

Country Name	Project for Strengthening of Agricultural Pesticide Residue Analysis System
Federal Democratic Republic of Ethiopia	

I. Project Outline

Background	<p>Agriculture was one of the core economic sectors of Ethiopia, which supported 85% of livelihoods of the population and accounted for approximately 40% of GDP and more than 90% of the total export value (2009/10). It had contributed to steady economic growth of the country and been the key for poverty reduction. According to the Ethiopia Trade Statistics in 2009/10, coffee was the top agricultural export commodity with the total value of 5,300 million US dollars. However, in 2008, pesticide contaminations found in succession in coffee to Japan, which accounted for 21% of the total coffee export. The Ministry of Health, Labour and Welfare of Japan issued an administrative order to inspect all coffee from Ethiopia and started its execution in May 2008. As a result, the export of coffee to Japan significantly declined, and the incident heavily harmed the Ethiopian economy. Coping with the situation, the Ethiopian government has established the Quality Monitoring and Pesticide Testing Laboratory in the Ministry of Agriculture to strengthen the oversight of safety of agricultural export commodities. The laboratory started its operation and soon identified problems such as insufficient experience of the staff members, shortage of consumables including solvents, and unidentified infection routes of commodities.</p>				
Objectives of the Project	<p>Through the accumulation of baseline data for pesticide residue analysis, establishment of the validation¹ of residue analytical methods, establishment of the laboratory management to accumulate analytical data, application of the residue analysis methods, and implementation of the trial monitoring in pilot areas, the project aimed at the strengthening of pesticide residue analytical capacity of the laboratory, thereby contributing to increase in the number of analyzable target agricultural products and pesticides analysed by the laboratory and establishment of effective oversight to the supply chain of agricultural commodities.</p>				
	<ol style="list-style-type: none"> 1. Overall Goal: <ol style="list-style-type: none"> 1) The number of analyzable target agricultural products and pesticides of the Quality Monitoring and Pesticide Testing Laboratory is increased. 2) Effective oversight to the supply chain of agricultural commodities is established. 2. Project Purpose: The pesticide residue analytical capacity of the Quality Monitoring and Pesticide Testing Laboratory is strengthened. 				
Activities of the Project	<ol style="list-style-type: none"> 1. Project Site: Quality Monitoring and Pesticide Testing Laboratory in Addis Ababa 2. Main Activities: <ol style="list-style-type: none"> 1) Accumulation of the baseline data to implement pesticide residue analysis and selection of the priority pesticide/agricultural commodities including coffee for analysis, 2) Establishment of the validation of residue analytical methods of target agricultural commodities with pesticide combination, 3) Establishment of the laboratory management to accumulate reliable analytical data, 4) Application of the residue analysis knowledge/techniques/methods obtained to agricultural commodities and other samples, 5) Conduct of monitoring of the trial activities concerning coffee in pilot areas using check sheet and supplemental chemical analysis. 3. Inputs (to carry out above activities) <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> Japanese Side <ol style="list-style-type: none"> 1) Experts: 4 persons 2) Trainees received in Japan: 12 persons 3) Equipment: analytical instrument for residue analysis, vehicles, PCs, printers, projectors, consumables for residue analysis, etc. </td> <td style="width: 50%; vertical-align: top;"> Ethiopian Side <ol style="list-style-type: none"> 1) Staff Allocated: 7 persons 2) Land and Facilities: project office 3) Local cost: cost for utility of offices (electricity, water and telephone) </td> </tr> </table> 			Japanese Side <ol style="list-style-type: none"> 1) Experts: 4 persons 2) Trainees received in Japan: 12 persons 3) Equipment: analytical instrument for residue analysis, vehicles, PCs, printers, projectors, consumables for residue analysis, etc. 	Ethiopian Side <ol style="list-style-type: none"> 1) Staff Allocated: 7 persons 2) Land and Facilities: project office 3) Local cost: cost for utility of offices (electricity, water and telephone)
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Project Period	November 2011 - November 2016 (Extension: November 2015 - November 2016)	Project Cost	(ex-ante) 300 million yen, (actual) 313 million yen		
Implementing Agency	Quality Monitoring and Pesticide Testing Laboratory, Ministry of Agriculture (MoA)				
Cooperation Agency in Japan	Ministry of Health, Labor and Welfare				

II. Result of the Evaluation

<Special Perspectives Considered in the Ex-Post Evaluation>

- The “certificates of analysis” expected by the Indicator 2 for the Project Purpose to be issued by the laboratory was considered as “advice notes” in this ex-post evaluation. A document titled “certificate of analysis” can be issued only by an institute accredited by an international standard such as the International Organization for Standardization (ISO). Since the laboratory was expected by the Indicator 1-2 for the Overall Goal to be accredited some years after the completion of the project, the laboratory could not issue “certificates of analysis” at the time of project completion but “advice notes.” The terminal evaluation (2015) also evaluated the achievement of Project Purpose interpreting the “certificates of analysis” as “advice notes.”

¹ A process to scientifically verify the validity of test method.

1 Relevance

<Consistency with the Development Policy of Ethiopia at the Time of Ex-Ante Evaluation>

Under the policy of the “Agricultural Development Led Industrialization” (ADLI), the government of Ethiopia has aimed at the improvement of living standard of farmers through commercialization of agriculture and economic growth supported by the export of agricultural commodities. Also, in the national development plan of the “Growth and Transformation Plan 2010/11-2014/15,” agriculture, which was a core of economic growth and played important roles to create preferable conditions for economic growth, was expected to be vitalized as one of the seven strategies to achieve the national target. Therefore, the project was consistent with the development policies of Ethiopia at the time of ex-ante evaluation.

<Consistency with the Development Needs of Ethiopia at the Time of Ex-Ante Evaluation>

Although the hardware including new analytical instruments has been well prepared in the Quality Monitoring and Pesticide Testing Laboratory (hereinafter “the laboratory”) newly established in 2009, the instruments and equipment has not been properly utilized due to a lack of analysts who have experiences of pesticide residue analysis. Thus, the performance of the laboratory conducting unreliable quality analysis has been an issue to be addressed. Therefore, the project was consistent with the development needs of Ethiopia at the time of ex-ante evaluation.

<Consistency with Japan’s ODA Policy at the Time of Ex-Ante Evaluation>

In the “Country Assistance Program for the Federal Democratic Republic of Ethiopia” (June 2008), agriculture/rural development focusing on the “research and development of agricultural technology, dissemination of improved technologies and support for their application” was designated as one of the five priority areas along with water, education, health and socioeconomic infrastructure. Therefore, the project was consistent with the Japan’s ODA policy for Ethiopia at the time of ex-ante evaluation.

<Evaluation Result>

In light of the above, the relevance of the project is high.

2 Effectiveness/Impact

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

The Project Purpose was achieved at the time of project completion. Coffee beans to Japan were examined before exporting according to the standardized procedures² by the methods validated by the laboratory (Indicator 1). Analytical staff members of the laboratory were trained by the project and became able to issue “advice notes” when necessary (Indicator 2) and to review and evaluate the “certificates of analysis” issued by the Japanese inspection institutions (Indicator 3).

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

The project effects have been partially continued at the time of ex-post evaluation. Coffee beans’ pesticide contamination has not been found since 2011, and mandatory inspection enforced by the Japanese government was deregulated in April 2017. Since the deregulation, the laboratory has not conducted pesticide residue analysis for coffee exported to Japan because the inspection is non-dispensable. Therefore, the project effects directly contributed to pesticide residue control and to the increase of coffee export to Japan up to April 2017. Since 2017, the laboratory has mainly conducted the test methods validations for other agricultural products such as tomato, haricot beans, and sesame seeds. The total volume of coffee export to Japan has constantly increased from 18,482 tons in 2015/16 to 33,824 tons in 2018/19. Although the laboratory is ready to issue “advice notices” and review and evaluate “certificates of analysis”, due to insufficient technical manpower, it would be difficult to deal with a large volume request.

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

The Overall Goal 1 was partially achieved, and the Overall Goal 2 was achieved. Although an analytical method for 23 kinds of pesticides was established by the project and the laboratory has applied it for coffee and other varieties of agricultural products, the capacity of the laboratory has not improved to be able to establish analytical methods for arbitrary combinations of samples and pesticides (Indicator 1-1). The laboratory has not applied for the accreditation to receive international certification due to insufficient technical manpower caused by the turnover of the staff trained by the project (Indicator 1-2). The number of incidents of excess of chemical residue over the standard value found in the target agricultural commodities has been very limited after the completion of the project in 2016 (Indicator 2-1). When an incident of excess of pesticide residue found on sesame in 2019, MoA requested the laboratory to develop a test method for it. The laboratory promptly responded to the request by adopting a test method developed in the project to the incident, and the incident was properly handled by MoA. (Indicator 2-2).

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

With the technical capacity and facilities enhanced by the project, the laboratory has started conducting test method validations of other crops other than coffee. Besides, based on the comprehensive judgements including the improved capacities of the laboratory, the government of Japan has removed its import restriction on coffee beans from Ethiopia. Because of this, the annual amount of coffee export to Japan has constantly increased after the completion of the project. The total volume of export to Japan in 2018/19 became 1.8 times of the one in 2015/16. No negative impact on natural, social and economic environment has been observed.

<Evaluation Result>

Therefore, the effectiveness/impact of the project is fair.

Achievement of Project Purpose and Overall Goal

Aim	Indicators	Results
Project Purpose: The pesticide residue analytical capacity of the Quality Monitoring and	Indicator 1: Every coffee to Japan is examined by inspection based on validation before it is exported.	Status of the Achievement: Achieved (not applicable) (Project Completion) Every lot of coffee to Japan was examined before exporting according to the standardized procedures by the methods validated by the laboratory.

² The standardized inspection procedures were composed with the process of 1) sampling of coffee beans (quarantine stations), 2) pretreatment and pre-analysis (the laboratory), 3) analysis in Japan and issuance of a “certificate of analysis” (Japanese inspection institutions), 4) review and evaluation of a “certificate of analysis” (the laboratory), and 5) issuance of an “advice note” for export permission (the laboratory). An “advice note” is a certificate of cleanliness and grade of coffee beans issued by the laboratory sent to exporters via Coffee Quality Inspection Center of MoA.

Pesticide Testing Laboratory is strengthened.		(Ex-post Evaluation) The laboratory has not conducted pesticide residue analysis for coffee exported to Japan since 2017 because the mandatory inspection enforced by the Japanese government was deregulated in 2017 and the inspection has been non-dispensable since then.
	Indicator 2: The certificates of analysis are issued when necessary.	Status of the Achievement: Achieved (partially continued) (Project Completion) The laboratory became able to issue an advice notice when necessary. (Ex-post Evaluation) The laboratory is ready for issuing an advice notice when it is requested. However, because the analysts trained by the project have left the laboratory except one analyst and a new analyst recruited after the project does not have enough experience of coffee beans pesticide residue analysis, it would be difficult to deal with a large volume inspection request.
	Indicator 3: The laboratory becomes capable of reviewing and evaluating analysis report from the coffee exporting companies.	Status of the Achievement: Achieved (partially continued) (Project Completion) The capacity of analysts of the laboratory was improved through the project, and the laboratory was able to review and evaluate “certificates of analysis” issued by the Japanese inspection institutions. (Ex-post Evaluation) The laboratory is ready for reviewing and evaluating “certificates of analysis” when it is requested. However, due to insufficient technical manpower stated above, it would be difficult to deal with a large volume request.
Overall Goal: 1. The number of analyzable target agricultural products and pesticides of the Quality Monitoring and Pesticide Testing Laboratory is increased. 2. Effective oversight to the supply chain of agricultural commodities is established.	Indicator 1-1: Necessary analytical method for the arbitrary combination of samples and pesticides is established.	(Ex-post Evaluation) Partially achieved An analytical method for 23 kinds of organochlorine and organophosphate pesticides was established by the project, and the laboratory has applied the method for coffee beans and other varieties of agricultural products including tomato, haricot beans, sesame seeds, and others. However, the capacity of the laboratory has not improved to be able to establish analytical methods for the arbitrary combinations of samples and pesticides.
	Indicator 1-2: The laboratory's analytical capability fulfills the technical requirements for application of international standards, e.g., ISO/IEC17025.	(Ex-post Evaluation) Not achieved Due to insufficient technical manpower caused by the turnover of the staff trained by the project, the laboratory has not applied for the accreditation to receive international certification such as ISO/IEC17025.
	Indicator 2-1: The number of the incidents of excess of chemical residue over the standard value found in the target agricultural commodities is declined compared to the year 2008.	(Ex-post Evaluation) Achieved According to the interview with a laboratory analyst, after the completion of the project in 2016, very limited number of incidents of excess of chemical residue over the standard value has found in the target agricultural commodities. One of them was the incident of excess of organophosphorus residue found in 2019 on sesame which was the second most export commodity next to coffee. The incident was promptly and properly handled by MoA in collaboration with the laboratory.
	Indicator 2-2: Effective measures to investigate the causes of such incidents and to prevent them are taken, when necessary.	(Ex-post Evaluation) Achieved When the incident of excess of pesticide residue found on sesame in 2019, MoA requested the laboratory to develop a test method for it. The laboratory promptly responded to the request by adopting a test method developed in the project to the incident, and the incident was properly handled by MoA.

Source: Quality Monitoring and Pesticide Testing Laboratory

3 Efficiency

Both the project period and cost exceeded the plan (ratio against the plan was 125% and 104% respectively) due to the delays of provision of equipment and dispatch of Japanese experts, and the trouble of an analytical instrument the laboratory had. The outputs were produced as originally planned by the end of the extended period of the project. Therefore, the efficiency of the project is fair.

4 Sustainability

<Policy Aspect>

The “Agriculture Sector Growth and Transformation Plan II 2015-2020” has set a goal on the establishment of a modern and organized laboratory which enable proper and prompt investigations on pesticide residue in agricultural products in order to fulfill the requirements of buyer countries and to increase the export of agricultural commodities. Also, the “Agriculture Growth Program Phase II 2015-2020” (AGP-II) aims at the establishment of an international standard pesticide laboratory to strengthen plant health services for the consumers both at home and overseas.

<Institutional/Organizational Aspect>

The total number of staff of the laboratory at the time of ex-post evaluation is seven, and it is not sufficient for the volume of work of the laboratory. MoA has assessed the system and structures of national agricultural pesticide residue control and is in the process of changing them to accommodate the growing demand for analysis. Changes proposed by MoA include recruitment of 16 new staff members of the laboratory to increase the variety of crops to be tested. The proposals for changes are not yet implemented at the time of ex-post evaluation.

<Technical Aspect>

Project effects on the technical aspect of the laboratory's activities has not been sufficiently sustainable because most of the analysts

trained by the project except one analyst have left the job mainly due to low salaries. However, the analyst staying in the laboratory has transferred her knowledge and skills learned in the project to a newly assigned analyst through hands-on training in their daily activities. Standard operating procedures (SOP)³ compiled by the project has been continuously utilized in the laboratory not only for coffee but also for other agriculture products.

<Financial Aspect>

The budget for the laboratory has been allocated from the government's sub-sector budget for agricultural development which has been steadily increasing from 2,202 million Birr in 2015/16 to 2,504 million Birr in 2019/2020. Although the specific amount of budget for the laboratory was not available, according to the laboratory staff members, it has not been sufficient for its activities and salaries, and it has caused staff turnovers and significantly affected the performance of the laboratory.

<Evaluation Result>

In light of the above, some problems have been observed in terms of the institutional/organizational, 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 by improving the capacity of the laboratory to examine coffee beans to Japan before exporting according to the standard procedures. However, the activities of the laboratory have been significantly limited due to insufficient technical manpower caused by the turnover of the staff. The Overall Goal was partially achieved by keeping no incident of agricultural pesticide residue after the completion of the project. But the capacity of the laboratory has not improved to be able to establish analytical methods for the arbitrary combinations of samples and pesticides and to apply for the accreditation to receive international certification. However, the project has contributed to the resumption of coffee export to Japan, and this has a great impact on Ethiopia's coffee industry. As for sustainability, some problems have been observed in terms of the institutional/organizational, technical, and financial aspects. Considering all of the above points, this project is evaluated to be partially satisfactory.

III. Recommendations & Lessons Learned

Recommendations for Implementing Agency:

- It is recommended that MoA accelerates the implementation of the proposals for strengthen the laboratory by recruiting of new analytical staffs including part-time staffs and allocating sufficient budget for the activities and salaries of the laboratory. The training of the new staff to be recruited will also be urgently required to improve the performance of the laboratory.
- After the implementation of the MoA's proposals for strengthen the laboratory including the assignment of new analytical staffs, it is recommended that the laboratory transfers the knowledge and skills learned in the project to the new staff members, improves and stabilizes the performance of agricultural pesticide residue analysis, and applies for the accreditation to receive international certification in order to be able to issue "certificates of analysis."

Lessons Learned for JICA:

- Although the technical capacity of the laboratory was improved by the project, most staff members trained by the project have left the job due to low salaries, and activities of the laboratory has been significantly limited after the completion of the project. To ensure sustainability of the effects of a technical cooperation project, it is recommended that a project focuses not only on the technical issues but also on the institutional managerial issues, and to includes possible tactics in its plan to improve institutional management of the counterpart agency. For that, it is recommended to make a detail study on the counterpart agency relating to staffing and financing at the initiation stage of a project.



Preparation for a test method validation



Vertical shaker for sample preparation

³ A set of step-by-step instructions compiled by the project to help laboratory analysts carry out their routine testing operations.