Indonesia: Science Education Quality Improvement Project – SEQIP

Ex-post evaluation report

OECD sector	1122000 /Primary education	
BMZ project ID	Phase I: 1996 66 306 Phase II: 2001 66 363	
Project executing agency	Ministry of National Education (MoNE)	
Consultant	Dip.-Ing. Manfred Genze	
Year of ex-post evaluation report	2009	
	Project appraisal (planned)	**Ex-post evaluation (actual)**
Start of implementation	Phase I: Q 3 1998 Phase II: Q 1 2003	Phase I: Q 1 1999 Phase II: Q 2 2003
Period of implementation	Phase I: 2.5 years Phase II: 2.5 years	Phase I: 3 years Phase II: 2.5 years
Investment costs	EUR 43.2 million	EUR 43.2 million
Counterpart contribution	Phase I: EUR 6.52 mill. Phase II: EUR 5.85 mill.	Phase I: EUR 5.68 mill. Phase II: EUR 5.85 mill.
Finance, of which FC funds	Phase I: EUR 12.27 mill. Phase II: EUR 10.43 mill.	Phase I: EUR 12.27 mill. Phase II: EUR 10.43 mill.
Other institutions/donors involved	Cooperation project with GTZ	Cooperation project with GTZ
Performance rating	3	
• Relevance	3	
• Effectiveness	2	
• Efficiency	4	
• Overarching developmental impacts	2	
• Sustainability	3	

Brief Description, Overall Objective and Project Objectives with Indicators

The Science Education Quality Improvement Project (SEQIP) was a cooperation project between Financial (FC) and Technical Cooperation (TC). The project objective was to improve teaching and learning in science lessons at Indonesian primary schools using scientific experimental kits. Indicators for the project objective achievement were:

- The trained teachers understand and are able to conduct the scientific experiments intended with the materials provided.
- The pupils carry out the range of possible experiments with the kits and understand the scientific rules and laws involved.

The overall objective was to improve primary school education and raise its relevance for the labour market. Its achievement was to be measured by the marks in the final primary exams, comparisons with similar schools and school competitions. Progress towards the achievement of the project objectives was monitored by GTZ.

The target group comprised the pupils in 4th-6th grade at primary schools in selected districts in seventeen provinces of the country. The project measures included fitting out the schools with scientific teaching materials (FC), further training for science teachers (TC), support in project coordination and teacher in-service training (TC), setting up a servicing and maintenance system as well as advisory services by an implementing consultant (FC).

Project design

Experimental kits were supplied to 19,000 Indonesian primary schools for pupils in the 4th to 6th grades to perform up to 60 different experiments in 10 groups per class. The kits were delivered together with posters (e.g. solar system) and learning cards (e.g. individual planets) as well as spare parts for fragile items in teaching material boxes for better storage. 28,000 kits were also provided to teachers for 25 demonstrations each. In addition, the schools were supplied with teacher's manuals and schoolbooks on basic science and instructions for experiments. As part of the consultancy services, Indonesian suppliers were advised on production processes with close quality supervision. In addition, the consultant trained teachers in maintenance and developed toolboxes (including a hammer, abrasive paper), of which 5,500 were distributed to schools.

Key Results of Impact Analysis and Performance Rating

Investments in basic education yield high macroeconomic gains. This applies in special measure to countries with a lack of quality education, such as Indonesia. By concentrating on modern science teaching, the project promoted key skills, such as self-reliance and creativity, which are relevant for occupations in the formal sector and self-employment in the informal sector and hence for future income prospects. As a side effect, the project improved the quality of Indonesian teaching materials production through startup finance and intensive advice, particularly in metalworking. This contributed to the generation of local employment and income, by reducing the dependency on the import of teaching materials. The majority of teachers at primary schools are women, who have therefore derived particular benefit from additional training through the programme. Thanks to SEQIP, girls even improved their grasp of basic science slightly more than the boys. Topics such as environmental protection and renewable and non-renewable resources are important components of science teaching. The practical relevance of the experiments in the project has done much to raise the environmental awareness of the pupils. The project only promoted public primary schools, whose pupils tend to come from poorer sections of the population.
We assess overall developmental efficacy as follows:
The postulated results chain of improving primary school education and raising its occupational relevance by providing teaching material and parallel teachers' in-service training for practical, active science lessons is plausible. The project objective conforms with Millennium Development Goals 2 and 3 and hence key goals of German development cooperation. Improving the quality of basic education rightly remains an integral component of the Indonesian education strategy. The donors consult in monthly sectoral working group meetings and are currently working on drafting a national programme for basic education. With Indonesian funding and under an FC-financed debt conversion programme, the SEQIP approach was disseminated further to 5,000 schools and enlarged to include mathematics lessons. A critical point, however, is the nationwide distribution of a competing product (INPRES kit) since 2006 without teacher in-service training, also at some project schools. In hindsight, this development casts doubt on the partner's commitment to the SEQIP approach. We therefore assess the relevance of the project as satisfactory (Subrating 3).
Teaching and learning in science lessons at primary schools has improved through the use of the experimental kits, as measured by GTZ monitoring. The trained teachers have mastered the demonstration or experimental methods as intended with the

materials provided and conduct them regularly. The pupils also carry out experiments with the kits. To assess whether the pupils also actually understand the relevant scientific rules and laws, a special test was developed as part of project monitoring. The pupils in the final grade 6 at the project schools of SEQIP II improved their performance in the course of the project by an average 4.2 percentage points (2004-2006) and recorded 9.0 percentage points higher than in non-SEQIP schools after project completion in 2006. Girls performed slightly better than boys. There has also been a clear improvement in teaching methods in Indonesia since project start, which were still almost solely confined to traditional practices of writing on the board and memorising. The target group was reached. Nineteen per cent of all primary schools in Indonesia were provided with teacher demonstration kits and 13% of all primary schools with additional pupil experimental kits and the respective teachers were given the requisite further training. We assess effectiveness as good (Subrating 2).

Cost savings of approx. EUR 1 million made funds available to finance additional books, spare parts and quality improvements. Compared with the current price of the experimental kit for pupils, production costs were very satisfactory. Compared with the costs for the competing product, the INPRES kit, however, they are not competitive. The quality of the SEQIP kits is far superior in terms of service life, storage and the number of possible experiments or demonstrations, but the nationwide distribution of the INPRES kits before, during and after the project suggests that the SEQIP materials do not meet demand on the Indonesian market. Moreover, some schools received several kits, while others in the same school association received none. As the schools do not share the kits as expected, the additional kits are left unused. Altogether, we gauge efficiency to be unsatisfactory (Subrating 4).

The overall objective was to improve primary school education and enhance its occupational relevance, to be verified with marks for final primary exams and school competitions. A nationwide comparison of marks with other schools indicated no systematic improvement in the project schools. This kind of comparison of marks is, however, of very limited validity in any case. The contents of examinations varied by school until 2007 and only contain multiple-choice questions, which prove little about the abilities to be improved via the project: analytical thinking, problem-solving abilities, creativity. The tests developed specifically for project monitoring, however, attest to a clear improvement in scientific abilities in the project schools. In addition, SEQIP pupils took part above average in the international Science Olympics (54% of all Indonesian participants in 2006 and 45% in 2007), although SEQIP was only introduced in about 20% of primary schools. In 2008, the team of Indonesian pupils even won the Olympics, beating primary school pupils from 9 other competing countries, such as Singapore, Taiwan and Hong Kong. We therefore judge the overarching developmental impact of the project as good (Subrating 2).

Due to its high quality, the teaching material has a longer service life than assumed at project appraisal. This is also enhanced by the training of teachers in repair and maintenance and the distribution of repair kits and spare parts. The repair kits are put to use. The schools have sufficient means for replacement investments but do not know where and how to order individual components as no ordering system has been established at district level. No spare parts are available for the demonstration kit for teachers as the German manufacturer has removed it from the inventory and no know-how has been transferred to the Indonesian manufacturers. The teachers' in-service training organised by TC on the application of teaching materials has not continued after project completion. Many trained teachers have now been promoted to headmasters or have relocated to private schools. On the one hand, the application of experimental methods imparted by SEQIP has been transferred to lessons in other schools, but on the other, no subsequent teachers are being trained. Teacher-training at universities still does not include any creditable courses on experimental teaching methods. A high risk to sustainability is, however, posed by the distribution of the INPRES kits, also at project schools, with no accompanying in-service training. With the end of German support, SEQIP seems to be finished for the Indonesian

Government and sustainability depends solely on individual dedicated teachers and headmasters. We thus assess project sustainability as satisfactory (Subrating 3).
Weighing up these aspects (good results, but risks for sustainability), we attest the programme a satisfactory performance rating (Subrating 3).
A very encouraging development in response to the ex-post evaluation is that the project executing agency is now developing low-cost SEQIP kits. The new kits will only cost a third of the original price and will therefore be able to compete with the rival product, the INPRES kit. The requisite experiment instructions for pupils and teachers to learn on their own will also partly compensate for the terminated teachers' training. Despite restricted budgets in the schools, the development achieved by the SEQIP project will continue to have an effect. Parallel to this, the original SEQIP materials can still be purchased, if enough funds are available.

General conclusions

Measures for improving quality in basic education remain largely ineffectual if they are confined to individual components. The effective further training of a teacher, for example, will do little good, if he does not find any adequate teaching materials after returning to school to apply the new teaching methods he has learnt. Supplies of materials also have little effect in general as long as they are not accompanied by in-service training. The combination of FC measures to supply teaching materials and TC measures for in-service teachers' training in their application is a very effective approach.
In education projects aimed at improving the learning performance of pupils, we highly recommend continuous monitoring (including baseline studies). The envisaged quality improvement in teaching can only be properly measured through regular lesson observations and specific performance tests for pupils. Of particular help is the development of separate performance tests for the project, where it does not involve reforming the national examination system at the same time. This monitoring should ideally be continued by the partner on its own after project completion.

Notes on the methods used to evaluate project success (project rating)

Projects are evaluated on a six-point scale, the criteria being relevance, effectiveness (outcome), "overarching developmental impact" and efficiency. The ratings are also used to arrive at a final assessment of a project's overall developmental efficacy. The scale is as follows:

1 Very good rating that clearly exceeds expectations
2 Good rating fully in line with expectations and without any significant shortcomings
3 Satisfactory rating – project falls short of expectations but the positive results dominate
4 Unsatisfactory rating – significantly below expectations, with negative results dominating despite discernible positive results
5 Clearly inadequate rating – despite some positive partial results the negative results clearly dominate
6 The project has no positive results or the situation has actually deteriorated

A rating of 1 to 3 is a positive assessment and indicates a successful project while a rating of 4 to 6 is a negative assessment and indicates a project which has no sufficiently positive results.

Sustainability is evaluated according to the following four-point scale:

Sustainability level 1 (very good sustainability)

The developmental efficacy of the project (positive to date) is very likely to continue undiminished or even increase.

Sustainability level 2 (good sustainability)

The developmental efficacy of the project (positive to date) is very likely to decline only minimally but remain positive overall. (This is what can normally be expected.)

Sustainability level 3 (satisfactory sustainability)

The developmental efficacy of the project (positive to date) is very likely to decline significantly but remain positive overall. This rating is also assigned if the sustainability of a project is considered inadequate up to the time of the ex post evaluation but is very likely to evolve positively so that the project will ultimately achieve positive developmental efficacy.

Sustainability level 4 (inadequate sustainability)

The developmental efficacy of the project is inadequate up to the time of the ex post evaluation and an improvement is very unlikely. This rating is also assigned if the sustainability that has been positively evaluated to date is very likely to deteriorate severely and no longer meet the level 3 criteria.

The overall rating on the six-point scale is compiled from a weighting of all five individual criteria as appropriate to the project in question. A rating of 1 to 3 indicates a “successful” project while a rating of 4 to 6 indicates an “unsuccessful” project. In using (with a project-specific weighting) the five key factors to form a overall rating, it should be noted that a project can generally only be considered developmentally “successful” if the achievement of the project objective (“effectiveness”), the impact on the overall objective (“overarching developmental impact”) and the sustainability are considered at least “satisfactory” (rating 3).