Summary of the Results of the Evaluation Survey

1. Outline of the Project	
Country: Federal Democratic Republic of Ethiopia	**Project Title:** The Project for Strengthening of Agricultural Pesticide Residue Analysis System
Issue Sector: Agriculture and Rural Development	**Cooperation Scheme:** Technical cooperation project
Division in Charge: Agriculture and Rural Development Department	**Total Cost:** 300 million Japanese Yen
Period of Cooperation: November 2011 – November 2015 (4 years)	**Partner Country's Implementing Organization:** Ministry of Agriculture
	Supporting Organization in Japan: Ministry of Health, Labour and Welfare

1-1. Background of the Project

The agriculture sector is the one of the core economic sector of significance to the economy of the Federal Republic of Ethiopia (hereinafter referred to as "Ethiopia"), which supports 85% of the livelihood of the total population. It occupies approximately 4% of the total GDP and more than 9% of the total export respectively. It supports steady economic growth and is the key for the reduction of persistent poverty. The improvement of overall quality by ensuring better production and productivity support promoting export for earnings hard currency and further development of domestic market.

According to the trade statistics of 2009/10, coffee is among the top agricultural commodities whose total revenue accounts US$ 5,300 million (21% of total export). Import of coffee to Japan has declined significantly due to the continuous incident of contamination of organochlorine pesticides exceeding the Japanese standard found in 2008. The incident has harmed the Ethiopian economy negatively because Japanese Ministry of Labour Health and Welfare issued the administrative order to inspect all coffee imported from Ethiopia in May, 2008.

Responding to the incident, Ethiopian Ministry of Agriculture established the Agricultural Products Quality Monitoring and Pesticide Testing Laboratory under the Plant Health Regulatory Directorate to improve the oversight to the export of agricultural commodities. It is identified that the laboratory has problems such as (i) staff member lacks adequate experience in residue analysis, (ii) shortage of solvents, agents and other consumables, and (iii) lack of effective measures taken for prevention of further contamination because of not knowing the causes of the contamination. MoA requests the Government of Japan technical cooperation project aiming at human capacity development to resolve such situations. In response to the request from Ethiopia, JICA has carried out a technical cooperation project, "The Project for Strengthening of Agricultural Residue Analysis System (SAPRAS)" from November 2011 to November 2015.

About four years have passed since the Project was launched. Considering the fact that the Project is to be completed in November 2015, JICA dispatched a consultation survey team in June 2015 with the purpose of discussing with the Ethiopian authorities concerned to clarify the target and priority activities for the remaining period of the Project. In accordance with the survey results, the joint terminal evaluation survey was conducted from 22 September to 2 October 2015.

1-2. Project Overview

(1) 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.

(2) Project Purpose

The pesticide residue analytical capacity of the Quality Monitoring and Pesticide Testing Laboratory is strengthened.

(3) Outputs

Output 1: Baseline data to implement pesticide residue analysis is accumulated and priority pesticide / agricultural commodities including coffee for analysis are selected.

Output 2: Validation of residue analytical method of target agricultural commodities with pesticide combination is established.

Output 3: Laboratory management to accumulate reliable analytical data is established.

Output 4: Residue analysis knowledge/technique/method obtained becomes applicable to agricultural commodities and other samples.

Output 5: Monitoring trial activity concerning coffee is conducted in pilot area using check sheet and supplemental chemical analysis.

(4) Inputs

1) Japanese side:

Japanese Experts: 7 persons (78.58 M/M)

Chief Advisor / Monitoring / Analysis / Coordinator

Equipment: Analytical instruments, Consumables for pesticide residue analysis, Computers, Printers, etc.

Total US$344,054.26

Operational cost: US$ 246,354.89 (Until the end of July 2015)

Total Cost: 300 million Japanese Yen

2) Ethiopian side:

Counterparts personnel

Project space

Operational cost

Total Cost: US$336,604.78

2. Evaluation Team

Members of Evaluation Team

Japanese side

Designation	Name	Organization
Team Leader	Mr. Tomochika Motomura	Senior Advisor to the Director General Rural Development Department Japan International Cooperation Agency

	Cooperation Planning	Ms. Miki Otsuka	Agriculture and Rural Development Group 1 Team 1 Rural Development Department Japan International Cooperation Agency
	Evaluation Analysis	Mr. Teppei Okano	Consultant, Icons Inc.

Ethiopian side

Name	Organization
Dr. Tarekegn Berhanu	Lead Analytical Chemist, Agricultural Products Quality Monitoring and Pesticide Testing Laboratory, Ministry of Agriculture

Period of Evaluation	22 September 2015 – 1st October 2015	Type of Evaluation : Terminal Evaluation

3. Results of Evaluation

3-1 Verification of Achievement

(1) Level of the achievement of Outputs

Output1: Baseline data to implement pesticide residue analysis is accumulated and priority pesticide / agricultural commodities including coffee for analysis are selected.

- Achieved

The indicators of Output 1 have been achieved. Data concerning the circulation and the usage of pesticide in Ethiopia was collected and utilized for the selection of target pesticides and agricultural commodities including coffee. The screening methods of agricultural commodities have been discussed among the stakeholders. For the process, the Project obtained the statistical data which compiles the survey results about the cultivation status of agricultural commodities in Ethiopia and prepared a summary of growing areas and the usage status of pesticides. At the same time, the Project collected baseline data regarding implementation of pesticide residue analysis. Utilizing such data and information, Japanese Experts and C/P prepared a list of the target agricultural commodities including coffee beans and the combination of pesticides.

Output2: Validation of residue analytical method of target agricultural commodities with pesticide combination is established.

- Partly Achieved

The indicators of Output 2 have been partially achieved and it may require an extension of the Project period to achieve all the indicators. Three members of C/P who are in charge of analysis have mastered basic operation and basic maintenance manipulation of Gas Chromatography-Electro Capture Detector (GC-ECD). In addition, all C/P members acquired basic knowledge and techniques on residue analysis procedure from study protocol preparation, study implementation, study data interpretation and the way of discussion to further study planning. Also, C/P learned the documentation and presentation procedures through their daily activities. However, they have not yet acquired some of the necessary knowledge and techniques for the application experiment, such as how to decide the temperature of the column oven, how to decide on the temperature increase program and how to set the temperature of the injection port. As for sample reception and sample preparation, several technical staff members of C/P acquire the knowledge and skills for appropriate procedure. On the other hand, the validation has not yet been completed due to the delay in installing necessary

equipment and delay in dispatching a Japanese expert on Analysis.

Output3: Laboratory management to accumulate reliable analytical data is established.

- Partly Achieved

The indicators of output 3 have been partially achieved and it may require an extension period of the Project to achieve all the indicators. Indicator 3-1 has been achieved and appropriate records were documented and accumulated for a raw data book, log book of instruments, sample receiving/ shipping records and so on. However, activities concerning to the Indicator 3-2 are currently far behind the schedule and only 30 % of SOP preparation has been completed. At this time, 13 items have been identified as necessary articles for SOP preparation and draft versions for 5 items have been completed.

Output4: Residue analysis knowledge/technique/method obtained becomes applicable to agricultural commodities and other samples.

- Not Achieved

Both indicators of Output 4 have not been achieved and it is challenging to achieve the indicators by the end of the Project. C/P will not be able to have enough opportunity to accumulate experiences in of the whole process of the pesticide residue analysis until the completion of the Project. Under the current situation, C/P will not be capable of judging Maximum Residue Level (MRL), as they do not have enough opportunity to experience the whole process of the pesticide residue analysis under the instruction of Japanese experts. For the same reason, it is difficult for C/P to accumulate the results of recovery test in an appropriate manner. If the Project period was extended for one year, it is expected that the whole process of the pesticide residue analysis on coffee beans would be optimized and an adequate limit of quantity would be achieved to fulfill the required MRL for export to Japan.

Output5: Monitoring trial activity concerning coffee is conducted in pilot area using check sheet and supplemental chemical analysis.

- Nearly Achieved

Monitoring trial activity concerning coffee is conducted in pilot area using check sheet and supplemental chemical analysis. The indicator has almost been achieved and expected to be achieved entirely by the end of the Project. An applicable check sheet was prepared for use in a pilot area and the Project conducted a test run using the check sheet. C/P learned the supply chain of coffee beans and understood the check sheet management procedure for quality risk management of coffee beans. At the same time, C/P understood the role of government in the supply chain.

(2) Level of the achievement of Project Purpose

Project Purpose: The pesticide residue analytical capacity of the Quality Monitoring and Pesticide Testing Laboratory is strengthened.

The indicators of the Project purpose have not been achieved at this time and it is challenging to achieve the indicators by the end of the Project. This is because of delays of input, such as the provision of necessary equipment / consumables and dispatch of a Japanese expert. The failure of analytical instruments (GC-ECD) which occurred in 2015 also had considerable impact on the implementation of the activities. For these reasons, the technology transfer has been behind schedule and has not yet reached the target level at present. Although the capacity of C/P has steadily improved through the Project activity, the inspection based on

validation of coffee beans has not been implemented since the structure for the validation of residue analysis could not be established during the Project period (Indicator 1). Regarding the issuance of certificates, the reliability has not been secured due to the incompletion of the validation and lack of practical experience of C/P on the certification structure (Indicator 2). As for the capacity of reviewing and evaluating analysis reports from the coffee exporting companies, C/P utilizes their knowledge and techniques acquired through the Project on daily basis. However, the knowledge and techniques are still at a basic level and C/P are expected to acquire a higher level of expertise (Indicator 3).

3-2 Summary of Evaluation Results

(1) Relevance

The relevance of the Project is assessed as high.

The government of Ethiopia sets “Agricultural Development-led Industrialization (ADLI)” as the country’s key principle and highly prioritizes the stable expansion of agriculture and the rural development sector. Also, the government intends to accelerate the poverty reduction through economic growth stated in the “Plan for Accelerated and Sustained Development to End Poverty 2005/06-2009/10”and the qualitative improvement of the commodity circulation process has been prioritized in order to gain foreign currency through export promotion of agricultural commodities. In addition the Ministry of Foreign Affairs of Japan lists "Agriculture and Rural development” as one of the main assistance sector for Ethiopia in the "Country Assistance Program for the Federal Democratic Republic of Ethiopia”. Thus the Project consistent with the national policy of Ethiopia and Japanese aid assistance policy. On the other hand, MoA established the laboratory under the Plant Health Regulatory Directorate to improve the oversight to the export of agricultural commodities responding to the incident which occurred in 2008. The Project aims at the capacity development of the laboratory to enhance its ability for pesticide residue analysis and the purpose of the Project is in line with the needs of the counterpart.

(2) Effectiveness

The effectiveness of the Project is assessed as moderate.

The indicators of Project Purpose have not been achieved at this time and it is found that achieving the Project Purpose by the end of the Project is difficult. This is because of delays of input, such as the provision of necessary equipment / consumables and dispatch of a Japanese expert. The failure of analytical instruments had considerable impact on the implementation of the activities. On the other hand, the steady outcomes in technical transfer to the laboratory are brought about by the efforts and ingenuity of Japanese Experts. Currently C/P members have accumulated basic knowledge and technology of pesticide residue analysis. Moreover they operate the laboratory under the proper management (inventory control of consumables, preparation of tidy analytical environment and accumulation of result of activities) with high motivations. If the project period was extended, the project has to focus on the activity related to output 3 and output 4, such as the technology transfer on SOP preparation/update, the optimization of pesticide residue analysis process of coffee beans, and the attainment of the target figure of recovery rate. All outputs were designed to contribute to the achievement of the Project purpose aimed at capacity building of the laboratory and the relationship between the Project purpose and outputs is deemed as appropriate, thus there is high possibility to achieve the Project purpose by the end of the extension period of the Project

(3) Efficiency

The efficiency of the Project is assessed as moderate.

Output 1 has been achieved and Output 5 is expected to be achieved in the remaining period of the Project. The method of the validation has not been established regarding Output 2 and the SOP has not been prepared yet as to Output 3. About Output 4, C/P members are not capable to judge Maximum Residue Level (MRL) and to accumulate the result of recovery test in appropriate manner at this time. Thus Outputs 2 to4 are difficult to achieve before the end of the Project. The situation was caused by the delay of the inputs due to the reason such as custom declaration in Ethiopia, lack of the space for the installation of instruments, global supply shortage of high-grade helium gas and so on. On the other hand, the consistent result was observed on strengthening of pesticide residue analysis system through capacity development of C/P since the Project has been able to provide the careful and effective technology transfer.

(4) Impact

The impact of the Project is assessed as relatively high.

Overall Goal 1: The number of analyzable target agricultural products and pesticides of the Quality Monitoring and Pesticide Testing Laboratory is increased.

Since most of the Outputs and the Project purpose have not been achieved at this time, the probability of fulfilling the Indicator 1 of the Overall goal is difficult to judge. However, if the Project period was extended, the indicator is expected to be partially achieved. An analytical method which has high applicability (Multi-component simultaneous analysis method) was introduced. The basic procedure of the analytical method was applied to coffee beans and its effectiveness was confirmed. However the process is still on the basic stage. The capacity of the laboratory has not reached to an adequate level to establish necessary analytical method for the arbitrary combination of samples and pesticides.

Overall Goal 2: Effective oversight to the supply chain of agricultural commodities is established.

The indicator is expected to be achieved after the completion of the Project. The number of the incidents of excess chemical residue over the standard value found in coffee beans has declined and the situation must be applied for other agricultural commodities as well in the future operation of the laboratory.

Since the Project purpose have not been achieved, it is difficult to judge the probability of the achievement of overall. However, it was found that the technical foundation has been established toward the overall goal and, therefore if the Project period was extended and all the activities were implemented as planned, there is high possibility to achieve the Overall goal. To date the Project conducted the application tests for Tomato and Ethiopian cabbage. Also the C/P learned the overview of the analytical method of other agriculture commodities, such as flower, honey and sesame. Because the analytical method of coffee beans which C/P have acquired can be applied for wide range of agricultural commodities, therefore the skill and knowledge are expected to utilize for the establishment of appropriate analytical method for each target commodities. As to other positive ripple effect, the considerable decline of the violation case of coffee beans exported to Japan is deemed as a remarkable effect of the Project. This is because the export permission system is well-functioning under the support of the Project. Also the laboratory is becoming the best reference for all other laboratories in Ethiopia including university. Many visitors from within the country and abroad are coming to laboratory to share experiences and learn how to set a residue laboratory.

(5) Sustainability

The sustainability of the Project is assessed as moderate.

(1) Political Aspect

The qualitative improvement of commodity circulation process is prioritized in the national policy of Ethiopia aiming at acquisition of foreign currency through export promotion of agricultural commodities. It is one of the important agenda in development strategy of Ethiopia and the policy is expected to be continued.

(2) Organizational Aspect

The administrative document to define the role and responsibility of the laboratory was submitted and will be authorized by MoA. When the document was authorized, the function of the laboratory would be clarified and it would contribute securing the sustainability from organizational aspect. The laboratory currently carries out the recruitment of new staff and works on the organization reinforcement. If the Project period was extended, above situation would be improved and the sustainability from organizational aspect is expected to be secured.

(3) Financial Aspect

The government of Ethiopia allocated 1.9 million Birr (Approximately 11,227 thousand Japanese Yen) of budget for the laboratory in 2015, however there are some issue on the execution of the budget due to the absence of the service provider on the repair and maintenance work of analytical instruments. To keep the activities of the laboratory efficient after the completion of the Project, the Ethiopia side will be required to provide necessary equipment / consumables as well as maintenance cost of the equipment.

(4) Technical Aspect

C/P acquired basic knowledge and techniques of pesticide residue analysis. Developing the capacity with self-sustaining way after the completion of the Project is consider as a primary key to secure the sustainability. In this context, the deliverables such as SOP will be the important tools which guarantee the sustainability from technical aspect, therefore the Project required to continue the preparation of SOP in the extension period of the Project. If the Project period was extended, the technical transfer of SOP preparation/update would be completed and the sustainability from technical aspect is expected to be improved.

3-3 Contributing Factors to Realize the Effects and Inhibiting Factors to Problem-causing

(1) Contributing Factors

(i) Good communication among the Project members

Japanese experts established a good relationship with C/P and that contributes to the smooth implementation of the Project activities and effective technology transfers. C/P are encouraged to participate in many collaborative works, group discussions and collective knowledge creation throughout the process of activities.

(ii) Improvement of employment conditions of C/P

The contractual situation of all the laboratory staff has been changed from temporary basis to regular basis. The improvement of working conditions motivates the laboratory staff and encourages them to stay on in their positions. The technology transfer through the Project has relied on the retention of the C/P members because the technical capacity to be transferred to the laboratory depends on the development of these personnel. Such enhancement of working conditions has led to positive attitudes of C/P members and the laboratory to have a clear overview of future activities.

(iii) Clarification of the role of the laboratory
The role and responsibility of the laboratory were clarified at the time of the Mid-term review. Because of the clarifications, the laboratory has a clear vision and direction for the future as an inspection institute of Ethiopia which is responsible for the pesticide residue analysis of agricultural commodities. The administrative document for the clarification was submitted to the State Minister and the responsibility, the goal and the future plan of the laboratory will be defined after the authorization of the document.

(2) Constraining Factors
(i) Delay of the procurement of equipment and consumables
It took a long time to procure and purchase the necessary equipment and consumables for the pesticide residue analysis, which led to the delay of the Project progress. Also, the Japanese Experts on Analysis were not dispatched in a timely manner because of the time required to arrange the schedule of the experts. These delays have inhibited the achievement of Outputs and the Project purpose.

(ii) Instrument maintenance
Whenever serious instrument maintenance problems are encountered, contact with engineers in Egypt is required and sometimes getting a timely response is difficult.

(iii) Staff Recruitment and promotion
Currently only three analysts are engaged in the activities of the project with other supporting and leading staff. One of the analysts left permanently. To reduce the risk of the turnover, recruitment of new employees and promotion of present staff has to be considered.

3-4 Conclusion
From the perspective of the five evaluation criteria, the relevance of the Project is assessed as High since the strengthening of pesticide residue analysis system and capacity building for the laboratory staff are one of the high priorities for the Government of Ethiopia and the Project's target is in line with the national strategy. The effectiveness of the Project is deemed as Moderate. The Project purpose has not been achieved at this time and it required more time to reap a concrete result of the Project. The efficiency of the Project is assessed as Moderate. Most inputs that are necessary for the implementation of activities have been allocated as planned but the timing of input was not appropriate and that affected to the implementation process of the Project activity. The Project's impact is deemed as Relatively high since some challenge remains to achieve the overall goal. All the external conditions to achieve the overall goal also have to be fulfilled. The Sustainability of the Project is assessed as Moderate. The political and technical sustainability is expected to be secured. On the other hand organizational and financial sustainability need to be secured in the extension period of the Project. For further improvement of the Project in the reaming term of the Project and after completion of the Project, the Team recommends the measures presented in "3-5. Recommendations".

3-5 Recommendations
(1) During the first two years of the Project period, the delivery of the planned inputs such as equipment and consumables was affected by a variety of unforeseeable situations. For example, global decrease in supply of helium gas, regulations of Japan concerning the export of some imported agents, long process for proceeding import permits for agents by Ethiopian authorities. Consequently, the experts for pesticide residue analysis

who was planned to be dispatched after all the necessary equipment and consumables were procured, has not arrived as originally expected. As a result, the achievement has not reached to the level that was originally intended. However, the Project endeavored to carry out the activities by modifying schedule, instructing the technical contents utilizing existing resources, as well as taking the opportunities of training in Japan. After the necessary equipment was delivered in the laboratory and the analysis expert was dispatched in 2013, the project activities have caught up with the original plan and analytical skills have been favorably transferred to the C/P, making use of the fundamental knowledge and skills acquired during the first two years.
Still activities related to confirmation of extraction, cleanup method and analytical condition for instruments are necessary. Also accuracy and reliability of analysis needs to be assured through recording data of several recovery tests. In order to conduct these activities, it is necessary to extend the project period for one year so that the short-term experts will be able to train C/P to conduct the whole process of pesticide residue analysis and recovery tests for coffee and other selected agricultural commodities for several times during the extended project period in order to confirm the conditions of analysis and accumulate the accuracy and reliability data. Furthermore, through these activities, one year extension of the Project will enable C/P to acquire the methodology to confirm the process of pesticide residue analysis to be utilized after the termination of the Project, which will enhance the capability of the laboratory to develop with self-sustaining way as well as the sustainability of the achievement of the Project. In conclusion, the Joint Terminal Evaluation Team recommends the extension of the Project for a period of one year.

(2) In order to accomplish to transfer the necessary analytical techniques to the C/P as planned during the Project period, it is crucial for the Ethiopian side to guarantee that the analytical staffs of the Laboratory would have enough time to focus on the laboratory work. Currently, the C/P are required to attend the frequent meetings at MOA as its formal staffs, however, when they need to concentrate on their laboratory work especially during the experts are stationed, it is important for the Ethiopian side to take this into consideration and put aside enough time for the training of analytical staffs at the laboratory. It is also another suggestion for the management of the Laboratory that it shall notice the visitors to the Laboratory to make an appointment in advance so that the staffs can efficiently arrange the time for the necessary laboratory work as well as the laboratory tour for the visitors.

(3) Currently, there are three analytical staffs in the laboratory (one of them has been on research leave), and the Ethiopian side has been recruiting the new staffs, however there have not been qualified candidates so far. Therefore, it is critical for the Ethiopian side to speed up the recruitment as soon as possible to enhance the sustainability of the project output and to transfer the analytical techniques from the C/P effectively. Also, the recruit of the new staffs shall be important in terms of securing the human resources in the Laboratory, considering the recent tendency of the high mobility of human resources in Ethiopia.

(4) In the Project, the necessary analytical environment to conduct pesticide residue analysis has been established. At the same time, it is essential for the Laboratory to establish the stable system to supply the consumables and other necessary chemical reagent. Therefore the Ethiopian side needs to secure the procurement route as well as the necessary budget for purchasing these materials. For the Japanese side, there is the possibility of dispatching the short-term expert to support the Ethiopian side to establish the procurement route if necessary.

(5) The official document which clarifies the role and future plan of the Laboratory has been under procedure for the approval by the Ministry of Agriculture. In order to enhance the sustainability and strengthen the institutional stability, the Ethiopian side is suggested to continuously work on to the approval of the document during the one year of the extended project period

3-6 Lessons learned

(1) Appropriate project period

The project which aims to enhance the capacity of the pesticide residue analysis skills of C/P is required to achieve the transfer of high analytical techniques during the limited project period and at the same time to secure the sustainability of the Project output usually without a firm foundation in terms of both hard and soft aspects of the laboratory.

Therefore, the project period needs to be considered after the detailed research and observation of the existing regulation/ system of the pesticide residue analysis/ management as well as the analytical environment and equipment of the laboratory in advance in order to set the appropriate project period.

(2) Reliable procurement of equipment and consumables

The Project had started without enough facility of the laboratory and it took almost two years to procure and purchase necessary equipment/ consumables for the pesticide residue analysis, which could be the root factor for the delay of the Project progress.

It is envisaged that the project regarding to the technical transfer of the pesticide residue analysis usually breaks out after the related incidents with a hurry to launch the project as soon as possible without securing the enough environment for the analytical work in the laboratory. In that case, the project would not be able to make the most of its project period, therefore it is required to start the project with the necessary laboratory equipment and consumables, securing the reliable procurement route.

(3) Suitable project design for the pesticide residue management

In the case of the pesticide management administration of Japan from 1940s, the pesticide registration, exclusion of the inferior pesticides from the market, and extension and monitoring of the appropriate usage of the pesticide have been institutionally developed in advance of the activities related pesticide residue analysis. For the project aimed to strengthen the capacity of pesticide residue analysis and system, it is required to review the whole process of the appropriate usage and management of the pesticide, and make sure all of the related organizations. After clarifying the issues on the whole flow, it is important to decide the scope of the Project. If possible, when the Project is developed, it is necessary to research about the situation of the pesticide usage, pesticide registration, the extension system and the overall flow of the pesticide residue testing in the target country in order to design the project which is suitable to the situation of the targeted country.