

Country Name	Determine the Outbreak Mechanisms and Development of a surveillance Model for Multi-Drug Resistant Bacteria
Socialist Republic of Viet Nam	

I. Project Outline

Background	<p>The emergence of multi-drug resistant bacteria, under the backdrop of antibiotic misuse in the fields of healthcare as well as livestock and fishery industries, became a global concern over the outbreak of refractory communicable diseases. Since the bacteria spread beyond national boundaries by globalized transfer of humans and products, global-scale countermeasures should be taken for preventing the emergence and spread of antimicrobial-resistant (AMR) bacteria. According to the previous studies on Expanded-Spectrum Beta-Lactamase (ESBL)-producing <i>Escherichia coli</i> (<i>E. coli</i>) in rural areas of the Red River Delta region, it was considered that Viet Nam had higher prevalence and spread of ESBL-producing bacteria than in other countries, and it was concerned that the situation would further become serious. Though ESBL-producing <i>E. coli</i> was not pathogenic under normal conditions, the chemotherapy for infectious diseases would get severe damages, given that genetic characteristics were transferred to pathogenic bacteria; thus, this was regarded as an emerging global threat. For these reasons, it was urgently needed to grasp the actual situation of the spread of AMR bacteria in Viet Nam and to conduct researches that would contribute to the containment of it.</p>		
Objectives of the Project	<p>In Viet Nam, through clarifying the wide spread mechanisms of multi-drug resistant bacteria, developing a comprehensive monitoring system for antibiotics residue and antibiotic-resistant bacteria over the process of food chain, and training researchers and technical staff related to food safety monitoring, the project aims at the enhancement of the research capacity of Vietnamese research institutes, thereby contributing to further expansions of related researches among related organizations and ministries.</p> <ol style="list-style-type: none"> Expected Overall Goal: N.A. Project Purpose: Research capacity to continuously monitor the multi-drug resistant bacteria is strengthened. 		
Activities of the Project	<ol style="list-style-type: none"> Project Site: Viet Nam (Whole land) Main Activities: (i) To clarify the wide spread mechanisms of multi-drug resistant bacteria in Viet Nam microbiologically, pharmacologically, and anthropologically, (ii) to develop a comprehensive monitoring system for antibiotics residue and antibiotic-resistant bacteria over the process from food production to intake, (iii) to train researchers and technical staff related to food safety monitoring at the targeted research institutes. Inputs (to carry out above activities) 		
	Japanese Side	Vietnamese Side	
	<ol style="list-style-type: none"> Experts: 1 person (long-term) 288 persons (short-term) Trainees Received: 35 persons Equipment: Ion Personal Genome Machine Sequencer, Real-time PCR System, High Speed Refrigerated Micro Centrifuge, High-speed Micro Centrifuge, Bioanalyzer, Automated Microbial Identification System, Geldoc XRC Plus Image Lab System, Clean Bench, etc. Operation cost 	<ol style="list-style-type: none"> Staff Allocated: 27 persons Land and facilities: project office, laboratories, and research facilities in implementing agencies Operation cost 	
Project Period	March 2012 – March 2017	Project Cost	(ex-ante) 302 million yen, (actual) 360 million yen
Implementing Agency	National Institution of Nutrition (NIN), Institute of Pasteur in Nha Trang (IPNT), Institute of Hygiene and Public Health (IHPH), Thai Binh Medical University (TBMU), Can Tho University (CTU), Binh Dien Wholesale Market Company (CBD)		
Cooperation Agency in Japan	Osaka University		

II. Result of the Evaluation

<Special Perspectives Considered in the Ex-Post Evaluation>

[Assessment of achievement level of the Expected Overall Goals]

For this SATREPS project, no Overall Goal was set forth in the Record of Discussions, but the Super Goal, “The spread of multi-drug resistant bacteria is prevented in Viet Nam”, was set. Considering the discussions made at the Terminal Evaluation Study, in order to assess the achievement level of the expected Overall Goal as one of the expected positive impacts, “Related researches are expanded among related organizations, ministries to contribute to strengthening of AMR control” should be verified as actions for social application of the research outputs/outcomes of this project. Thus, in this ex-post evaluation, the achievement of this Goal can be examined by (i) whether the administrative system for AMR control, such as a practice of new laws and decisions, has been placed; and (ii) whether the monitoring system of AMR bacteria and residual antimicrobials is officially institutionalized by utilizing the monitoring manuals developed by the project, as Supplementary Information 1 and 2 respectively.

1 Relevance

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

At the time of ex-ante evaluation, this project was consistent with the development policy of the health sector in Viet Nam, namely “The Health Sector Five-Year Plan (2011-2015)” which prioritized food safety and hygiene by strengthening the quarantine system and capacity development of human resources engaged in the system. Furthermore, “The Health System Development Master Plan (2010-2020)” also

¹ SATREPS: Science and Technology Research Partnership for Sustainable Development

stated an importance of combatting the infectious diseases.

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

At the time of ex-ante evaluation, this project was consistent with Viet Nam’s development needs to improve the research capacity of related institutions in order to cope with infectious diseases as described in “Background” above.

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

At the time of ex-ante evaluation, the Country Assistance Program for Viet Nam (2009) aimed at “Rural Development and Improvements in Livelihood” (under “Improvements in Living and Social Conditions and Corrections of Disparities”) and committed to assistance toward the infectious disease control and strengthening the quarantine system to secure the food safety and hygiene.

<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>

By the project completion, the project partially achieved its purpose, “Research capacity to continuously monitor the multi-drug resistant bacteria is strengthened”. Out of 18 publications accepted by peer-reviewed international journals, 8 publications were authored by Vietnamese researchers (Indicator 1). The monitoring manuals developed by the project were approved by an official review committee and monitoring activities have continued accordingly. Discussions regarding practical application of research outcomes on the basis of the comprehensive report of the project were started by the Ministry of Health (MOH) as well as among organizations concerned (Indicator 2). However, in terms of the institutionalization of the monitoring activities for AMR and antibiotics residues, the practical discussions were not commenced by the time of project completion (Indicator 3).

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

The project effects on research outputs have continued since the project completion. Key research outputs, such as “data from research for reference” and “Standard Operation Procedure (SOP)”, developed by the Project, have been utilized not only by implementing agencies but also by other international organizations or hospitals. By utilizing the research facilities and equipment provided by the project, NIN, IHPH, IPNT and TBMU have further continued researches. One example is that NIN started assessing the usage of antibiotics in livestock and fishery industries for the period from 2019 to 2023 in order to propose intervention methodology. At the same time, most of those agencies, NIN, IHPH, IPNT, TBMU and CTU started new research projects based on the research outputs by the project. One of the examples is the study by CTU on food pathogens and antibiotic resistant bacteria from 2019 to 2021. It should be well noted that, the establishment of the core group which includes NIN, IHPH, IPNT and other organizations, named as “the working group to develop a plan to prevent antibiotic resistance in the community in the period 2021-2025”, has contributed not only to further strengthening of the research capacity but also to expanding the research outcome.

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

The expected Overall Goal, “Related researches are expanded among related organizations, ministries to contribute to strengthening of AMR control” has been partially achieved by the time of ex-post evaluation. Several decisions related to AMR control in healthcare and livestock were issued by the government (Supplementary Information 1). Furthermore, there are some new regulation and guidelines which were drafted based on the information reported from implementing agencies. Much efforts have been made by the Ministry of Agriculture and Rural Development (MARD) to establish a national monitoring program of AMR bacteria and residual antimicrobials in animal and food. However, in order to make the monitoring system officially institutionalized, it is required further to set up personnel system, to select monitoring criteria, to determine the sampling method, sample size, monitoring location as well as to seek for financial resources to establish national monitoring program of AMR bacteria and residual antimicrobials in animal and food. In addition, it is expected that the involvement of those implementing agencies under MOH should be encouraged in the institutionalization process, so that the research results by those agencies are well incorporated into the subject monitoring system. (Supplementary Information 2).

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

As ripple effects, the project has contributed to the capacity development of researchers in those organizations not directly included in the project. Through the seminars and workshops, the knowledge of drug resistant bacteria and laboratory technology have been expanded to those researchers in government agencies, officers of food safety management organizations as well as lecturers of universities.

<Evaluation Result>

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

Achievement of Project Purpose and Expected Overall Goal

Aim	Indicators	Results
(Project Purpose) Research capacity to continuously monitor the multi-drug resistant bacteria is strengthened.	Indicator 1: At least 1 research article, of which first author is a Vietnamese researcher, is accepted by peer-reviewed international journals in each research theme*. *microbiology, pharmaceutical sciences, and anthropology	Status of the Achievement: Achieved (Continued) (Project Completion) • By the project completion, 18 publications were accepted by the peer-reviewed international journals under the research themes on microbiology and pharmaceutical sciences with the analysis from an anthropological perspective. Out of those, 8 publications were authored by the Vietnamese researchers. (Ex-post Evaluation) • It was confirmed that after project completion, several publications of which authors are Vietnamese researchers (from NIN) were accepted by peer-reviewed international journals.
	Indicator 2: Discussions are commenced with MOH for the practical application of research outcomes on the basis of the comprehensive report of the project.	Status of the Achievement: Achieved (Continued) (Project Completion) • A draft of “Multi-drug Resistant Bacteria in Viet Nam – A Comprehensive Report of the SATREPS Project” was authorized at the Joint Coordinating Committee (JCC) meeting on May 31, 2016. Discussions were commenced with MOH and several informal comments were made by MOH and MARD for the practical application of research outcomes, such as the necessity of a concrete implementation scenario with the role-sharing arrangement of MOH and the MARD, cost, time, etc.

		(Ex-post Evaluation) <ul style="list-style-type: none"> In order to synthesize and analyze reports regarding antibiotic usage on AMR in the period from 2013 to 2019 as well as to develop the recommendation policy on AMR, the core group, named as “the working group to develop a plan to prevent antibiotic resistance in the community in the period 2021-2025”, was established by the General Department of Preventive Medicine under MOH in September 2019. The core group includes NIN, IHPH, IPNT and other organizations. 																												
	Indicator 3: Discussions are commenced with organizations concerned for the institutionalization of the monitoring system of AMR bacteria and residual antimicrobials (incl. integration into existing food safety monitoring system).	Status of the Achievement: Not Achieved (Continued) (Project Completion) <ul style="list-style-type: none"> Monitoring activities for ESBL-producing <i>E.coli</i> and Ampicillin (an antibiotics residue) continued since June 2014 by NIN, IPNT and IHPH. In February 2015, an official review committee consisting of MOH and MARD approved the content of the monitoring manuals from a technical perspective. By the project completion, some practical discussions commenced with MOH, MARD and the recommendations were made for better AMR control and continuous utilization of research outputs on food safety after project completion. However, practical discussions for the institutionalization of the monitoring activities for AMR and antibiotics residues have not been commenced. (Ex-post Evaluation) <ul style="list-style-type: none"> MARD has planned to establish national monitoring program of AMR bacteria and residual antimicrobials in animal and food with support from international donors, Food and Agriculture Organization of the United Nations (FAO) and the Fleming Fund. The kick-off meeting among MOH, MARD and FAO was organized at the end of 2019. The SOP developed by the project was shared to Department of Animal Health (DAH) of MARD, the core technical member to formulate the monitoring system of AMR bacteria and residual antimicrobials, and has being applied in term of isolation process, screening for resistant bacteria in their laboratories. 																												
(Expected Overall Goal) Related researches are expanded among related organizations, ministries to contribute to strengthening of AMR control.	Supplementary Information 1: The administrative system for AMR control, such as practice of new laws and decisions, is placed.	(Ex-post Evaluation) Achieved Following decisions related to AMR control in healthcare and livestock were issued.																												
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	Supplementary Information 2: The monitoring system of AMR bacteria and residual antimicrobials is officially institutionalized by utilizing the monitoring manuals developed by the project.	(Ex-post Evaluation) Not achieved <ul style="list-style-type: none"> In order to make the system officially institutionalized, further undertakings such as, to set up personnel system, to select monitoring criteria, to determine the sampling method, sample size, and monitoring location as well as to seek for financial resources, are needed, but they have not materialized yet. In addition, it is expected that the involvement of those implementing agencies under MOH should be encouraged in the institutionalization process, so that the research results by those agencies are well incorporated into the monitoring system of AMR bacteria and residual antimicrobials in food and animal. 																												

Source : JICA documents and data and information obtained through questionnaire and interviewed with implementing agencies

3 Efficiency

The project period was as planned, while the project cost exceeded the plan (ratio against plan: 100% and 119%, respectively). The outputs of the project were produced as planned. Therefore, the efficiency of the project is fair.

4 Sustainability

<Policy Aspect>

“The Health Sector Five-Year Plan (2016-2020)” prioritizes food safety and hygiene. Furthermore, the Aide Memoire of “Multi-Stakeholder Engagement to Combat Antimicrobial Resistance in Vietnam”, signed in 2015 among several ministries and some development partners in Viet Nam, has been still valid. It prescribes the roles and activities, which are supposed to be borne by each stakeholder.

<Institutional/Organizational Aspect>

All of implementing agencies involved in the project have allocated the sufficient number of staff for relevant departments, so that they

can continue research activities using the research outputs by the project as well as to operate and maintain facilities/equipment procured under the project. There is a mechanism in a form of seminars, workshops, and meetings for implementing agencies to share and report research results to other government authorities who can incorporate them into their undertakings as scientific evidences or into the policy formulation. New researches developed by using the research output of the project have often been reported to government authorities as well.

<Technical Aspect>

Through continued research activities by using the equipment and facilities, researchers of the implementing agencies have maintained and improved their technical capacities necessary for on-going researches as well as for equipment maintenance. Workshops, seminars have also contributed for researchers and officers of government authorities to sustain and further improve their scientific knowledge.

<Financial Aspect>

All of implementing agencies involved in the project have continued to allocate necessary budget for AMR control related researches. The source of funds varies. Some institutions have obtained the financial resources from international organizations, such as Danish International Development Agency, World Health Organization and JICA. MOH has allocated some budgets for AMR control related activities as well as for AMR monitoring in food under the food safety management project. As for the operation and maintenance of the research facilities and equipment installed by the project, the sufficient budget has been allocated either by the government or by themselves.

Budget for operation and maintenance of the research facilities and equipment (Unit of currency: Viet Nam Dong in million)

Name of institutes	Financial resources	2017	2018	2019	2020
NIN	MOH	40.0	48.0	63.0	n.a.
IHPH ⁽¹⁾	own	2.0	2.0	1.0	15.0
TBMU	own	3.0	3.0	3.0	3.0
CTU ⁽²⁾	own	n.a.	n.a.	n.a.	n.a.

Source: NIN, IHPH, TBMU and CTU

Note: (1) IHPH maintains a refrigerator and a freezer. The refrigerator was broken in 2019 and its repair cost was included in 2020.

(2) CTU secures financial resources whenever the equipment becomes out of order. The equipment has been maintained in good condition.

<Evaluation Result>

Therefore, the sustainability of the effects through the project is high.

5 Summary of the Evaluation

The project partially achieved the Project Purpose, “Research capacity to continuously monitor the multi-drug resistant bacteria is strengthened”. Although the research outcomes were utilized, the practical discussions were not commenced in terms of the institutionalization of the monitoring activities for AMR and antibiotics residues. After the project completion, through the working group to develop a plan to prevent antibiotic resistance in the community, the project effects on research outputs continued and contributed further to the expected positive impact, in expanding the related researches among related organizations and ministries, and in strengthening the AMR control. As for sustainability, there was no problem in policy, institutional/organizational, technical, and financial aspects. As for efficiency, the project cost exceeded the plan.

Considering all of the above points, this project is evaluated to be satisfactory.

III. Recommendations & Lessons Learned

Recommendations for Implementing Agency:

- As main regional research institutes in Viet Nam, NIN, IHPH and IPNT, continue developing related researches and maintaining the reporting mechanism to incorporate scientific evidences into the policymaking. In view of the need to monitor the AMR control and the importance of food safety, MOH and MARD should take prompt action to support lower level institutes as well as to continue strengthening collaboration with the related ministries to have more practical and national-level dialogue.

Lessons Learned for JICA:

- At the project formulation process, full consideration should be given to the organizational structure of project’s implementing agencies as well as their relations to the respective government agencies, especially in case that the project effect is expected to contribute to the policymaking or the institutionalization of national system. Specifically, the project should consider carefully to include the agency/ institutes into the project framework, which may play important role for realization of project outcome. It was pointed out by the study that the implementing agencies under MOH have had a limited involvement in the process of institutionalization monitoring system of AMR bacteria and residual antimicrobials in food and animal for which another government organization known as MARD is directly responsible.



