disinfestation techniques by VHT against fruit flies on other tropical fruits are established.	Disinfestation technique(s) is (are) established at least for one tropical fruit other than mango.	(Ex-post Evaluation) Partially achieved. VHT has been applied on Arumanis variety of mango and melon but limited to the preliminary test stages, i.e. the mortality test and fruit injury test.

Source : Horticulture Development Plan (2005-2009), DGH Strategic Plan (2010-2014), Terminal Evaluation Report (2014), questionnaire survey to and interviews with DGH, AAQ and PFI

## 3 Efficiency

Although the project period was within the plan (the ratio against the plan: 100%), the project cost slightly exceeded the plan (the ratio against the plan: 103%). Therefore, efficiency of the project was fair.

## 4 Sustainability

### <Policy Aspect>

The National Medium-Term Development Plan 2015-2019 (RPJMN<sup>1</sup> 2015-2019) and DGH Strategic Plan 2015-2019 listed several horticultural products including pineapple, orange, mango, mangosteen, snake fruit as national main commodities, and emphasized the importance of improvement of international cooperation and relationships for trading horticultural commodities. Since mango is included in the list, the disinfestation techniques using VHT established by the project is expected to be continuously utilized.

<sup>1</sup> RPJMN: Rencana Pembangunan Jangka Menengah Nasional

#### <Institutional Aspect>

While there were some changes in organizational structures in DGH, they didn't affect the operations of horticulture quarantine in AAQ and PFI. The official assignment of the VHT Team in PFI has been done in 2010 by DGH as stated above. The number of staff in charge of horticulture quarantine and VHT techniques has been almost constant or slightly decreasing in PFI (Table 1). According to the interviews in AAQ and PFI, the number of staff in charge of VHT techniques is sufficient for the current operations since disinfestations are not yet conducted in full-scale. However, PFI is carrying out maintenance of equipment with two outsource employees, and AAQ anticipates the shortage of staff once the export of mangoes and melons is initiated. The head of the Sub-directorate of Fruit Crop Protection of DGH mentioned that once the export of mangoes started, the number of staff and budget of PFI would be adjusted accordingly.

Table 1. Number of staff in charge of horticulture quarantine  
(Number of staff in charge of VHT techniques)

	2012	2013	2014	2015	2016	2017*
DGH	54(5)	54(5)	52(5)	52(5)	51(4)	48(4)
AAQ	N/A (3)	829(3)	972(3)	1029(3)	1103(3)	1103(4)
PFI	46(6)	40(6)	40(5)	40(4)	43(4)	41(4)

\* As of August 2017.

#### <Technical Aspect>

According to the interviews with PFI staff, while one of the counterparts was transferred to be promoted as a head of the other section in PFI, the staff members of PFI trained by the project sustained their knowledge and skills through the operations of disinfestation using VHT. In order to extend their operations to other horticulture commodities, further improvement of knowledge and skills of technical staff on phytosanitary<sup>2</sup> is needed. Although there was no stand-alone training for equipment maintenance but as a part of VHT training, most of the PFI staff trained by the project are currently engaged in maintenance of equipment. However, since they are not specialized in maintenance work and the budget for maintenance is in short, further technical and financial support is needed for equipment maintenance. Variety of manuals prepared by the project was sufficient and they are fully utilized. While the computer data system introduced by the project has been properly utilized, due to the insufficient security of the system, data could be changed by anybody, and the validation of data cannot be guaranteed. Besides, because the data system is not linked with other related agencies such as DGH and AAQ, the data are not fully utilized.

#### <Financial Aspect>

PFI is financially supported by DGH, but the annual budget for disinfestation, equipment maintenance and data system has been decreasing since the end of the project in 2013 (Table. 2). This was because the disinfestation of mangoes and melons has not been fully operationalized due to the idling of quarantine steps negotiations between Indonesia and importing countries. According to the interview with VHT coordinator of PFI, once the negotiation settled, DGH will increase the financial support accounting the needs of PFI. Also, according to the coordinator, the budget is sufficient for the standard laboratory operations including rearing and equipment maintenance. However, for raising the level of the standard operation, further budget support is expected for repairing Biotrons for insects rearing, a water softener, a fruit hardness tester and some other equipment, and for extending tests to other commodities other than mangoes and melons.

Table 2. Annual Budget for Laboratory Operations of PFI  
unit: million IDR

Year	2013	2014	2015	2016	2017
Budget	500	475	300	150	90

#### <Evaluation Result>

In light of the above, slight problems have been observed in terms of technical and financial aspects of the implementing agency. Therefore, the sustainability of the effectiveness through the project is fair.

#### 5 Summary of the Evaluation

The Project Purpose was achieved at the time of project completion. The project effects have mostly been continued while the Overall Goal was partially achieved by the time of the ex-post evaluation. As for sustainability, while the environment for continuing the disinfestation operations using VHT established by the project is secured, special staff and techniques for equip maintenance is expected together with the budget for that. Skills and knowledge for upgrading the security and connectivity of the data management system installed by the project is also waited in anticipation. As for efficiency, the project cost slightly exceeded the plan. Considering all of the above points, this project is evaluated to be satisfactory.

### III. Recommendations & Lessons Learned

#### Recommendations for Implementing Agency:

- Disinfestation techniques by VHT against fruit flies established by the project has not been extended to other tropical fruits (Overall Goal). One of the reasons for that is the agreement on the post-project action plan among DGH, AAQ and PFI has not been achieved. Therefore, it is recommended AAQ to take initiative to coordinate stakeholders including exporters to make an action plan for increasing the export of mangoes, melons and other tropical fruits.
- Since security and connectivity of the computer data system installed by the project is insufficient, additional training is needed for the staff of PFI. Therefore, it is recommended DGH to technically and financially assist PFI to update the computer data system.

#### Lessons Learned for JICA:

- The Overall Goal of the project has not been fully achieved because the agreement on the post-project action plan has not been achieved among the implementing agency, its umbrella agency and other agencies concerned. Also, the governments' quarantine steps negotiations have been idling, export of mangoes and melons are not initiated as of the ex-post evaluation in 2017. As a result, although the post-project action plan and the governments' negotiations were not the explicit scope of the project, they affected the full-fledged

<sup>2</sup> Measures for the control of plant diseases intrusion from other areas or countries.

manifestation of the project effects and its sustainability. Therefore, post-project scenario for the final target of the project should be specifically planned by the implementing agency and its umbrella agencies involving other related agencies at the planning stage and substantially executed during the project period, so that the achievements of projects' objectives could be higher, and continuation of the project effects could be ensured.



Cool storage for fruits storage in the Laboratory



Technical staff of laboratory in front of VHT machine