

Country Name		Project for Promotion of Student-Centered and Inquiry-Based Science Education					
Islamic Republic of Pakistan							
I. Project Outline							
Background	<p>Improving the quality of education at elementary education was one of the highlighted challenges in the “National Education Policy 1998-2010” in Pakistan. In 2006 the Ministry of Education (MOE) moved away from “Teacher-centered rote learning” method and introduced new curricula based on the concepts of “Student-centered, Inquiry-Based, and Outcome based”. MOE planned to introduce new curricula based textbook in three years starting from 2009 and implement new teaching methodology in the classroom. Teachers in schools, however, lacked 1) practical skills to implement new teaching method, 2) training opportunities to equip those skills, 3) teachers guides, and 4) enough science subject knowledge. National Institute of Science and Technical Education (NISTE) had offered trainings for science teachers for the past 20 years, however, their achievements had not been properly translated into the classroom activities of teachers. On the other hand, JICA had dispatched senior volunteers to NISTE since 2003 for assisting the development of experimental tools with easily available materials. MOE requested JICA for a technical cooperation project aiming at establishing a student-centered and inquiry-based (SCIB) training model that ensures teachers deliver SCIB science lessons.</p>						
Objectives of the Project	<p>Through developing SCIB teaching plans for Grade 4 to 8 science, equipping master trainers with skills and knowledge to deliver SCIB science lessons, identifying necessary interventions for effective teacher training through pilot activities in ICT, and sharing the experience of model SCIB teacher training among other educational related stakeholders, the project aimed at establishing effective teacher training model that ensures teachers to deliver SCIB science lessons, thereby contributing to utilization of the model by other provinces and areas other than five pilot clusters in ICT. The project objectives set forth are as follows:</p> <ol style="list-style-type: none"> 1. Overall Goal: Effective teacher training model that ensures teachers to deliver Student-centered and inquiry-based (SCIB) science lessons is utilized by other provinces and areas other than 5 pilot clusters in ICT according to their setup. 2. Project Purpose: Effective teacher training model that ensures teachers to deliver SCIB science lessons is established. 						
Activities of the project	<ol style="list-style-type: none"> 1. Project site: Islamabad (Islamabad Capital Territory (ICT)) 2. Main activities: (1) Develop prototype SCIB teaching plans based on new curriculum and available new textbooks through field testing at selected schools and adjust the prototype to be in line with the provincial textbooks; (2) Design and conduct the master trainer training programs and develop training materials; (3) Formulate effective strategy to ensure implementation of teacher training at the cluster level in ICT and master trainers trained at NISTE conduct teacher training in pilot areas of ICT; and (4) Organize nation-wide forums and support provincial level forums to share and disseminate good practices on SCIB science lessons among provinces etc. * The subject to be focused on is General Science and the grade levels are from Grade 4 to Grade 8. 3. Inputs (to carry out above activities) <table border="0" style="width: 100%;"> <tr> <td style="width: 50%;"> Japanese Side <ol style="list-style-type: none"> 1) Experts: 9 persons 2) Trainees received in Japan: 22 persons 3) Equipment: computers, projectors, printer, photocopy machine etc. </td> <td style="width: 50%;"> Pakistan Side <ol style="list-style-type: none"> 1. Staff allocated: 25 persons 2. Project office rooms, training venue, hostel, air conditioner 3. Local cost (for development of Grade 8 teaching plans) </td> </tr> </table> 					Japanese Side <ol style="list-style-type: none"> 1) Experts: 9 persons 2) Trainees received in Japan: 22 persons 3) Equipment: computers, projectors, printer, photocopy machine etc. 	Pakistan Side <ol style="list-style-type: none"> 1. Staff allocated: 25 persons 2. Project office rooms, training venue, hostel, air conditioner 3. Local cost (for development of Grade 8 teaching plans)
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Ex-Ante Evaluation	2008	Project Period	May 2009 – April 2012	Project Cost	(ex-ante) 350 million yen (actual) 340 million yen		
Implementing Agency	National Institute of Science and Technical Education (NISTE)						
Cooperation Agency in Japan	KRI International Corporation						

II. Result of the Evaluation**1 Relevance**

<Consistency with the Development Policy of Pakistan at the time of ex-ante evaluation and project completion>

The project has been consistent with Pakistan’s development policy. At the time of ex-ante evaluation, ‘improving science education’ was set forth in “National Education Policy 1998-2010”, “National Plan of Action on Education for All (2001-2015)” and “Medium Term Development Framework 2005-2010”. At the time of project completion, “National Plan of Action on Education for All (2001-2015)” was still effective, and other policy documents such as “National Education Policy 2009” and provincial education sector plans (drafts) put emphasis on promotion of SCIB science education.

<Consistency with the Development Needs of Pakistan at the time of ex-ante evaluation and project completion>

At the time of ex-ante evaluation, SCIB based curriculum had been introduced but textbooks were not developed/revised accordingly, hence, teachers’ skills for practice of SCIB lessons were low and there was no teaching material for teachers to improve their understanding on SCIB lessons.

After the commencement of this project, the process of new textbooks development/revision and printing in ICT and provinces took longer than what was anticipated (as shown in “Background” above). This situation on textbooks was taken into consideration during the project implementation phase, and it was agreed to continue to develop teaching plans without waiting for the new textbooks anticipating that when the new textbooks would be developed they would also be aligned with 2006 curriculum as has been teaching plans¹.

At the time of project completion, due to the 18th constitutional amendment in Pakistan in 2010, the mandate to develop/revise/print textbooks was also devolved to the provinces. Similarly, the dissemination of teacher training model in provinces became the jurisdiction of each province (not NISTE), and thus, the project revised the Overall Goal to match with the situation and put more focus on the Main activities (4) stated above to influence the provinces.

<Consistency with Japan’s ODA Policy at the time of ex-ante evaluation>

The project was consistent with Japan’s ODA policy on improvement of basic education, as stated in the Country Assistance Program for the Islamic Republic of Pakistan (2005).

<Evaluation Result>

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

2 Effectiveness/Impact

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

The Project Purpose was mostly achieved by the time of project completion. Based on the pilot teacher training in ICT, the teacher training model was developed and documented as “Guidelines for Student-centered and Inquiry-based (SCIB) Science Education Teacher Training Program”, which were reviewed and endorsed by MOE and the Project Implementation and Monitoring Committee (PIMC) (Indicator 1). Moreover, according to the end-line survey and the monitoring report, 70% of trained teachers for Grade 4 and 5 (Primary) practiced at least one aspect of the features of SCIB science², while 55% of trained teachers for Grade 6 and 7 (Elementary) did it (Indicator 2).

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

The project effects have been partially maintained since project completion. In ICT, teacher’s trainings have been conducted through a CIDA project (2007-2016)³ after completion of the JICA project. These trainings are based on the 2006 new curriculum and new textbooks introduced from 2012 onwards based on questions, prediction and discovery concepts. 70% of the contents of the new textbooks, which were developed by some of the counterpart personnel of the JICA project, contain the SCIB approach. Additionally, more than a half of the staff trained under the JICA project was retained by NISTE, who mainly contributed in the designing and implementation of CIDA supported teacher’s trainings, hence, included the SCIB approach in post project teacher trainings as well⁴.

In provinces, on the other hand, it has no longer been NISTE’s mandate to train teachers, and the master trainers trained under this project are not engaged in the teacher trainings: there was no mechanism agreed under the project to involve master trainers trained under the project as master trainers of training institutes, as those who were trained were actually teachers teaching in various schools and not master trainers and/or trainers at a training institute⁵. Nevertheless, they still utilize the knowledge or experience from this project in their schools. Also, those counterparts who joined the project from textbook board of the provinces contributed to the development/writing of new textbooks along with other authors.

In both ICT and provinces, the guidelines developed under this project have not been used since project completion as new textbooks have been introduced. It is important to remind that Guidelines were developed in the absence of textbooks as an alternative mean of support till the time that text books are available⁶. Also, the SCIB teaching plans developed under the project have not been used in ICT or other provinces since project completion, as it is widely understood by teachers that the new textbooks provide enough material to teach Grade 4 to 8, and teachers mainly use diaries written by teachers instead of teaching plans⁷.

As for practice of three criteria of SCIB science lesson concept, according to the class observation conducted for ex-post evaluation⁸, one out of two teachers for Grade 5 was practicing two criteria (“questions from students” and “students’ chances of prediction”), and one out of three teachers for Grade 6 and 7 was practicing two criteria (“questions from students” and “students’ chances of discovery”).

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

The Overall Goal has been partially achieved by the time of ex-post evaluation. As explained above, a total of 140 teachers in ICT across clusters, belonging to both pilot and non-pilot schools of this project, were trained through the CIDA project after the project

¹ Science subject Textbooks development/revision/printing process in Islamabad and provinces for Grades 4-8 was undertaken as follows: a) Islamabad: 2011-2015; b) Punjab: 2011-2016; c) Sindh: 2015-2016; d) KPK: 2011-2015; and e) Balochistan: 2013-2015.

² Three criteria were focused to assess lesson presenters’ skills in realizing SCIB science lessons: (1) questions from students, (2) students’ chances of prediction, and (3) students’ chances of discovery.

³ The outline of the CIDA project is as follows: The project of “Capacity Building of Teachers Training Institutions of MOE, and Training of Elementary School Teachers in ICT, FATA, FANA and AJK, was initiated in 2007 under the CIDA’s Debt for Education Conversion (DFEC) program. The five years project was started to improve quality of elementary education in Pakistan, with NISTE, and then “Policy and Planning Wing” of the Ministry of Education, with the target to train 1,280 elementary teachers with the budget of Pak Rupees 669.556 Million. The PC1 for the project was modified in 2013, and further extended till 2016 at no cost extension. NISTE trained an overall 1,421 teachers with 226 elementary teachers in ICT (a total of 140 elementary teachers (67% female, 33% male teachers) were trained since the completion of JICA project (from 2013 to 2016) under CIDA’s DFEC program in ICT).

⁴ For example, the CIDA-supported trainings focus on Biology, Chemistry with the additional component of how to use Information Communication Technology (ICT), and how to teach Science using SCIB approach (such as science education to be based on real life situations, use of science kits and provision of science kits to all primary and middle schools).

⁵ An underlying factor regarding provinces is that Provincial Education Departments were not engaged as lead coordinated departments to coordinate with other key related organizations such as training institutes, school administrations, textbooks & Bureau of curriculum etc. Hence, the project could not promote the ownership and build institutional capacities that were necessary for the long term sustainability and impact of the project on intended beneficiaries at the provincial level.

⁶ As pointed out by the focal person of NISTE, and as per terminal evaluation summary of JICA’s SCIB project under the sustainability head, where it is mentioned as “...textbooks linked with SCIB science approach can contribute to expand the SCIB science lessons in other provinces”.

⁷ The diaries cannot be termed as replacement of teaching plans, as these diaries are more of generic nature, focusing on broad outline and without objective of outcome of the lessons.

⁸ Class observation was conducted for five science teachers of Grade 5, 6 and 7 in three schools from pilot areas in ICT during the field survey for ex-post evaluation.

completion. Therefore, the SCIB approach has been utilized in ICT other than five pilot clusters (Indicator 1). In provinces, the SCIB teacher training model could not continue as explained above except in a sense that the SCIB approach was incorporated in the textbooks and the trained master trainers have been practicing the SCIB approach as teachers in their respective schools (Indicator 2).

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

No negative impact on natural environment has been observed and no land acquisition and resettlement has been occurred under the project.

<Evaluation Result>

In light of the above, through the project, targets set in indicators for the Project Purpose were mostly achieved by the time of project completion, however, the project effects have been partially maintained since project completion, and targets set in indicators for the Overall Goal have been partially achieved by the time of ex-post evaluation. Therefore, the effectiveness/impact of the project is fair.

Achievement of project purpose and overall goal

Aim	Indicators	Results
(Project Purpose) Effective teacher training model that ensures teachers to deliver SCIB science lessons is established.	1. Well planned and implemented SCIB teacher training model including 1) preparation, 2) training delivery/method, 3) training contents, 4) monitoring and evaluation is compiled, documented and endorsed.	Status of the achievement: achieved (partly continued) (Project Completion) The training guidelines based on the ICT pilot teacher training implemented in the project were compiled and endorsed by MOE and PIMC. (Ex-post Evaluation) The training guidelines (Guidelines for Student-centered and Inquiry-based (SCIB) Science Education Teacher Training Program) produced under the project have not been used in ICT or other provinces since project completion, but the SCIB approach was incorporated in the new textbook, and the trainings have been conducted under a CIDA project. SCIB teaching plans developed under the project have also not been used in ICT or other provinces since project completion.
	2. 70% of teachers in pilot areas in ICT who received training practices at least one criteria of SCIB science lesson concept.	Status of the achievement: mostly achieved (partially continued) (Project Completion) According to the end-line survey and the monitoring report, 70% of trained teachers for Grade 4 and 5 (Primary) and 55% of trained teachers for Grade 6 and 7 (Elementary) practiced at least one aspect of the features of SCIB science. (Ex-post Evaluation) According to the class observation conducted for ex-post evaluation, one out of two teachers for Grade 5 was practicing two criteria of SCIB science lesson concept (“questions from students” and “students’ chances of discovery”), and one out of three teachers for Grade 6 and 7 was practicing two criteria (“questions from students” and “students’ chances of discovery”).
(Overall Goal) Effective teacher training model that ensures teachers to deliver Student-centered and inquiry-based (SCIB) science lessons is utilized by other provinces and areas other than 5 pilot clusters in ICT according to their setup.	1. SCIB teacher training model utilized in ICT other than 5 pilot clusters.	(Ex-post Evaluation) Mostly achieved The SCIB teacher training model has been utilized in ICT mostly through teacher trainings under the CIDA project, and a total of 140 teachers were trained in ICT across clusters.
	2. SCIB teacher training model is introduced to provinces with adoption/adaptation.	(Ex-post Evaluation) Partly achieved SCIB teacher training model has not been introduced to provinces since project completion, but the SCIB approach has been incorporated in the text books and the trained master trainers who were actually teachers have continued practicing the SCIB approach in their respective schools.

Source: JICA internal document, interview with NISTE, Federal Directorate of Education (FDE), brief interviews with administrators and teachers in 30 schools in ICT, and in-depth interviews with administrator and teachers and class observation in three schools in ICT.

3 Efficiency

Both project cost and project period were within the plan (97% and 100% against the plan, respectively). Therefore, the efficiency of the project is high.

4 Sustainability

<Policy Aspect>

The 2009 National Education Policy, the upgraded policy of the above-mentioned “National Education Policy 1998-2010”, serves as the latest policy till the time the new policy will be implemented. It highlights importance of quality of education and therefore implies the need for improving science education through training teachers and /or promoting SCIB science education through focus on the new curriculum of 2006.

<Institutional Aspect>

The organizational structures for promoting SCIB science education of NISTE remains the same as the one during the project implementation period. For future prospects, NISTE is in transition of becoming a National Skills University. Afterwards, the scope and mandate of activities will change.

Regarding the current number of NISTE science officers, eight out of a total of 14 staff members trained under the project (to conduct teacher trainings to promote SCIB science education in Pakistan) still work in NISTE at the time of ex-post evaluation. This number is sufficient considering that after devolution NISTE has much less mandate of training than what it had before.

In provinces, approximately 90% of teachers trained as master trainers under the project still work in schools; however, given a lack of mechanism to involve those “master trainers” as master trainers of training institutes, the number of such trained teachers is not sufficient to continue the training activities based on the SCIB training model established under the project in their provinces.

<Technical Aspect>

The skill level of staffs of NISTE is sufficient to promote SCIB science education in Pakistan at the time of ex-post evaluation based on availability of staff directly trained through this project. Even those members who are posted out or went to other departments on deputation, can be called in for any training activity, should a need arises. Regarding master trainers and teachers, 100% master trainers and 100% pilot teachers trained under this project remain at the schools in ICT. However, there exist no mechanism to support these master trainers and pilot teachers to continue the program. Therefore, there is need to enhance skills of the current staff at the managerial level to further sustain and continue such programmes. As for provinces, all staffs in provincial education authorities trained under the project have been transferred to other departments, and the number of teachers (“master trainers”) trained under this project is limited.

<Financial Aspect>

The amount of total budget in NISTE was approximately three million Pakistani Rupees in 2013, approximately five million Pakistani Rupees in 2014 and approximately six million Pakistani Rupees in 2015, which was to cover teacher trainings. While FDE has 20 to 30 million Pakistani Rupees of annual budget for teacher trainings, these amounts have not been spent due to the above-mentioned teacher training cost has been all funded by CIDA. After completion of the CIDA project in June 2016, teacher trainings would mostly be funded by the federal budget. However, the authorities at NISTE and FDE do not have any current initiative to carry on with the CIDA project interventions. Also, there is capacity gap at FDE on how to plan and spend budget due to transfer of the concerned staff, ad-hoc (non-permanent) officials and lack of focused training on financial management and budgetary planning.

Provincial educational authorities do not have any specific budget to conduct their respective organizational activities to promote SCIB science education at the time of ex-post evaluation.

<Evaluation Result>

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

5 Summary of the Evaluation

Though the project, targets set in indicators for the Project Purpose were mostly achieved by the time of project completion, but the project effects have been partially maintained since project completion. The targets set in indicators for the Overall Goal have been partially achieved by the time of ex-post evaluation. As for sustainability, some problems have been observed in terms of institutional, technical and financial aspects. Considering all of the above points, this project is evaluated to be satisfactory.

III. Recommendations & Lessons Learned

Lessons learned for JICA:

1. It is not practical to roll out the training programme through master trainers alone if they are teachers by profession and not trainers. Under this project those who were trained as master trainers were actually school teachers, whose mandate is to teach & not to train.
2. Under this project, master trainers were trained from schools & were not from training institutes. A coordination mechanism was needed between school education departments and teacher training institutes for monitoring of SCIB science lessons utilizing the project-trained master trainers in teacher training. When implementing a similar project in future, a mechanism needs to be firmly established in project implementation stage for coordination among various organizations and schools to ensure continuity of project activities.



Grade 5 Science Student doing her class work FDE School in Islamabad



Grade 6 Science class in Progress in FDE School in Islamabad