Country Name	Science Teacher Education Project (STEPSAM2) (2008-2012 Project)	Science Teacher Education Project (STEPSAM2) (2008-2012 Project)			
Kingdom of Cambo	The Project for Educational Resource Development in Science and Mathematics at the Lower Secondary Level (2013-2016 Project)				
I. Project Outline					
Background	In Cambodia, the education sector reform had been promoted under the Sector-wide Approach since 2000, and the net enrolment rate in primary education dramatically improved to 92%, which was the highest level among the Association of Southeast Asian Nations (ASEAN) countries. However, the retention rate in primary education was only 59.7%, which was the lowest level among the ASEAN countries. In addition, lack of logical and critical thinking and application ability and the low quality of science and mathematics lessons, which would have hampered industrial and economic development as well as other opportunities in the long run, were identified through the program formulate study conducted by JICA. In response, it was necessary to improve the quality of science and mathematics lessons in primary and lower secondary education in the country.				
	[2008-2012 Project] Through trainings on Lesson Study (LS) and Inquiry-Based Lesson (IBL) for national trainers, trainer's trainings on science by national trainers at all Provincial Teacher Training Centers (PTTCs) and Regional Teacher Training Centers (RTTCs), implementation of LS and experiment by RTTC and PTTC trainers, formulation of Inservice Training (INSET) Implementation Plan, and development of handbooks about LS and IBL, the project aimed at improving the quality of teacher training on science in target areas, thereby contributing to enhancement of the quality of teaching capacity of science teachers in the areas.				
Objectives of the Project	<ol> <li>Overall Goal: The quality of teaching capacity of science teachers is enhanced in target areas.</li> <li>Project Purpose: The quality of Teacher Training (Pre-service Training (PRESET) and INSET) on science is improved in target areas.</li> </ol>				
	[2013-2016 Project] Through development of Teacher's Guide, trainings for the introduction of the Guide for teachers, revision of the Guide based on its practice at a field level, and formulation and implementation of INSET programmes, the project aimed at strengthening the foundation for Ministry of Education Youth and Sports (MoEYS) to support teachers for science and mathematics lesson improvement at the lower secondary school level, thereby contributing to dissemination of the educational resources developed by the project to other areas through training programmes conducted by MoEYS.				
	Overall Goal: The educational resources developed by the project are disseminated to other areas the training programmes conducted by MoEYS. Project Purpose: The Foundation for MoEYS to support teachers for science and mathematics is improvement at the lower secondary level is strengthened.	rough lesson			
Activities of the Project	<ol> <li>Project Site: [2008-2012 Project]</li> <li>18 PTTCs (Phnom Penh Special Economic Zone, provinces of Kampong Cham, Kandal, Prey Veng, Takeo, Siem Reap, Banteay Meanchey, Kompong Chhang, Pursat, Svay Rieng, Kampot, Preah Sihanouk, Kampong Speu, Kratie, Kampong Thom, Preah Vihear, Stung Treng, Battambang)</li> <li>6 RTTCs (Phnom Penh Special Economic Zone, provinces of Kampong Cham, Battambang, Kandal, Prey Veng, Takeo)</li> <li>[2013-2016 Project]</li> <li>6 RTTCs (Phnom Penh Special Economic Zone, provinces of Kampong Cham, Battambang, Kandal, Prey Veng, Takeo)</li> <li>Main activities: [2008-2012 Project]</li> <li>1) Trainings on LS and IBL for national trainers, 2) Trainer's trainings on science by national trainers at all RTTCs and PTTCs, 3) Implementation of LS and experiment by RTTC and PTTC trainers, 4) Formulation of INSET Implementation Plan, 5) Development of handbooks about LS and IBL, etc.</li> <li>[2013-2016 Project]</li> <li>1) Development of Teacher's Guide, 2) Trainings for the introduction of the Guide for teachers, 3) Revision of the Guide based on its practice at a field level, 4) Formulation and implementation of INSET programmes, etc.</li> <li>3. Inputs (to carry out above activities) Japanese Side</li> <li>2008-2012 Project]</li> <li>10 Experts: 18 persons</li> <li>21 Trainers received: 12 persons</li> <li>22 Land and facilities: an office space in MoEYS and meeting/ class rooms for training, seminars, and workshops in National Institute of Education, RTTCs, and PTTCs</li> <li>23 Lord expenses: cost for project printer, etc.</li> <li>24 Lord expenses: cost for project printer, etc.</li> </ol>				

	<ul> <li>[2013-2016 Project]</li> <li>1) Experts: 12 persons</li> <li>2) Equipment: PCs, copy machine, etc.</li> <li>3) Local expense: cost for project activities</li> </ul>		[2013-2016 Project]					
			1)	) Staff allocated: 115 persons				
			2)	Land and facilities: a project office in MoEYS and				
				facilities for training sessions/seminars in Regional				
				Teacher Training Centers				
			3)	Local expenses: utility cost				
Project Period	[2008-2012 Project]		[20	08-2012 Project]				
	September 2008 – August 2012		(ex-	-ante) 385 million yen, (actual) 438 million yen				
	[2013-2016 Project]	Project Cost	[20	13-2016 Project]				
	June 2013 – May 2016(Extended		(ex-	-ante) 551 million yen, (actual) 519 million yen				
	period- May 2016)							
Implementing Agency	[2008-2012 Project] Ministry of Education Youth and Sports (MoEYS), National Institute of Education (NIE),							
	Regional Teacher Training Center (RTTC), Provincial Teacher Training Center (PTTC)							
	[2013-2016 Project] MoEYS, RTTC, NIE							
	[2008-2012 Project]							
Cooperation Agency	PADECO Co., Ltd., Hiroshima University							
in Japan	[2013-2016 Project]							
	PADECO Co., Ltd.							

# II. Result of the Evaluation

[Special Perspectives to be considered]

(Verification of Continuation Status of the Project Effects for the 2013-2016 Project)

The status of the verifiable indicators for the Project Purpose of the 2013-2016 Project at the ex-post evaluation were verified as the verifiable indicators for the Overall Goal since the project aimed at approval of the Teacher's Guide and the contents of in-service training for teachers by MoEYS as the Project Purpose at the time of project completion and the utilization of the Guide and the performance of training programs using the contents at the time of ex-post evaluation.

1 Relevance

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

The projects were consistent with Cambodia's development policies such as the "Rectangular Strategy–Phase II" (2008) positioning human resource development as one of its strategies and emphasizing education sector as a priority, the "Education Strategic Plan (2006-2010) and the "Education Sector Support Project" (2006-2010) clarifying the importance of teacher trainings to improve the quality and efficiency of education, and the "Education Strategic Plan" (2009-2013) putting capacity development of education staff at all levels as the key component and highlighting "Development of Pre and In-service Teacher Training" as one of five prioritized programs. <<Consistency with the Development Needs of Cambodia at the Time of Ex-Ante Evaluation >

The projects were consistent with Cambodia's development needs of improving the quality of science and mathematics lessons in primary and lower secondary education.

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

The projects were consistent with the "Country Assistance Program for the Kingdom of Cambodia" (2002) setting "support to socially vulnerable people" including education, as one of the priority areas, and also with the "Country Assistance Program for the Kingdom of Cambodia" (2012) listing "promotion of social development" as one of the priority areas. <Evaluation Result>

In light of the above the releva

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

2 Effectiveness/Impact

[2008-12 Project]

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

The Project Purpose was achieved by the time of project completion. Through the project, lesson plans and handbooks about IBL and LS on science were developed, and national trainers were fostered enough to provide lessons about IBL and LS on science following the plans and the handbooks. As a result, the quality of science lessons by RTTC and PTTC trainers was improved (Indicator 1), and the quality of science lesson plans of schools in INSET target schools was also considered to be enhanced (Indicator 2).

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

The project effects have continued since project completion. Upon interviewing project stakeholders about science lessons at Teacher Education Colleges (TECs), NIE, RTTCs, and PTTCs, all reported that the quality of the lessons has been significantly enhanced. For instance, before the project, Cambodia faced a difficulty in defining the notion of science education, and national trainers provided science lessons without enough knowledge in the subject. The project addressed such problems by introducing IBL and LS with their lesson plans and handbooks. Furthermore, it was also reported that teachers at INSET-introduced schools have continuously conducted INSET and that the quality of their science lessons and plans has been notably improved.

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

The achievement status of the Overall Goal could not be verified at the time of ex-post evaluation. Although being recorded for teaching and learning purposes such as online lessons, videotaped lessons have not rigorously used to assess the lessons. However, it was presumed that the Overall Goal has been achieved to a certain extent, as the interviewees for the ex-post evaluation reported that the quality of teaching capacity of science trainers and teachers at primary and lower secondary levels has been enhanced. The reason for this was because the project effects have still continued, which produced the following positive impacts: 1) development of innovative habit for teachers to utilize all available materials in their classes, 2) heightening of basic teaching capacity of teachers, 3) positive feedbacks or reactions from primary and lower secondary students, 4) more opportunities to discuss and exchange teaching experiences among teachers of LS and IBL in regular working group meetings, and 5) integration of LS and IBL into New Generation Schools (NGSs)<sup>1</sup> and education

<sup>&</sup>lt;sup>1</sup> NGSs were established in 2014 as autonomous public schools with a mandate to innovate education system and improve educational quality. With financial

#### curriculum.

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

Some other positive impacts were observed at the time of ex-post evaluation. To illustrate, TEC in Phnom Penh has been developing a co-teaching method based on the project outputs, spending one year already. Moreover, the project successfully created a positive culture in Cambodia's science education. As the result of the project, national trainers and teachers came to understand the importance of delivering science lessons with preparation, implementing experiments in science classes, and applying a student-centered method. With such enthusiasm, teachers have continuously conducted research about science and expanded its knowledge individually or in a group (MoEYS has allowed each school to have a group of teachers to discuss and exchange teaching experiences). It should be further noted that there are even some teachers who have replicated LS and IBL to other subjects such as geography and history, according to TEC in Phnom Penh.

### [2013-16 Project]

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

The Project Purpose was achieved by the time of project completion. Through the project, Teachers' Guide and INSET contents (a training implementation manual and a set of handouts) were developed, and MoEYS officially approved the use of them (Indicator 1 and 2). Then, the Guide and INSET contents were distributed to all schools in the target provinces.

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

The project effects have continued since project completion. The Teacher's Guide and INSET developed by the project and approved by MoEYS have been continuously used at all schools in the target provinces.

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

The Overall Goal has been achieved at the time of ex-post evaluation. After project completion, 5,000 copies of Teacher's Guide were produced and distributed to non-target schools by MoEYS with a support of the World Bank. INSET contents were also distributed to all RTTCs and TECs and further to teachers who attended trainings there. As a result, the Guide and INSET contents have been used at lower secondary institutions (Indicator 1). However, it should be noted that there are some teachers, particularly in rural schools, who need to spend their own money on photocopying these documents. Training programmes based on the Teacher's Guide and INSET contents have been also performed at all lower secondary institutions (Indicator 2). Furthermore, through observations at the field survey, it was confirmed that LS, IBL, their handbooks, and the Guide have positively influenced teachers' performance and motivation in classrooms at primary and secondary education. On the other hand, it should be noted that the quality of science class at schools in rural areas has been relatively low, regardless of teachers' quality, due to the shortage of labs and experiment materials brought by the lack of the budget. <Other Impacts at the time of Ex-post Evaluation>

No other positive or negative impact was observed at the time of ex-post evaluation.

## <Evaluation Result>

Therefore, the effectiveness/impact of the two projects is high.

Achievement of Project Purpose and Overall Goal						
Aim	Indicators	Results				
[2008-12 Project]						
(Project Purpose)	1. The quality of science lesson of RTTC and	Status of the Achiev	vement: Achieved	(Continued)		
The quality of Teacher	PTTC trainers marks more than 3 points on a	(Project Completion	n)			
Training (Pre-service	1-4 scale.	• As shown in the table below, the quality of science lessons of RTTC and				
Training (PRESET) and		PTTC trainers marked more than 3 points.				
INSET) on science is			R	ГТС		PTTC
improved in target areas.		2008 (baseline)		3.0		2.4
		2012 February	3	3.2		3.2
		(Ex-post Evaluation	1)			
		<ul> <li>Upon interview</li> </ul>	ving project stakeh	olders about s	science	e lessons at TECs,
		NIE, RITCs, a	nd PITCs, all repo	orted that the c	quality	of the lessons has
	2. The melity of action to have also of	been significant	tly enhanced.	(Cantinual)		
	2. The quality of science lesson plan of schools in target schools for INSET	(Project Completion	n)	(Continued)		
	senoors in target senoors for invsit i	<ul> <li>The quality of s</li> </ul>	cience lesson nlan	of schools in I	NSET	target schools was
		considered to b	e enhanced.	or sentoors in r		unger sentoois was
		[Quality of science	lesson plan of scho	ools in INSET	target	schools]
			Objective	Organizatio	on	Activity
		Results of lesson	observation by the	project		-
		2008 (baseline)	2.3		1.5	1.8
		2011 May	2.1		1.4	1.6
		Results of lesson	plan assessment by	national traine	ers	
		2012 January	2.7		2.5	2.5
		Note: As lesson pla	an assessment by n	ational trainers	s was	conducted in 2012
		for the first time, th	ne results were cor	npared to that	of less	son observation by
		the project.				
		(Ex-post Evaluation	1)			

supports from the Government of Cambodia, NGSs operates their labs better and conducts more experiments than other public schools.

(Overall Goal) The quality of teaching capacity of science teachers is enhanced in target areas.	1. The scores of the assessment of videotaped lessons (of trainers and teachers at primary and lower secondary level) are improved based on the scores of Feb. 2010.	<ul> <li>According to the interviewees for the ex-post evaluation, teachers at INSET-introduced schools have continuously conducted INSET and the quality of their science lessons and plans has been notably improved</li> <li>Status of the Achievement: Not verified (Ex-post Evaluation)</li> <li>As videotaped lessons have not rigorously used to assess the lessons, the indicator could not be verified. However, according to the interviewees for the ex-post evaluation, the quality of teaching capacity of science trainers and teachers at primary and lower secondary levels has been enhanced.</li> </ul>			
[2013-16 Project]					
(Project Purpose)	1. Teacher's Guide for science and	Status of the Achievement: Achieved (Continued)			
The Foundation for	mathematics lesson improvement at the	(Project Completion)			
MoEYS to support	lower secondary level is approved by	• MoEYS officially approved the use of Teacher's Guide in PRESET,			
teachers for science and	MoEYS.	INSET, and lower secondary schools.			
mathematics lesson		(Ex-post Evaluation)			
improvement at the lower		Refer to the Indicator 1 for the Overall Goal			
secondary level is	2. In-service training contents to introduce	Status of the Achievement: Achieved (Continued)			
strengthened.	Teacher's Guide to lower secondary science	(Project Completion)			
	and mathematics teachers is approved by	• MoEYS officially approved INSET contents (a training implementation			
	MoEYS.	manual and a set of handouts).			
		(Ex-post Evaluation)			
		Refer to the Indicator 2 for the Overall Goal			
(Overall Goal)	1. Status of the use of developed Teacher's	(Ex-post Evaluation) Achieved			
The educational resources	Guide	• 5,000 copies of Teacher's Guide were produced and distributed to non-			
developed by the project		target schools by MoEYS with a support of the World Bank, and they have			
are disseminated to other		in orientation trainings			
areas through training	2 Performance of training programmes	(Ex-post Evaluation) Achieved			
programmes conducted by	implemented by RTTC trainers	• Training programmes based on the Teacher's Guide and INSET contents			
MoEYS.	implemented by ferre duments	have been performed at all lower secondary institutions in both the target			
		provinces and non-target provinces.			
Source : Terminal Evaluation	ion Report, Project Completion Report, Const	ultation Report, Questionnaire and interview to TTD, TEC, and RTTCs.			
3 Efficiency					
For the 2008-12 Project	ct, although the project period was within	n the plan (ratio against plan: 100%), the project cost slightly exceeded			
he plan (ratio against plan: 114%). For the 2013-16 Project, even though the project cost was within the plan (ratio against plan: 94%).					

the plan (ratio against plan: 114%). For the 2013-16 Project, even though the project cost was within the plan (ratio against plan: 94%), the project period slightly exceeded the plan (ratio against plan: 103%). The outputs were produced as planned.

Therefore, the efficiency of the overall projects is fair.

#### 4 Sustainability <Policy Aspect>

The "Education Strategic Plan" (2019-2023) assures that the improvement of the quality of science and mathematics education, especially at primary and lower secondary education, is the sectoral development and reform priority of the government of Cambodia and MoEYS. Additionally, the higher policy framework, such as the "Education Road Map 2030" (2019-2030), supports the "Education Strategic Plan" in the long run. As the project aimed to enhance the quality of science and mathematics lessons, it has been endorsed by such national policies.

<Institutional/Organizational Aspect>

Since project completion, there have been some changes in the organizational structure/setting to improve the quality of teaching at primary and lower secondary education. For example, Phnom Penh and Battambang RTTCs were upgraded into TECs in the period of the "Education Strategic Plan" (2014-2018) to accommodate developed basic teacher trainings from 12+2 (primary school to college) to 12+4 (primary school to university). Moreover, the government of Cambodia expanded NGS system to existing 9 model schools in provinces of Kandal, Kampong Cham, Kampong Speu, and Svay Rieng. NGSs adopt LS and IBL methods. To keep solving its pedagogy issue, the government of Cambodia invested on New Generation Pedagogical Research Center (NGPRC) in 2019 to keep research and provide on-time innovation of teaching methods and trainer networks. Social Communication Networks (SNS) usage among teachers, especially Telegrams, one of SNS application, and improved salary since 2013 are also the key setting institutional environment to promote the sustainability of the project outputs. As can be seen from the continuous status of the project effects and the achievement status of the Institutional/Organizational Aspect, and according to education stakeholders interviewed for the ex-post evaluation, the number of staff in the education has been sufficient overall even though there are some gaps in the number between urban areas and rural areas.

Nearly 90% of the education stakeholders interviewed for the ex-post evaluation confirmed that the necessary skills and knowledge to improve the quality of teaching at primary and lower secondary education have been sustained. In the background, there are some reasons, such as observations of teacher trainees' classes by RTTC and PTTC trainers after teacher training programs, establishment of a group of teachers in schools to discuss and exchange teaching experiences, holding of regular working group meetings among teachers from schools in the network schools of RTTCs or PTTCs, and introduction of a co-teaching method at TEC in Phnom Penh that allows teachers to teach in team and complement each other for the better quality of education.

According to the education stakeholders interviewed for the ex-post evaluation, the sufficient amount of budget for teacher training programs has been allocated by MoEYS every year. On the other hand, the budget for experiment in science classes has been relatively low at 2 million Riels per year, and only two experiments per school and per year can be done. Additionally, the budget to follow up the teachers who joined teacher training programs has been provided only in the initial year after the programs so that monitoring and

evaluation of their actual performance in classes beyond the initial year have not been conducted. Also, because of scarce budget, schools in remote areas do not have enough labs and experiment materials. Therefore, it can be concluded that there is room for improvement from the financial perspective.

#### <Evaluation Result>

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

#### 5 Summary of the Evaluation

The 2008-2012 project achieved the Project Purpose aiming to improve the quality of teacher training on science in target areas. The Overall Goal aiming to enhance the quality of teaching capacity of science teachers in the areas was not exactly verified with the indicator, but it was judged as partially achieved in the interview. The 2013-2016 project achieved the Project Purpose aiming to strengthen the foundation for MoEYS to support teachers for science and mathematics lesson improvement at the lower secondary level and the Overall Goal aiming to disseminate the educational resources developed by the project to other areas through training programmes conducted by MoEYS. As for sustainability, the lack of budget was confirmed in terms of labs, experiments, experiment materials, and teachers' follow-up. As for efficiency, in the 2008-2012 project, the project cost slightly exceeded the plan, and in the 2013-2016 project, the project period 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:

- The annual budget for experiment at each school is a welcoming public expenditure under program-based budgeting of the education sector executed by MoEYS. Such allocation links to the strategic purpose of the "Education Strategic Plan" (2019-2023) and results in science education promoted by all RTTCs, PTTCs, TECs, teachers, and schools. At present, MoEYS should rationally address the low level of the budget and should produce a clear incremental commitment/plan.
- MoEYS should consider allocating more budget for post-monitoring and inspection of the teacher training programs in the third or fifth year after the program to ensure that the implementation of LS, IBL, Teacher's Guide, and others such as INSET IP are useful and produce correctly actions on time.
- Teachers have been benefited from the published Teacher's Guide and other manuals developed by the projects. These materials have been regarded as very useful for their capacity development and service delivery. The limited number of the published materials can pose a small motivational problem in the long run, especially when teachers face such an issue and solve it either by photocopying it from other teachers at their expense or by telegram sharing. Thus, MoEYS should consider the support to the publication in the near time to fill the immediate needs. To make the distribution plan appropriately, MoEYS should know deficiencies of the materials beforehand by setting a mechanism to regularly check available resources at the school level. In the medium to long run, MoEYS can consider the digitalization of these materials for the convenient access of RTTCs, PTTCs, TECs, schools, teachers, and other related parties like NGSs.
- Beyond 2023, School-Based Management (SBM) will be intensified to reach its nation-wide target by 2030. At the same time, NGSs will reach 50 schools and the activities of NGPRC will become mature in the pedagogical research and teacher trainer network. In this regard, it is necessary for MoEYS to address a good integration of the project outputs in that changing environment.

### Lessons Learned for JICA:

MoEYS has recently committed to strengthening the teaching method by adopting the student-centered approach. The
elements/approaches introduced/developed by JICA project such as IBL, LS, Teacher's Guide have been used and integrated into their
official documents. For example, LS has been integrated into the School-Based Mentoring Approach in the Cambodia's Education
System. Therefore, in order to secure the sustainability of project effects even after the end of projects, it should be carefully considered
at the time of project planning if there is a high likelihood that the effects are actually incorporated into government's policies, not only
endorsed by the policies. Also, merits of the project elements/approaches should be explained to the authorities of the implementing
agency during the project period.



Biology class at Kandal RTTC



Science class at Dangko Primary School