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Analysis from a Capacity Development Perspective

# **Strengthening of Mathematics and Science in Secondary Education (SMASSE) Project in Kenya**

January 2007

Institute for International Cooperation  
Japan International Cooperation Agency



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in Secondary Education (SMASSE)  
Project in Kenya**

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The analysis and recommendations of this report do not necessarily reflect the official views of JICA. It is the fruit of a collaborative effort by the study group on “CD analysis on SMASSE project,” organized by JICA.

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## Preface

Although the term “capacity” used in “capacity development” originally refers to the “ability”, JICA defines it as the ability of developing countries “to set and attain goals, and to identify and solve the development issues of their own countries”; in other words “problem-solving abilities”. JICA also regards capacity development (CD) as “the ongoing process of enhancing the problem-solving abilities of developing countries by taking account of all the factors at the individual, organizational and societal levels”.

Based on the idea that CD is a useful concept in reexamining the nature of its projects, JICA attaches importance to the systematization and accumulation of lessons and experiences for future use by continuously analyzing previous cooperation activities from a CD perspective.

JICA conducts a variety of technical cooperation activities in developing countries in the basic, higher and technical education sectors. In the Strengthening of Mathematics and Science in Secondary Education (SMASSE) Project in Kenya, which has been picked as a topic for this report, the training outcomes have successfully extended to the end training participants thanks to the use of concepts related to the achievement of student-centered lessons as keywords for the in-service training of mathematics and science teachers. Another distinguishing feature is the fostering of ownership and the creation of independent, sustainable training operation mechanisms such as the SMASSE Fund. This resulted from continuous approaches to a variety of stakeholders in the partner country, from administrative officials of the central and local government to local residents. Furthermore, this project has succeeded in establishing a network for inter-regional collaboration because the results have been extended not only to the Republic of Kenya but also to neighboring African countries.

This research synthesizes these features in order to put forward lessons and recommendations from the perspective of CD support. These lessons and recommendations are expected to be applied in managing the implementation of JICA’s cooperation for mathematics and science education around the world, as well as in formulating new projects. Moreover, in the larger context of JICA’s technical cooperation, they can suggest concrete support measures for improving the capacity of developing countries to address development issues.

Teaching materials will be created on the basis of the results of the present case analysis in order to incorporate them into training programs for JICA staff, experts, related personnel, and human resources in developing countries.

In this way, we hope that the lessons and recommendations obtained from this research will be

further deepened through on-site practice and discussions.

Finally, we would like to express again our gratitude to all those involved in the SMASSE project, who responded to interviews and cooperated in the realization of the present study.

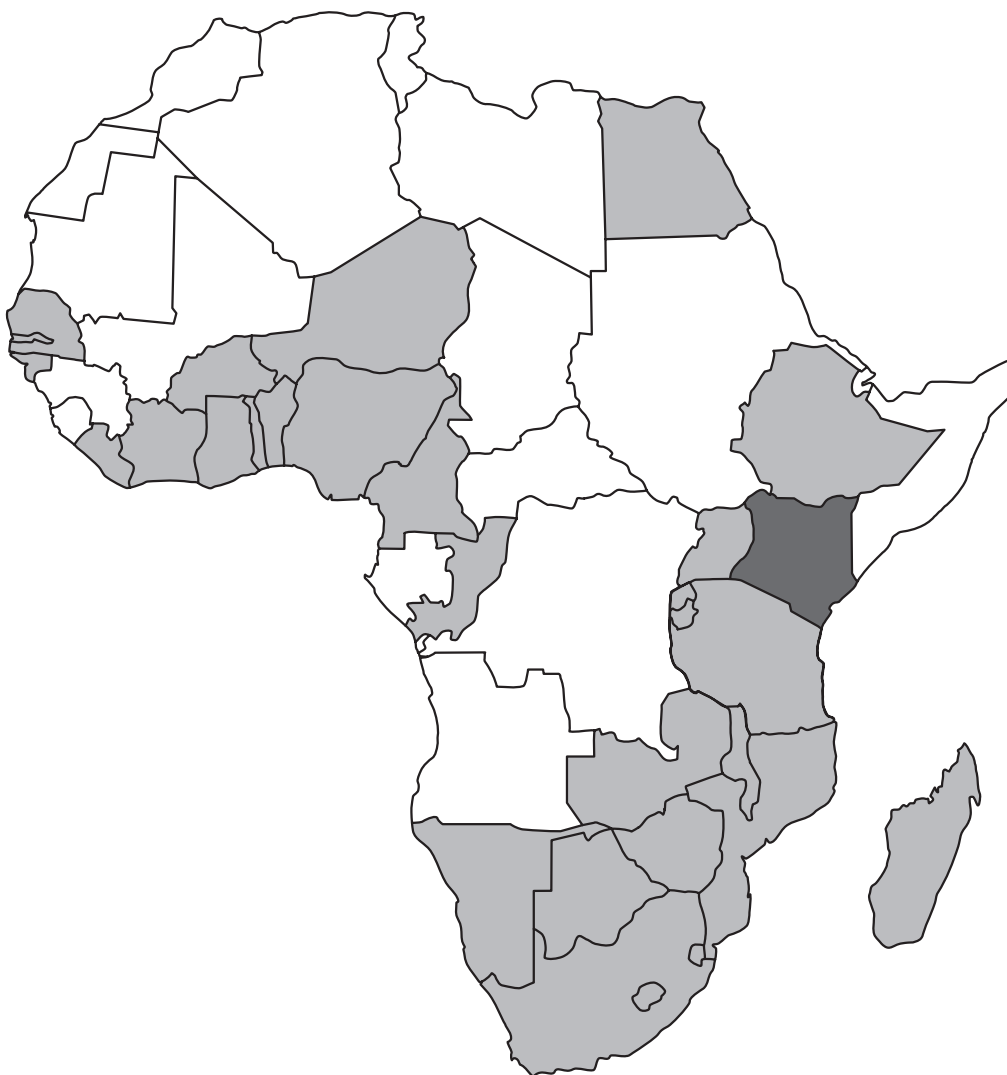
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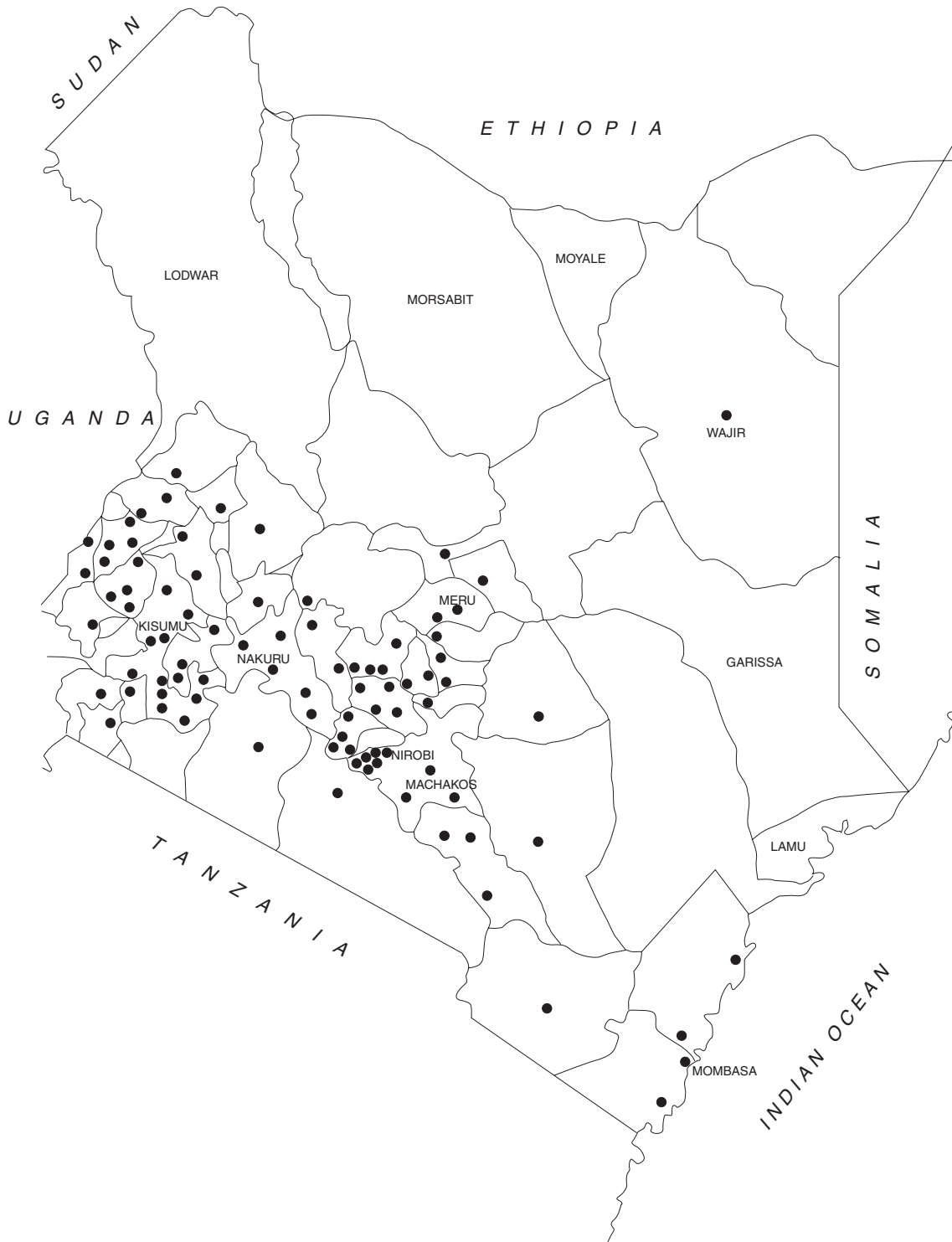
Director General: Toru Taguchi

### SMASSE-WECSA Member Countries



Source: SMASSE Project (2005)

**Map of Kenya (locations of district-level in-service training centers)**



Source: SMASSE Project (2005)

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## Summary

### ■ Background and Purpose of the Case Study

The “Strengthening of Mathematics and Science in Secondary Education (SMASSE) Project”, launched in Kenya in 1998, is aimed at the improvement of mathematics and science education through In-service Training (INSET) for teachers. The project focuses on lesson improvement as its key concept and established a training system using the cascade approach at the national and district levels, which facilitated the diffusion of training effects to all participants including those who are at the lowest level of the cascade. It has also set up mechanisms by which a part of school tuition fees is used to cover the costs for district-level training, thus ensuring the sustainability of training management and implementation. After the launch of Phase II in 2003, the Kenyan government established the national training center and INSET was extended both domestically, to cover the entire Kenyan territory, and intraregionally, to conduct activities to the strengthening of mathematics and science in secondary education in 30 Sub-Saharan countries.

The first objective of this study is to put together the characteristic features of cooperation in the field of mathematics and science education, and the lessons learned from the project, in order to facilitate their use in the planning and implementation stages of new activities, in the context of the expansion of cooperation of Japan International Cooperation Agency (JICA) for mathematics and science education worldwide.

JICA attaches great importance to the notion of “Capacity Development (CD)”, which supports the enhancement of the problem solving abilities of developing countries. The second objective of this study is to analyze the SMASSE project, which led to the establishment of INSET as a system, in terms of the stakeholders it targeted, of the approaches it used to elicit endogenous efforts, and of the roles played by the Japanese members, in order to formulate recommendations for the implementation and management of future technical cooperation in general. Although the targeted area of the project has been expanding, the focus of this study is limited to the analysis of CD in Kenya.

### ■ Definition of CD

JICA (2006) defines CD as “the ongoing process of enhancing the problem-solving abilities of developing countries by taking into account all the factors at the individual, organizational, and societal levels”. In light of this concept, the role of technical cooperation is not to “carry out CD”, but to assist the endogenous CD of developing countries. It is a way of thinking which defines capacity as “the ability of developing countries to solve development problems on their own” and considering it as “a complex combination of elements including institutions, policies, and social systems” (complexity of capacity), and the concept of CD attaches great importance to proactive and endogenous efforts (ownership) on the part of developing countries. Consequently, the role of JICA and its related personnel as CD facilitators is to

grasp the overall picture of the necessary capacity, and use it to strategically position its cooperation in a way that stimulates independent, and endogenous capacity enhancement processes.

**■ Project Overview**

The request for assistance in the field of mathematics and science in secondary education, addressed by the Kenyan government to Japan in 1996, resulted in the launch of the SMASSE project in 1998. The table below indicates the expected outcomes specified in the Project Design Matrix (PDM), together with the outcomes specified in the PDM for Phase II, which was launched in 2003.

**Project Design Matrix (PDM)**

	Phase I ( PDM Second Version )	Phase II Domestic Components	Phase III Regional Components
Overall goal	Capability of young Kenyans in Mathematics and Science is upgraded.	Capability of young Kenyans in Mathematics and Science is upgraded.	Quality of Mathematics and Science Education at secondary level in member countries is strengthened.
Project purpose	Quality of Mathematics and Science education at secondary level is strengthened through INSET for teachers in the Pilot District.	Quality of Mathematics and Science education at secondary level is strengthened in Kenya through INSET of teachers.	ASEI-PDSI is practiced in teacher training institutions and secondary schools in member countries
Outputs	<ol style="list-style-type: none"> <li>1. A system of training for the District trainers in Pilot Districts in Mathematics and Science will be established at KSTC.</li> <li>2. A system of INSET in Mathematics and Science will be established in the Pilot Districts.</li> <li>3. Role of KSTC and District INSET centers as resource centers will be strengthened.</li> </ol>	<ol style="list-style-type: none"> <li>1. A system of training for the District trainers in Mathematics and Science will be strengthened at National INSET center.</li> <li>2. A system of INSET in Mathematics and Science will be established in the Districts.</li> <li>3. Role of SMASSE National INSET Center and District INSET Centers as resource centers will be strengthened.</li> </ol>	<ol style="list-style-type: none"> <li>1. Trainers for ASEI-PDSI based INSET will be produced in member countries</li> <li>2. SMASSE National INSET Center will be consolidated as a resource center for Mathematics and Science in Africa.</li> <li>3. SMASSE National INSET Center will function as secretariat of SMASSE-WECSA.</li> </ol>

Source: Composed from Social Development Cooperation Department, JICA (2001), (2003)

**■ Outcomes from a CD Perspective**

The CD perspective was not clearly specified in the PDM of the project. As a result, several gaps can be identified between the PDM and the capacity factors required for establishing “a sustainable system for improving teachers’ capability to conduct lessons”. As the project was designed to focus on building INSET “implementation mechanisms” at the national and district levels, approaches at the policy level result directly at the school level, and changes in awareness were not included among the objectives of the project. However, the project succeeded in enhancing capacity factors necessary for “a sustainable system for improving teachers’ capability to conduct lessons” centering around the national training center, which is the direct beneficiary, and functioning at the national, district and school levels. The necessity of INSET as a tool for strengthening mathematics and science in secondary education has been acknowledged in governmental policy, and the system for implementing national-level training has been established. In the context of intra-regional cooperation in Phase II, Kenyan counterparts

(C/Ps), who had initially been the recipients of assistance, turned into providers and implementors of CD assistance for third countries, demonstrating the CD taking its root within the partner country.

Capacity required from a CD perspective is shown in the table below, together with the outcomes planned and produced so far in the project. (In the second column on the right “Planned”, “●” indicates planned activities, and “—” indicates unplanned activities. In the first column on the right “Achieved after 8 years”, “●” indicates capacity which has been developed, while “△” indicates capacity which still needs to be strengthened).

### Capacity Necessary for the Establishment of a “Sustainable System for Improving Teachers’ Capability to Conduct Lessons” and Outcomes Planned/Produced in the Project

		Necessary capacity factors	Planned	Achieved	
National level	International contribution	<ul style="list-style-type: none"> <li>Project outputs are shared with other countries of the region</li> </ul>	●	●	
	Societal	Policies	<ul style="list-style-type: none"> <li>Specification of INSET in educational policies and education-related legislation.</li> <li>INSET budgeting</li> </ul>	—	●
		Institutions	<ul style="list-style-type: none"> <li>INSET institutionalization</li> <li>School notification and follow-up</li> </ul>	●	●
	Organizational	<ul style="list-style-type: none"> <li>Development of training facilities, teaching materials and aid</li> <li>Organizational-level capacity to implement and monitor legislation (capacity to fulfill the functions of national-level training, including the development of teaching materials and aid)</li> </ul>	●	●	
	Individual	Knowledge Skills Techniques	<ul style="list-style-type: none"> <li>Individual-level capacity to implement and monitor legislation (capacity to fulfill the functions of national-level training, including the development of teaching materials and aid)</li> </ul>	●	●
		Awareness	<ul style="list-style-type: none"> <li>Policymakers acknowledge the importance of INSET and of regarding teachers as professionals who should constantly upgrade their skills</li> </ul>	—	●
Local level	Societal (Institutions)	<ul style="list-style-type: none"> <li>INSET plan formulation</li> <li>INSET budgeting</li> </ul>	●	●	
	Organizational	<ul style="list-style-type: none"> <li>Development of training facilities, teaching materials and aid</li> <li>Capacity for budget execution</li> <li>Organizational-level capacity to implement projects (capacity to fulfill the functions of district-level training)</li> <li>Monitoring capacity</li> </ul>	●	△	
	Individual	Knowledge Skills Techniques	<ul style="list-style-type: none"> <li>Individual-level capacity to implement projects (capacity to fulfill the functions of district-level training)</li> </ul>	●	●
		Awareness	<ul style="list-style-type: none"> <li>Recognition of the importance of INSET and of teachers’ attitude as professionals who should constantly upgrade their skills</li> </ul>	—	●
School level	Societal (Institutional)	<ul style="list-style-type: none"> <li>INSET budgeting</li> </ul>	—	●	
	Organizational	<ul style="list-style-type: none"> <li>Teachers’ capacity to learn from one another</li> <li>Monitoring capacity</li> </ul>	—	△	
	Individual	Knowledge Skills Techniques	<ul style="list-style-type: none"> <li>Teachers’ capacity to comprehend</li> </ul>	—	△
		Awareness	<ul style="list-style-type: none"> <li>School principals take a cooperative stance based on the awareness of the importance of INSET and of constantly upgrading teachers’ skills</li> <li>Teachers are willing to attend INSET</li> <li>Teachers express their intention to use what they learned through INSET in the classroom</li> </ul>	—	△

Source: Composed by JICA Research Group, Institute for International Cooperation (IFIC) (2002)



## ■ Project Features which Contributed to the Establishment of INSET as a System

Although the project was not initially planned from a CD perspective in its PDM, it succeeded in making a contribution to CD promotion because it did not limit itself to the outcomes envisioned in the planning stage, but consciously incorporated activities based on a CD perspective.

Five project features considered to have played a crucial part in achieving this goal are given below.

- 1) In the project formulation stage, the needs of a variety of stakeholders were identified and linked with the political concerns of the recipient country.
- 2) Approaches aimed at securing sustainability, such as utilizing the existing resources of the recipient country in order to form an independent financial base from the project formulation stage, were adopted for all the strategies and tactics in the project.
- 3) Fostering ownership by the recipient country at various levels was emphasized during the implementation process.
- 4) The tangible outcomes obtained as a result of content development and monitoring activities served to attract further support, which included support toward the specification of INSET in policies, and to changes in awareness at the individual level.
- 5) The “waiting” stance of Japanese experts contributed to the capacity enhancement process of the recipient country in the long run. Although resource loading and activity planning had to stay flexible in order to ensure sustainability, the project benefited from full support from the rest of the Japanese personnel involved, given the trust relationships between the experts and other Japanese personnel.

## ■ Recommendations for the Overall Implementation and Management of Technical Cooperation

On the basis of the above project analysis, a few recommendations can be formulated not only for JICA’s cooperation in the field of education, but also for the implementation and management of technical cooperation in general.

### (1) The Establishment of a Sustainable System and the Concept of “Complexity” in CD Achievement

The reason for the success of the project can be found in the careful planning of activities from the viewpoint of sustainability, based on the findings of the preliminary study, and in the thorough implementation of this plan. This process was made possible by the trust relationships built with the Kenyan side from the preliminary study stage. In order to select a sustainable cooperation approach, therefore, it is necessary to grasp multi-level needs through a comprehensive analysis of the recipient country’s capacity, from the project formulation and preliminary study stages. In the case of the SMASSE project, existing capacity was analyzed from the three perspectives of the institutional base,

of the financial base and of human resources, at each of the national, district and school levels. In addition, due consideration must be given to negotiation with the recipient side, as well as to the identification and involvement of key persons.

### **(2) Indirect Assistance Stimulating Developing Country-Driven Efforts**

Indirect assistance aiming to stimulate developing country-driven efforts should encourage counterparts to “think by themselves” in the context of needs assessment, content development, monitoring, evaluation activities, etc., with the purpose of nurturing ownership of the C/Ps. Moreover, the sustainability of ownership needs to be secured through an institutional framework which guarantees that efforts made within the project belong to the recipient country. Flexible operation management which leaves initiative and decision-making in the hands of the recipient side, which is willing to “wait” although it might take longer to produce the desired outcomes, has the potential to make a significant contribution to the CD of developing countries. It should be added that the identification and provision of effective non-economic incentives also represent a vital key to success.

### **(3) Lessons Learned as CD Facilitators with Respect to the Implementation System**

To put into practice the above concept of “complexity” and to engage in the assistance enabling the recipient country’s independent efforts, it is desirable that the JICA Headquarters, overseas offices and the project collaborate closely, so that relevant departments can respond promptly and adequately to on-site needs, from the formulation through the implementation and evaluation stages. It is also necessary to identify and train experts who can act as project managers, who understand the needs of developing country, and who can develop strategic scenarios with a vision for the future. JICA should also aim at maximizing the use of local resources, and to link its various operation schemes in the form of programs. Furthermore, in order to adequately evaluate projects which strive to achieve CD in parallel with their planned outcomes, it is desirable that a project management methodology which allows simultaneous evaluation of project outcomes and CD achievement will be developed.

## Introduction

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### 1 Background and Purpose of the Case Study

The “Strengthening of Mathematics and Science in Secondary Education (SMASSE) Project” was initiated in 1998 with the purpose of improving mathematics and science education in Kenya through the training of in-service teachers in secondary schools. The project set the concept of “lesson improvement” as its key word and endeavored to facilitate the spreading of the training effects to end participants of the training while building an In-Service Training (INSET) system using the cascade approach at national and district levels. Furthermore, it established mechanisms in which part of the tuition fee is allocated to the operating costs of district-level training, thus fostering the sustainability of training management and implementation. In Phase II, which was launched in 2003, a national INSET center was set up by the Kenyan government, and the training was implemented across the country. At the same time, activities, intended to contribute to the strengthening of mathematics and science education at the secondary level in the 30 countries of Sub-Saharan Africa, are implemented through an intra-regional network.

In the context of the worldwide expansion of JICA’s cooperation for mathematics and science education, this case study aims at offering a systematic perspective on the features and lessons learned in the field of cooperation for mathematics and science education, and explore their applicability in the planning and implementation stages of new projects.

JICA emphasizes the need for a “Capacity Development” (CD) approach which supports the enhancement of the problem-solving abilities of developing countries. The second objective of this report is to analyze the project which established INSET in Kenya taking into account a number of aspects such as what stakeholders were targeted in the partner country, what kind of approaches were used in order to stimulate endogenous efforts, what role was played by the Japanese participants, and what kind of achievements and further challenges emerged as a result, in order to put forward suggestions regarding future implementation and management of technical cooperation as a whole. While the project area has been expanding, the focus of the present case study is limited to Kenya.

This case study is expected to be relevant to

- a reference material in the formulation and implementation of similar cooperation projects in the field of basic education and mathematics and science education

- feedback shared by the parties involved in education cooperation and major donors, in their initiatives on strengthening mathematics and science education
- a model for project analysis using a CD analysis framework
- a casebook for personnel and expert training

## 2 Implementation System and Methodology of the Case Study

Two leading offices, the Research Group of the JICA Institute for International Cooperation and Group 1 (basic education) of the Human Development Department, formulated the analysis framework to implement the present case study. In line with this analysis framework, the consultant\* took charge of the field study and the drafting of the report under the direction of the leading offices.

Table 0-1 shows the basic analysis perspectives used in this study, the points of analysis, and the CD framework, as established by the leading offices.

**Table 0-1 Framework of the Case Study**

Basic analysis perspectives	<ul style="list-style-type: none"> <li>• What steps were taken in order to elicit outcomes for the INSET system implemented in the project? Who were the stakeholders and what were their roles in ensuring the sustainability of the training system? Moreover, as the project area is expanding, how can the training system be adjusted to accommodate the needs of each country it is applied to?</li> </ul>
Points of analysis	<ul style="list-style-type: none"> <li>• Content analysis: development of the training pedagogy               <ol style="list-style-type: none"> <li>1) Formulation of pedagogy and lesson improvement methodology</li> <li>2) Formulation of training instruction methods</li> </ol> </li> <li>• Mechanism analysis: what were the organizational, personnel and finance-related aspects concerning establishment of a national-level sustainable training system?               <ol style="list-style-type: none"> <li>1) Establishment of the INSET system</li> <li>2) Institution-building for sustainable training management</li> </ol> </li> <li>• Project features aimed at yielding outcomes               <ol style="list-style-type: none"> <li>1) Features targeted at enhancing ownership by various Kenyan stakeholders</li> <li>2) Role of Japanese experts</li> <li>3) Inter-scheme coordination</li> <li>4) Features related to expanding regional cooperation</li> </ol> </li> <li>• A social environment enabling smooth implementation of project activities (external factors)</li> </ul>
CD perspective	<ul style="list-style-type: none"> <li>• What were the mechanisms providing incentives for Kenyan partners, which were used to ensure the sustainability of institution-building and the related activities?</li> <li>• Who were the actors involved and how did they operate in the above process?</li> <li>• What role did JICA personnel (experts, offices, etc.) play in order to achieve this purpose?</li> <li>• What were the facilitating and impairing external factors and actors and how were they addressed?</li> </ul>

Source: Composed by JICA Research Group (IFIC).

Following the above framework, experiences were extracted chronologically, starting from the project formulation stage to its implementation and evaluation.

\* M. Ota (Chief Researcher, Koei Research Institute)

As shown in Table 0-2, the study methodology used in this case study relied on the analysis of project reports, interviews and simplified questionnaires addressed to Japanese parties, as well as direct and indirect beneficiaries. (Main interviewees are shown in Attachment 2). In addition, related documents drafted by governments and donors were also analyzed. Locations and travel schedules of the on-site study (from February 18 to March 19, 2006) are given in Attachment 3. Results of the on-site study questionnaire are shown in Attachment 4, the state of project implementation in visited districts in Attachment 5, and the state of project implementation in visited schools in Attachment 6.

**Table 0-2 Study Methodology**

Target		Method	Purpose	
Reports*	<i>The Project for Education in Kenya: Record of Study Results for Project Formulation (Material for internal examination) (1995)</i>		Literature review	To grasp project background, stakeholder situations, planning and implementation outlines and their changes, achievements, evaluation results, etc.
	<i>The Project for Education in Kenya: Record of Study Results for Second Project Formulation (Material for internal examination) (1996)</i>			
	<i>Report of the Basic Study Team (1997)</i>			
	<i>Report of the Preliminary Study Team (1997)</i>			
	<i>Report of the Consultation on Implementation Study Team (1998)</i>			
	<i>Report of the Implementation Guidance (Mid-term) Evaluation Team (2001)</i>			
	<i>Report of the End of Project Evaluation Team (2002)</i>			
	<i>Record of Consultation on Implementation of Phase II (2003)</i>			
<i>Information and Data for Mid-term Evaluation (2005)</i>				
Japanese staff	JICA personnel	Headquarter and overseas office personnel in charge	Interview	To grasp project implementation process, outcomes and further challenges
	Project staff	Former JICA experts/domestic support committees	Interview	
		Current JICA experts	Interview	
Direct beneficiaries	Central government organizations	Ministry of Education, Science and Technology	Interview	
		National INSET centers (national in-service trainers)	Interview/simplified questionnaire	
	Local government organizations	District-level board of education	Interview	
		District-level trainers	Interview/simplified questionnaire	
End beneficiaries	Secondary schools	Heads' Association (principals)	Interview	
		Mathematics and science teachers	Simplified questionnaire	
		Students	Simplified questionnaire	

\* Original Reports are written in Japanese.

Source: Compiled based on operational instructions and other materials.

### **3 Structure of the Case Study**

The present case study consists of 4 chapters. Chapter 1 summarizes basic CD ideas, and advances a hypothesis regarding the reasons why the project under study can be regarded as an instance of successful contribution to CD. Chapter 2 clarifies and analyzes the approaches applied within this project in chronological order. In chapter 3, the current situation of the project and its features and initiatives are analyzed from a CD perspective. Finally, chapter 4 highlights the lessons learned from this project, and formulates strategic implications for the overall implementation and management of JICA's technical cooperation.



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## Chapter 1 The Capacity Development (CD) Perspective

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Aiming that its projects will promote sustainable development and yield results with social and economic impact in developing countries, JICA incorporates the concept of CD as a basic perspective into JICA's activities.<sup>1</sup> CD refers to the ongoing process of enhancing the problem-solving abilities of developing countries by taking into account all the factors at the individual, organizational and societal levels. In other words, problem-solving capacity is perceived as an aggregate of a variety of capacities. Currently, JICA is seeking to shift the focus of its technical cooperation to a more comprehensive cooperation based on a CD perspective.

The project, which is taken as the case for this analysis has been recognized as a model of excellence among JICA's education cooperation projects, being conferred the first JICA Award<sup>2</sup> in October 2004.<sup>3</sup> Although in its Project Design Matrix (PDM), this project was not initially designed as cooperation from a CD perspective, it was judged to have contributed to the CD<sup>4</sup> of the partner country by actually establishing "a sustainable system for improving in-service teachers' capability to conduct lessons", a crucial problem-solving capacity in the field of In-service Training for Teachers in mathematics and science education.<sup>5</sup> This chapter will first examine the factors for the capacity necessary for establishing such a system. Second, we will look at the gap between the capacity expected from a CD perspective and the capacity developed through JICA's cooperation (the outcomes expected in the PDM). Third, after having confirmed the relevant capacity factors, we will put forward a tentative answer to the question of how a project which was not designed as a CD-based cooperation could contribute to the CD of the partner country and how it filled the gaps.

<sup>1</sup> JICA Task Force on Aid Approaches (2004)

<sup>2</sup> The JICA Award was established in 2004 as a recognition system for JICA-implemented projects distinguished with outstanding results. 21 projects including the project under study were commended for the first award. (Of these, 3 projects targeted the Sub-Saharan area including the project under study). In the future, the award will be granted every 5 years, as part of the ceremony, marking the anniversary of the founding of JICA.

<sup>3</sup> The end of project evaluation team (dispatched in October 2002) assessed the project as follows.

- A successful project which not only achieved the establishment of an In-Service Training (INSET) system and the qualitative improvement of mathematics and science education (especially in the area of teaching methods), but also used an original approach in its project management methods, thus constituting a model for future activities.
- The achievement of project sustainability through an original approach which respects Kenyan ownership and introduces the "beneficiary-payment principle", a stimulus for self-help efforts on the part of the recipient country, is particularly worth mentioning.

Source: JICA Social Development Cooperation Department (2002) (summary).

Furthermore, in the Report of the mid-term evaluation team for Phase II (dispatched in November 2005), all the result achievement indicators were expected to be attained upon completion of the project, and it was even considered appropriate to raise some of the indicators due to the rapid progress of the project (JICA Human Development Department 2005).

<sup>4</sup> Mabuchi and Yokozeki (2004).

<sup>5</sup> JICA Task Force on Aid Approches (2004).



## **1-1 Capacity Factors Necessary for Establishing “A Sustainable System for Improving In-service Teachers’ Capability to Conduct Lessons”**

### **1-1-1 CD and JICA’s Technical Cooperation**

During the 1990s, when marked donor fatigue became apparent after the end of the Cold War, it was often argued in the international aid community as to whether development assistance, in particular technical assistance, had actually proven effective in making a difference. The 2002 United Nations Development Programme (UNDP) Report drew the conclusion that technical cooperation should provide a means to support the CD of developing countries, and that donors should collectively pool funds instead of carrying out projects separately. Such criticisms have mainly been directed towards an old type of technical cooperation, which had been adopted by Western countries. It is cited that such cooperation tend to depend upon the dispatch of foreign experts who took over the positions of local experts, and the formulation of Project Implementation Units (PIUs) independence of existing organizations.<sup>6</sup> It also provided a fresh perspective for Japan to review and re-examine its own experience and comparative advantage it has acquired in providing technical cooperation on a project basis. Japan’s technical cooperation approach has also been characterized by the belief that, since developing countries are lacking skills and capacity, the gap should be filled through the input of know-how (technology and knowledge) and facilities from the outside, while foreign experts should “teach” recipient countries the way to development.<sup>7</sup> In reality, the gap-filling approach, which relies on expert-driven project management, has often failed to result in efficient cooperation, due to the scarcity of both counterparts (C/Ps) (either absent or transferred), and budgetary provision by partners. This situation led North European countries, together with UK and the UNDP, to point out that gap-filling technical cooperation can actually be detrimental to the capacity development of developing countries, and to insist that the emphasis should be shifted from technical cooperation projects to assistance in the form of financial support. Such recent debate concerning aid framework prompted JICA to examine the complementarity between its technical cooperation and other aid modalities.<sup>8</sup>

### **1-1-2 JICA’s Definition of CD**

In such circumstances, JICA has redefined its technical cooperation from a CD perspective. These efforts have been specifically targeted at designing JICA’s cooperation in such a way as to support the ongoing progress of enhancing the problem-solving abilities, and at consolidating JICA’s role as facilitator providing indirect support. In other words, technical cooperation is no longer seen as the injection from the outside of necessary technology and capital: JICA redefines that it should focus on taking root within the local state of affairs as the local capacity.

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<sup>6</sup> Kanda and Kuwajima (2005).

<sup>7</sup> JICA Task Force on Aid Approaches (2004).

<sup>8</sup> JICA Institute for International Cooperation (IFIC) (2005a).

The JICA Institute for International Cooperation (2006) has defined CD as “the process of enhancing the overall problem-solving abilities of developing countries by taking account all the factors at the individual, organizational, and societal levels” as shown in Table 1-1. The definition conceives of technical development not as “carrying out CD” but as “supporting the endogenous CD of developing countries.” This idea characterizes capacity as “the ability of developing countries to solve development problems on their own” and focuses on their proactive efforts (“endogeneity of capacity”) by comprehensively viewing it as “a mixture of a variety of factors including institutions, policies and the social system (complexity of capacity).<sup>9</sup> The role of JICA and its related personnel as facilitators of CD is to strategically position cooperation in relation to the overall picture of necessary capacity, and to help pave the way through various initiatives for the recipient country towards the achievement of independent, endogenous capacity.<sup>10</sup>

**Table 1-1 Three Levels of Capacity**

Level	Definition of capacity
Institutional/Societal	The environment and conditions necessary for demonstrating capabilities at the individual or organizational levels, and the decision-making processes, and systems and frameworks necessary for the formulation and implementation of policies and strategies that are over and above any individual organization.
Organizational	The decision-making processes and management systems, organizational culture, and frameworks required to achieve a specific objective.
Individual	The will and ability to set objectives and advance them using one's knowledge and skills.

Source: JICA Institute for International Cooperation (2005b).

### 1-1-3 CD in JICA's Cooperation for Mathematics and Science INSET

It has been 10 years since JICA started its cooperation for mathematics and science education in 1994. However, JICA's activities in the field had mainly involved teacher training projects aimed at enhancing teaching skills. Without limiting its scope to a traditional transfer of educational skills, the project under study also attached great importance to the development of mechanisms and institutions enabling teachers to make use of their potential for the improvement of mathematics and science education. Consequently, the project may be considered an example of cooperation reflecting the complex character of CD, which seeks to strengthen the overall problem-solving capacity of developing countries.

<sup>9</sup> Aid management based on the concept of complexity is a program-oriented approach which recommends carrying out activities in conjunction with other projects, fund assistance, and support from other donors, which indirectly supports the establishment of necessary mechanisms, institutions and policies on the basis of a complex and strategic cooperation scenario rooted in capacity assessment. Furthermore, such an approach regards support from other donors, local initiatives, the policy and institution environment, and stakeholder relations as a concrete “risk factor” which in the mid- to long term can extend its influence to the project outcomes. It calls for flexible project management, which does not hesitate to adjust the project design or the program structure when significant changes occur (JICA Institute for International Cooperation (2006)).

<sup>10</sup> As CD facilitators, aid donors should constantly focus on nurturing problem awareness and motivation on the part of the developing country, in the course of consensus-building and consultation, project and program formulation, planning and operation, and the evaluation process, based on the examination of CD progress indicators and on a sound grasp of what kind of capacity enhancement is targeted. Such steps are necessary for the aid donor to pave the way leading to CD (JICA Institute of International Cooperation (2006)).

Mabuchi and Yokozeki (2004) consider that the capacity that needs to be developed, strengthened and maintained through INSET for mathematics and science education (a form of problem-solving capacity), is “the developing country’s capacity to constantly upgrade in-service teacher initiative through its own efforts, in other words, a sustainable system for improving teachers’ capability to conduct lessons”. In order to develop and establish such a system, it is necessary to clarify what the mechanisms should be and to set these mechanisms in the institutions of the targeted area through various initiatives in a sustainable manner.<sup>11</sup> The article cites that designing the institutional system of training through actual practice is one of the characteristic features of JICA cooperation for mathematics and science education, and highlights it as a workable approach for effective and sustainable capacity development. Moreover, to achieve the ultimate goal of institutionalizing and extending INSET, the article stresses the following; 1) importance of the acceptability and sustainability of both the funding and training system, 2) the inclusion of mechanisms providing incentives for the parties involved in the operation of the system, 3) an adequate grasping of the influences arising from institutionalization, and 4) the need for strategic publicity and the involvement of key personnel are also important. The necessity to analyze the extent to which the INSET system has been developed and established in all its stages, from the national to the school level, and to take into account the complexity of CD at each stage, in terms of legislation and infrastructure, knowledge, skills, techniques and awareness, is also underlined.<sup>12</sup>

#### **1-1-4 Capacity Factors Necessary for “A Sustainable System for Improving In-service Teachers’ Capability to Conduct Lessons”**

Table 1-2 shows, as an example, the “selected process indicators for measuring the institutionalization and establishment of INSET system” formulated by Mabuchi and Yokozeki (2004), to which the aforementioned three levels of capacity have been added. The table has been modified for relevance to the case under study. The capacity factors necessary for the establishment of “the sustainable system for improving teachers’ capability to conduct lessons” expected in this project, are as follows (Table 1-2).<sup>13</sup>

Let us now turn to an examination of the kind of capacity improvement initially expected within the context of the project. Since the project was not initially designed from a CD perspective, the capacity factors expressed in Table 1-2 were not necessarily specified at the planning stage.

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<sup>11</sup> The overall structure of JICA’s cooperation for securing the sustainable enhancement of in-service teacher leadership in developing countries is reflected in the following components. (1) development of a sustainable INSET system in the targetted area, through a process of trial and error, (2) involvement of policy makers and public relations, (3) system diffusion through training and public relations, (4) dialogue and cooperation for the establishment of policies and institutions (Mabuchi and Yokozeki (2004)).

<sup>12</sup> Mabuchi and Yokozeki (2004).

<sup>13</sup> As this case study focuses on CD analysis in Kenya, activities belonging to the regional component in Phase II are seen as “international contribution” from the standpoint of Kenyan CD.

**Table 1-2 Capacity Factors Necessary for the Realization of “A Sustainable System for Improving In-service Teachers’ Capability to Conduct Lessons” (Progress Indicators of CD)**

			Necessary capacity factors
National level	International contribution		<ul style="list-style-type: none"> <li>Sharing of project outcomes with the countries in the region</li> </ul>
	Societal	Policies	<ul style="list-style-type: none"> <li>INSET is clearly stated in educational policy and education-related legislation</li> <li>INSET funding is included in the budget</li> </ul>
		Institutions	<ul style="list-style-type: none"> <li>INSET institutionalization</li> <li>School notification and follow-through</li> </ul>
	Organizational		<ul style="list-style-type: none"> <li>Development of training facilities, teaching materials and aid</li> <li>Organizational-level implementation of legislation/monitoring capacity (capacity to fulfill the functions of national-level training, including the development of teaching materials and aid)</li> </ul>
	Individual	Knowledge Skills Techniques	<ul style="list-style-type: none"> <li>Individual-level implementation of legislation/monitoring capacity (capacity to fulfill the functions of national-level training, including the development of teaching materials and aid)</li> </ul>
Awareness		<ul style="list-style-type: none"> <li>Policymakers’ acknowledge of the importance of INSET and of regarding teachers as professionals who should constantly upgrade their skills</li> </ul>	
Local level	Societal (Institutions)		<ul style="list-style-type: none"> <li>INSET plan formulation</li> <li>INSET funding is included in the budget.</li> </ul>
	Organizational		<ul style="list-style-type: none"> <li>Development of training facilities, teaching materials and aid</li> <li>Capacity for budget execution</li> <li>Organizational-level capacity to implement projects (capacity to fulfill the functions of district-level training)</li> <li>Monitoring capacity</li> </ul>
	Individual	Knowledge Skills Techniques	<ul style="list-style-type: none"> <li>Individual-level capacity to implement projects (capacity to fulfill the functions of district-level training)</li> </ul>
		Awareness	<ul style="list-style-type: none"> <li>Awareness of the importance of INSET and of constantly upgrading teachers’ skills</li> </ul>
School level	Societal (Institutions)		<ul style="list-style-type: none"> <li>INSET funding is included in the budget</li> </ul>
	Organizational		<ul style="list-style-type: none"> <li>Teachers’ capacity to learn from one another</li> <li>Monitoring capacity</li> </ul>
	Individual	Knowledge Skills Techniques	<ul style="list-style-type: none"> <li>Teachers’ capacity to comprehend</li> </ul>
		Awareness	<ul style="list-style-type: none"> <li>School principals take a cooperative stance based on an awareness of the importance of INSET and of constantly upgrading teachers’ skills.</li> <li>Teachers are willing to attend INSET</li> <li>Teachers express their intention to use in class what they learned through INSET</li> </ul>

Source: Mabuchi and Yokozeki (2004).

## **1-2 Capacity Actually Required for Development, and the Outcomes Initially Expected in the Project Planning Stage**

### **1-2-1 Outcomes Envisioned in the Project PDM**

Since the independence, the Kenyan government has been concentrating on acquiring the knowledge, technology and establishing values and the mindset required in the process of country building through education, with the aim of fostering valuable citizens. Thus since 1970, the government has allocated over 30 % of the national budget to the field of education. However, most of

this funding is used for teachers’ salaries, the majority of other expenses being generally covered by guardians and communities through the spirit of “harambee” (meaning, roughly, “let us pull together and get the job done” in Swahili).<sup>14</sup> Since the 7th National Development Plan, the Kenyan government has stressed the importance of strengthening mathematics and science in secondary education as a means to promote industrialization and sustainable development. Nevertheless, in an educational environment depending on guardians and communities for support, it was extremely difficult to achieve improvements in a subject which requires teaching equipment and materials. As a result, the field saw no qualitative improvement as the quality of teachers also saw no improvement. The clearly unsatisfactory situation of mathematics and science within the context of the final examination of secondary education worried not only the government, but the society in its entirety.<sup>15</sup>

At the United Nations Conference on Trade and Development (UNCTAD) held in April 1996, the Japanese delegation stressed the importance of “educational cooperation to Africa” among other priority issues, and later JICA sent two project formulation study groups to Kenya in September 1995 and April 1996. As a result, in 1996, the Kenyan government requested support from Japan for strengthening mathematics and science secondary education, and in 1998 the 1st phase of the project under study was launched.<sup>16</sup> The results expected in the PDM, which was drafted at launching, as well as those expressed in the PDM Phase II are shown in Table 1-3.

**Table 1-3 PDM**

	Phase I (PDM Second Version)	Phase II Domestic Components	Phase II Regional Components
Overall goal	Capability of young Kenyans in Mathematics and Science is upgraded.	Capability of young Kenyans in Mathematics and Science is upgraded.	Quality of Mathematics and Science Education at secondary level in member countries is strengthened.
Project purpose	Quality of Mathematics and Science education at secondary level is strengthened through INSET among teachers in the Pilot District.	Quality of Mathematics and Science education at secondary level is strengthened in Kenya through INSET for teachers.	ASEI-PDSI is practiced in teacher training institutions and secondary schools in member countries
Outputs	<ol style="list-style-type: none"> <li>1. A system of training for the District trainers in Pilot Districts in Mathematics and Science will be established at KSTC.</li> <li>2. A system of INSET in Mathematics and Science will be established in the Pilot Districts.</li> <li>3. Role of KSTC and District INSET centers as resource centers will be strengthened.</li> </ol>	<ol style="list-style-type: none"> <li>1. A system of training for the District trainers in Mathematics and Science will be strengthened at National INSET center.</li> <li>2. A system of INSET in Mathematics and Science will be established in the Districts.</li> <li>3. Role of SMASSE National INSET Center and District INSET Centers as resource centers will be strengthened.</li> </ol>	<ol style="list-style-type: none"> <li>1. Trainers for ASEI-PDSI based INSET will be produced in member countries</li> <li>2. SMASSE National INSET Center will be consolidated as a resource center for Mathematics and Science in Africa.</li> <li>3. SMASSE National INSET Center will function as secretariat of SMASSE-WECSA.</li> </ol>

Source: Adapted from JICA Social Development Cooperation Department (2001).

<sup>14</sup> The situation was the same for primary education, until the government’s decision to make primary education free and compulsory in 2003, and to cover all related expenditures.

<sup>15</sup> JICA Project Formulation Study Department (1995).

<sup>16</sup> Positioned at the core of the “Program for Development of Primary and Secondary Education (Promoting School Attendance and Enhancing Quality)”, a Japanese cooperation project aimed at improving quality of teachers in primary and secondary education in Kenya, the project under study consists of Phase I (July 1998 – June 2003) and Phase II (July 2003 – June 2008), which focus on Kenyan domestic components and regional components. (SMASSE-Western, Eastern, Central and Southern Africa (WECSA)).

### 1-2-2 The CD Perspective and Planning-stage Outcomes

If we look at the outcomes expected in the project from a CD perspective, as described in Table 1-2, in conjunction with the initially planned outcomes expressed in Table 1-3,<sup>17</sup> the capacity enhancement expected from the implementation of the project should be as shown in the cells outlined with a thick black line in Table 1-4. The cells outside the thick black outline illustrate capacity factors

**Table 1-4 The Gap Between the Capacity Necessary for Establishing “A Sustainable System for Improving In-service Teachers’ Capability to Conduct Lessons” and Initially Planned Capacity**

			Necessary capacity factors
National level	International contribution		<ul style="list-style-type: none"> <li>Project outcomes are shared among the countries of the region</li> </ul>
	Societal	Policies	<ul style="list-style-type: none"> <li>INSET is clearly stated in educational policy and education-related legislation</li> <li>INSET funding is included in the budget</li> </ul>
		Institutions	<ul style="list-style-type: none"> <li>INSET institutionalization</li> </ul>
	Organizational		<ul style="list-style-type: none"> <li>Development of training facilities, teaching materials and aid</li> <li>School notification and follow-through (relocation from districts due to the centralization of authority)</li> <li>Organizational-level implementation of legislation / monitoring capacity (capacity to fulfill the functions of national-level training, including the development of teaching materials and aid)</li> </ul>
	Individual	Knowledge Skills Techniques	<ul style="list-style-type: none"> <li>Individual-level implementation of legislation / monitoring capacity (capacity to fulfill the functions of national-level training, including the development of teaching materials and aid)</li> </ul>
Awareness		<ul style="list-style-type: none"> <li>Policymakers acknowledge the importance of INSET and of regarding teachers as professionals who should constantly upgrade their skills</li> </ul>	
Local level	Societal (Institutions)		<ul style="list-style-type: none"> <li>INSET plan formulation</li> <li>INSET funding is included in the budget</li> </ul>
	Organizational		<ul style="list-style-type: none"> <li>Development of training facilities, teaching materials and aid</li> <li>Capacity for budget execution</li> <li>Organizational-level capacity to implement projects (capacity to fulfill the functions of district-level training)</li> <li>Monitoring capacity</li> </ul>
	Individual	Knowledge Skills Techniques	<ul style="list-style-type: none"> <li>Individual-level capacity to implement projects (capacity to fulfill the functions of district-level training)</li> </ul>
		Awareness	<ul style="list-style-type: none"> <li>Awareness of the importance of INSET and of constantly upgrading the teachers’ skills</li> </ul>
School level	Societal (Institutions)		<ul style="list-style-type: none"> <li>INSET funding is included in the budget</li> </ul>
	Organizational		<ul style="list-style-type: none"> <li>Teachers’ capacity to learn from one another</li> <li>Monitoring capacity</li> </ul>
	Individual	Knowledge Skills Techniques	<ul style="list-style-type: none"> <li>Teachers’ capacity to comprehend</li> </ul>
		Awareness	<ul style="list-style-type: none"> <li>School principals take a cooperative stance based on an awareness of the importance of INSET and of constantly upgrading teachers’ skills.</li> <li>Teachers are willing to attend INSET.</li> <li>Teachers express their intention to use in class what they learned through INSET.</li> </ul>

Source: Composed by the author.

<sup>17</sup> Including outcomes inferred from the PDM activity column.

which had not been included in project planning. The gap is due to (1) the fact that at the start of the project a policy-level approach had not been considered, (2) the donor's position that, instead of targeting schools directly, teachers who have received training at the national center being expected to pass it on through a "cascade approach", and (3) the fact that the change in awareness is not expressly regarded as an outcome of the activities. In other words, while targeting the 3 levels of capacity, the project concentrated on establishing a mechanism for INSET implementation at national and local levels.

### **1-3 Project Features Aimed at Promoting CD (Hypothesis)**

Nevertheless, the project has been judged to have contributed to the establishment and independent operation of the In-Service Training (INSET) for Teachers system. Without limiting itself to the outcomes envisioned at the time of planning, the project consciously incorporated activities reflecting a CD perspective. Below, we would like to tentatively suggest 5 factors that made such activities possible.

- (1) (A multi-level perception of needs) The fact that the needs related to enhancing the lesson conducting capacity of in-service teachers were not only identified with the help of professionals involved in education, but also brought to the attention of policymakers and other key persons from the early stages of the project, may be said to have had a positive impact on institutionalization and budgeting.
- (2) (System-building contributing to sustainability) The establishment of a project implementation system from the early stages which strove for sustainability in terms of the human, financial and institutional resources, in conjunction with the involvement of relevant key persons, not only led to the achievement of the planned results, but also became a steppingstone towards the sustainability and expansion of activities.
- (3) (Nurturing ownership) The incorporation of incentives into the project implementation system and activity methods motivated those involved in the establishment of INSET at different levels, ultimately resulting into recipient-country ownership.
- (4) (Yielding tangible outcomes) As the project progressed, the emergence of visible results in response to the issues and needs identified in (1) started to be perceived by government officials, teachers and various other stakeholders, testifying to the meaningfulness of the project, and thus stimulating the inclusion of INSET into educational policies, as well as the spreading of outcomes to the school level.

- (5) (Support from Japanese staff) Systematic support for the project from the Japanese side, based on the awareness shared by Japanese experts and staff, may also be said to have contributed greatly to the success of the project.

A review of the project approaches will serve to validate the above hypothesis.



## Chapter 2 Features of This Case: Various Approaches Applied to the Project

There are many factors which led to the success of this project which are not cited in the Project Design Matrix (PDM), including the problem-solving approaches during the planning and implementation stages. Therefore, this chapter describes in detail the various approaches applied to this project including the processes which were used to solve the problems that the project faced, based on the experiences of the staff and the other stakeholders, in addition to the main activities carried out after the planning stage. The project will be divided into 3 periods, the Formulation Period, Phase I and Phase II. Table 2-1 shows the main activities of the project (plans for fiscal year 2006 and thereafter are also shown).

**Table 2-1 Main Dynamics of the Project**

		Formulation Stage					Phase I					Phase II					
		1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	08
Formulation	Efforts made by Kenya Secondary School Heads Association	█															
	Development of the mechanisms (dispatch of the JICA study teams)			█													
	Dispatch of the team for preliminary study (signing R/D*1)						█										
National level	Development of on-site systems						█										
	Designing and improvement of the training contents							█					█	█			
	Implementation of the pilot training (in 9 districts)							█									
	Implementation through the domestic training scheme (in 6 districts)										█		█				
	Implementation on a national scale (in the other 57 districts)												█		█		
	Strengthening of mathematics and science in primary education															█	█
	Strengthening of mathematics and science in vocational training schools															█	█
Regional level	Technical Exchange Program						█	█	█	█	█	█	█	█	█	█	█
	Organizing SMASSE*2-WECSA*3 Meetings								█	█	█	█	█	█	█	█	█
	Third country training									█	█	█	█	█	█	█	█
	Other training														█	█	█
	Cooperation with institutions in Africa													█	█	█	█

\*1 Record of Discussions

\*2 Strengthening of Mathematics and Science in Secondary Education

\*3 Western, Eastern, Central and Southern Africa

Source: Composed from Social Development Cooperation Department, Japan International Cooperation Agency (JICA) (2001 and 2002) and SMASSE Project (2005).

## 2-1 Project Formulation Stage (From Dispatch of the Project Formulation Study Team in September 1995 to Signing the Record of Discussions (R/D) in February 1998)

### “Finding Out with One’s Own Eyes and Ears”

All you need to do is to do the same thing that we do in Japan. It is as simple as that. You start to understand things when you act by yourselves and find out with your own eyes, and this helps to reduce incorrect judgments.

Source: Interview with the Chief Advisor Sugiyama. The JICA Expert Hattori also expressed, “We do not take another person’s word for it, but instead gather information by listening and seeing. We should always be suspicious and think constantly about what a person’s real intentions are behind the words.” (Interview with the JICA Expert Hattori)

### 2-1-1 Process of Project Formulation

#### “The Secondary School Heads Association Posed the Problem”

In 1993, Kenya Secondary School Heads Association and the Ministry of Education and Human Resource Development launched discussions concerning whether In-Service Training (INSET) for Teachers could be held for each subject at the cluster level. The discussions were initiated because, in educational circles as well as in society as a whole, it was recognized that there was an urgent need for improvement in students’ abilities for mathematics and science. The training has not been initiated despite the proposal submitted by the Heads Association to the Ministry of Education. JICA’s Project Formulation Study similarly found the necessity for INSET. This made it possible to realize the problem solving measures which have been stressed for many years.

Source: Interview with Kibe, In-house consultant at JICA Kenya Office (former Secretary-General of Kenya Secondary School Heads Association).<sup>18</sup>

In this case the project started in response to the strong needs which were shared by the parents, school staff and government officials. The target of the project was to make “improvements in mathematics and science abilities of the youth” which was a development issue recognized by the national government and in the society in general as a serious problem. Development of a “sustainable” system for INSET was the goal of the project.

Before the project was launched, 3 years were spent formulating the project from 1995 onwards, as Table 2-2 shows. The first study aimed at understanding the needs of the partner country by observing the problems involved in planning and government policies in Kenya (problem analysis).

<sup>18</sup> At the time, the Highway Secondary School (where the In-house consultant Kibe was the Principal) and other schools in Nairobi Province were already operating the INSET using the cluster approach, which was supported by the parents and the schools. The training was organized by the Secondary School Heads Association, responding to pressure from the parents. After retiring from the school, Kibe indirectly supported the project as the In-house consultant at JICA Kenya Office from January 1997.

**Table 2-2 JICA Studies Prior to the Launch of the Project**

	Purpose of the study	Outcome of the study	Significance of the study
Project Formulation Study in the education sector (September 1995)	<ul style="list-style-type: none"> <li>Explore the methods for Japanese cooperation in education through a survey on the present situation in the education sector particularly on mathematics and science education, as well as looking at the problems that the partner country faces. Find and formulate specific possible projects including identifying the already requested proposals.</li> </ul>	<ul style="list-style-type: none"> <li>The most appropriate project to consider was technical cooperation based on grant assistance to improve the quality of mathematics and science teachers in primary and secondary education, in selected pilot districts.</li> </ul>	<ul style="list-style-type: none"> <li>Understand the needs of the partner country based on an analysis of the problems that the country faces (problem analysis).<sup>19</sup></li> <li>“The possibility of the project becoming a model case for Africa” was mentioned.</li> </ul>
Second Project Formulation Study in the education sector (August 1996)	<ul style="list-style-type: none"> <li>Develop a specific proposal for comprehensive cooperation mainly aiming at the strengthening of mathematics and science, using the Project Cycle Management (PCM) method.</li> </ul>	<ul style="list-style-type: none"> <li>The outcome suggested that the most favorable direction was to cooperate in improving teachers’ quality through INSET.</li> </ul>	<ul style="list-style-type: none"> <li>Capacity assessment was carried out using the participatory approach.</li> <li>A favorable direction for cooperation was proposed (see the left column).</li> </ul>
Basic study team for the project (January 1997)	<ul style="list-style-type: none"> <li>Discuss the possibility of cooperation in response to the official request for a project-type technical cooperation for INSET in mathematics and science (in 5 districts, which later became 9 due to the partition of some of the districts).</li> </ul>	<ul style="list-style-type: none"> <li>The study concluded that the INSET for mathematics and science using the cascade approach was appropriate. A strategic scenario (the policy on the training system) was established, including the following: (1) Kenya Science Teachers College (KSTC) would function as the center; (2) the trainers of district teachers would be trained; and (3) the seminars would be held in the pilot districts to improve the abilities of all the mathematics and science teachers.</li> </ul>	<ul style="list-style-type: none"> <li>The strategic scenario was established.</li> </ul>
Preliminary study team for the project (July 1997)	<ul style="list-style-type: none"> <li>Confirm the basic policy for implementation, the implementation plan and the structure for implementation in Kenya, and develop a draft master plan.</li> </ul>	<ul style="list-style-type: none"> <li>Some key issues were agreed on such as the budgetary measures, the implementation center (KSTC), recruitment of 8 full-time Counterparts (C/Ps) and that the training in the 9 districts would be carried out by the independent efforts of Kenyans.</li> </ul>	<ul style="list-style-type: none"> <li>Securing the financial basis and recruitment of human resources were negotiated to ensure sustainability (see 2-1-3 for further details).</li> </ul>
Team for consultation on implementation (February 1998)	<ul style="list-style-type: none"> <li>Confirm the implementation structure of Kenya and sign the R/D.</li> </ul>	<ul style="list-style-type: none"> <li>R/D, PDM and the proposal for the activity plan were agreed, and the budget from the Kenyan government was confirmed.</li> </ul>	

Source: Composed from the reports from above-mentioned studies.

<sup>19</sup> “The government has traditionally recognized that mathematics and science education serves as a foundation for the development of the nation and are not only useful for contributing to the development of industrial technologies. The country therefore enshrines the promotion of mathematics and science education in the National Development Plan and has been striving for improvements in technical higher education, using foreign aid including Japanese assistance. ... The Kenyan Government should expand the use of the beneficiary pay principle in higher education, and allocate public resources to non-labor costs in primary and secondary education. However, the government is required to carry out a reduction in the education budget and reduce the total number of public workers, as well as restructure educational staff under the present structural adjustment. Contradictorily they also need to improve the working conditions of teachers to ensure the quality of teachers, and so the foreign assistance, especially for primary and secondary education, is greatly needed in Kenya for the time being.” (Project Formulation Study Department, JICA, 1995, p. 105)

The 2nd Project Formulation Study team was sent to analyze the present situation of the partner country and to gain a full picture of the capacities that the partner country should strive to achieve, as well as to understand which capacities should be strengthened the most. The study was carried out using the participatory method to nurture Kenyan ownership of the project. (It was a “capacity assessment” although this term was not used for the study at that stage. See 2-1-3.) A strategic scenario was developed in the basic study, which was the 3rd study. The preliminary study team (the 4th study) and the team for consultation on implementation (the 5th study) engaged in patient negotiations concerning the implementation system and method, in order to develop a sustainable training system. The creation of the implementation mechanism which ensures sustainability was almost completed through these processes.

The possibility of this case being used as a model case in Africa was already mentioned at the time when the study was conducted in 1995<sup>20</sup>. The future possibility for the expansion of the project’s activities in other parts of Africa was already being discussed by the Japanese staff at that time.<sup>21</sup>

### 2-1-2 Involvement of Key Personnel

The Japanese staff mainly carried out the problem analysis and capacity assessment, but a participatory approach was also adopted which resulted in the raising awareness of the partner country that it was a central player in the project. The Deputy Chief Inspector of Schools at the Ministry of Education and the Principal of KSTC visited Japan to participate in the training just before signing the R/D, where they came to understand the necessity of the INSET system and its method of implementation. These concepts were totally unheard of in the partner country. This helped smooth the implementation of the project, because of the full support provided by the Deputy Chief Inspector in coordination with the Ministry of Education, as well as the support of the Principal of KSTC in the recruitment of the full-time counterparts (C/Ps). The Principal also lent money from the College budget when disbursement of the budget from the Ministry of Education was delayed.

### 2-1-3 Problem Analysis — “Capacity Assessment” and Deciding the Approach to be Taken

A realistic approach to the project was explored based on the thorough capacity analysis on the organizational, institutional and social aspects of the partner country, while also considering the external conditions. As shown in Table 2-3, the appropriate approach was determined from the

<sup>20</sup> Project Formulation Study Department, JICA (1995). Based on the analysis that “the educational institutes in the partner country have a high absorptive capacity for aid, although the burden of the standing expenses on the country could prove to be a problem,” the conclusion was drawn that “cooperation with Kenya is significant when considering that the country could become a key country and a model for human resource development in Africa, after the 1993 Tokyo International Conference on African Development (TICAD).” It was also pointed out that “there should be discussion concerning the possibility in the future of implementing third country training for educators of mathematics and science teachers from English-speaking African countries.”

<sup>21</sup> Commenting on the submission of the request for the project’s implementation on a national scale from the third year of implementation, the Chief Advisor said, “Showing our intentions in the early stages will give a clear signal to the partner country and serve to entrench the project activities.” (Interview with ex-staff in charge of the project at JICA Headquarters.) The effort seemed to have been made to share the idea as early as possible among the Japanese stakeholders as well as with the partner country.

**Table 2-3 Approaches Designed for the Sustainable Development of the Project**

	Kenyan context (capacity)	Appropriate approaches which enable sustainability	R/D
Institutional basis	<ul style="list-style-type: none"> <li>The national government proposed the strengthening of mathematics and science teaching in secondary education in the National Development Plan, and implemented various measures including construction of school laboratories and increasing the salary of mathematics teachers, which proved to be ineffective.</li> <li>School staff and parents were desperate for the improvement of mathematics and science education because many students were denied the chance to go to universities or were unable to complete their secondary education due to low scores for mathematics and science in the final exams for secondary education.</li> <li>Teachers could be transferred to different schools anywhere in the country because they were national government employees.</li> <li>There is a need for improvements in teaching methods, experiment methods, teachers' manuals as well as development and improvement of teaching materials which meet the requirements of Kenya. Only the national education institutes were able to accumulate personnel, experience and knowledge in Kenya, which is a highly centralized state.</li> <li>Kenyan secondary education was at a point where addressing lesson improvements was possible, i.e. it had minimum facilities, equipment, teachers, textbooks and curricula although there were some difference between schools.</li> <li>Japan was the only donor for secondary education (so it was not necessary to pay any costs for coordination with other donors).</li> </ul>	<ul style="list-style-type: none"> <li>A strong need for the project from political, economic and social perspectives meant there was a high possibility that the training system would become institutionalized.</li> <li>The training system will need to be integrated with the existing job-ranking system set up by the Ministry of Education for future institutionalization.</li> <li>A unique training system set up in one district has little relevance to teachers, who could be transferred to different schools anywhere in the country.</li> <li>The training system therefore should be implemented on a national scale to eliminate the regional divide (the project should be terminated after the implementation of the pilot training if there is no prospect of such a development).</li> <li>The system will adopt the cascade approach taking into consideration the centralized features of the state and the necessity for standardization at the national level.</li> </ul>	<ul style="list-style-type: none"> <li>The document does not mention implementation on a national scale.</li> <li>KSTC will hold a two-week training course in April and August inviting 80 to 100 teachers (it was only 2 weeks in August in reality).</li> <li>The training courses at the district level will be held for a total of four weeks for 300 to 360 teachers during a year (it was only 2 weeks during a year in reality).</li> <li>The cluster level is to be discussed as the project progresses (according to the negotiation process in the Minutes of Meetings M/M).</li> </ul>
Financial basis	<ul style="list-style-type: none"> <li>At the district level, financial resources are scarce because of the highly centralized system of the country.</li> <li>The national government only provides the budget for teachers' salaries in secondary education and the provision of a budget for district-level INSET cannot be expected although getting a budget for the national INSET might be possible.</li> <li>There has been a custom called Harambee (which means "work together" in Swahili) in which the local residents carry out the construction of schools and hospitals as well as improvements to the roads using self-support efforts when the national treasury is lacking finances. The custom is derived from an enthusiasm to promote Kenyan original politics and economy after the country became independent.</li> <li>Secondary education has been supported by school fees.</li> </ul>	<ul style="list-style-type: none"> <li>A budget will be provided by the national government for the national INSET. Their poor ability in funding the standing expenses should be expected at the initial stage of the cooperation (some alternative measures could be the use of the 2KR* C/P fund or the Non-Project Grant Aid).</li> <li>Discussion on the budgetary measures for district-level INSET will continue, although the idea to use a small percentage of the school fees was proposed (such a proposal has to come from the school staff).</li> </ul>	<ul style="list-style-type: none"> <li>The budget for fiscal year 1998/1999 was said to be 12 million Kenyan shillings (Ksh), but the Ministry of Finance proposed an estimate of 10 million Ksh (the actual amount was 1.5 million Ksh).</li> </ul>
Human resource basis (the entry points)	<ul style="list-style-type: none"> <li>KSTC was founded in 1966 as a three-year college for training mathematics and science teachers with Swedish assistance. It is now operated by Kenya after 10 years of Swedish technical cooperation.</li> <li>Extension work for in-service teachers rather than research activities is the appropriate role for the KSTC lecturers, because their main work is educating future teachers.</li> <li>KSTC was the only institute for teacher training which had the concept of lesson improvements, thanks to the education during the Swedish cooperation which emphasized high-quality teaching-methods.</li> <li>The number of teachers in secondary education is small compared to primary education. Their working conditions have been relatively good, which has prevented most personnel from moving to other occupations. The teachers in secondary education have a certain level of knowledge about the necessary subjects. (The training in the project concentrated on teaching methods for mathematics and science.)</li> </ul>	<ul style="list-style-type: none"> <li>KSTC was chosen as the C/P organization.</li> <li>The full time C/Ps for the project (the national INSET trainers) were selected from the KSTC lecturers.</li> <li>Existing human resources were used (the full time C/Ps and teachers) instead of creating new employment.</li> </ul>	<ul style="list-style-type: none"> <li>"Full-time C/Ps will be recruited within 4 weeks of signing the R/D, and the administrative staff will be appointed by June 1, 1998." (8 full-time C/Ps were chosen from the KSTC lecturers in March and assigned in May.)</li> </ul>

\* Second Kennedy Round

Source: Composed from the interview with the Chief Advisor Sugiyama and other materials.

perspective of ensuring sustainability, especially (1) building an institutional basis supported by political endorsements, (2) securing the financial basis and (3) training on human resources basis.

### (1) Institutional Basis

Institutionalization of the INSET (making it compulsory) is essential to ensure the sustainability of the training system. Implementation on a national scale was required considering the highly centralized character of the partner country.<sup>22</sup> Therefore the basic study in January 1997 concluded that the cascade approach was the most appropriate for the training system.<sup>23</sup> Three cascade levels were to be adopted for the training, of which the first is the national level, the second is the district level and the third is the cluster level (gathering several schools). A list of 9 districts was submitted by the Kenyan government as the target districts.<sup>24</sup> (The official requisition designates 5 districts but later it became 9, due to the partition of some districts. There was no change to the target areas.)

### (2) Financial Basis

Establishment of the financial basis was a concern from the beginning.<sup>25</sup> The necessity of budgetary measures by the national government was repeatedly addressed during the study stage. At the same time, there was a shared understanding among the Japanese staff for the necessity of project formulation under the assumption that Kenya had a low capacity to bear the standing costs during the Project Formulation Study which was held in 1995. For this reason, the utilization of the “2nd Kennedy Round (2KR) C/P fund” or the “Non-Project Grant Aid” was suggested to the Kenyan government several times during the 3 years of preliminary study.<sup>26</sup> In many cases, the financial commitment of a partner country is extremely difficult to obtain in the initial period of the project, for political and administrative reasons. Therefore in this project, the commitment of the partner country was gradually brought about by the promotion of the expected project outcomes through the needs survey for the partner country as well as monitoring and evaluation activities. The Non-Project Grant Aid was used for these activities. The national government also developed District INSET Centers spending 200,000 Ksh (about US\$ 2,630) per center, in which the Non-Project Grant Aid was utilized. The budgetary measures for district-level INSET were

<sup>22</sup> Interview with the Chief Advisor Sugiyama. “We considered that there would be no potential for the sustainability of the project if implementation on a national scale was not possible, because it meant that there was no chance for institutionalization, at the end of Phase I. We were thus thinking that there was no point in implementing Phase II (the project should be terminated after Phase I) in that case.” (The Chief Advisor Sugiyama)

<sup>23</sup> Social Development Cooperation Department, JICA (1997a).

<sup>24</sup> The selection of the districts was practically made by the Japanese staff, because the Kenyan staff suggested that consensus through consultation would be impossible due to the strong influence of the relatives and communities (Social Development Cooperation Department, JICA, 1997a).

<sup>25</sup> For example, the Social Development Cooperation Department, JICA (1997b) mentioned, “The degree of Kenyan preparation in hosting the study team for the project exceeded our expectations, which showed the Kenyan enthusiasm for the project. However, the Kenyan inputs, which were repeatedly confirmed during the consultations at this time, might not be totally implemented considering the present financial situation. Japan should consider measures to support the burden of local costs.”

<sup>26</sup> Project Formulation Study Department, JICA(1995), Social Development Cooperation Department, JICA (1997a), (1997b).

not yet determined although the idea to collect a part of the students' school fees was suggested.

### (3) Human Resource Basis

The system for human resource development was almost in place. The Japanese staff requested recruitment of the full-time C/Ps as a condition for the launch of the project since the full-time C/Ps were considered to be indispensable for the project. However, they had not been recruited by the time that the R/D was concluded in January 1998. A condition for the launch of the project in July 1998 was therefore included in the R/D,<sup>27</sup> which was that at least eight full-time C/Ps should be recruited. There would be a Chief Advisor and a Project Coordinator recruited for the project by the beginning of the project, thus the Japanese staff expected that there would be the possibility of postponement or cancellation of the project if necessary.

The fact that the project was truly meeting the needs of the beneficiary country enabled such a bold attitude. According to the Chief Advisor, "There is ultimately no need for serious concern as long as the project meets the needs of the partner country. The Ministry of Education was not especially committed to the project at the beginning. However there was an awareness widely shared by the school staff, parents' associations, the opposition party and the Secondary School Heads Association that the strengthening of mathematics and science education was needed." A major element which enabled such a flexible attitude was also found on the Japan side, where JICA was able to lead the project, to assist in the area of basic education, without a strong influence from the Japanese government ministries and agencies in charge. As a result, 8 C/Ps were recruited (see 2-2-1 (1)) and the project office was set up in the January to June period, with the efforts of the officer in charge of the project at the Ministry of Education (the Deputy Chief Inspector of Schools) and the JICA In-house consultant.

The reasons why KSTC was chosen as the C/P institute lay in its relatively well-functioning infrastructures as well as the fact that it was a college for teachers' training instead of the university. It was therefore assumed that the KSTC lecturers would more likely to be interested in the in-service teacher education rather than in academic research.<sup>28</sup> The KSTC lecturers were also expected to have sufficient abilities to absorb new knowledge because most of them were the graduates of Kenyatta University, whose parent body was the Faculty of Education of Nairobi University. KSTC also had willingness to make lesson improvements because it was the only teachers' college in Kenya where an education which emphasized teaching-methods had been carried out in the past. Therefore KSTC had the correct conditions to accept the technical cooperation.<sup>29</sup>

<sup>27</sup> The project was to start in July in conformity with the start of the Kenyan fiscal year.

<sup>28</sup> Interview with Ikeda, the former Supporting Advisor in Japan/Professor of Hiroshima University.

<sup>29</sup> Interview with the Chief Advisor Sugiyama.

### 2-1-4 Problem Analysis for Training Content Development

Questionnaire surveys, interviews and the focus group discussions were held by the preliminary study team in July 1997 to understand the current conditions, which resulted in the issues being identified as shown in Table 2-4.<sup>30</sup> However, the training contents were still at the examination stage during the project formulation period, as shown in the report which says, “The establishment of sustainability requires development of teaching-methods for mathematics and science which meet the needs of the Kenyan environment. Such methods should be developed through observation of the real situation of mathematics and science education in Kenya, from the pedagogic standpoint.”<sup>31</sup>

**Table 2-4 Content Issues of Mathematics and Science in Secondary Education in Kenya (At the Time of the Preliminary Study)**

- Theoretical education is emphasized, and experiments and observation are neglected (because these theoretical lessons correspond to the national exams which lead to the qualifications for completion of secondary school education).
- Equipment for technical training in experiments is lacking as well as the existing one deteriorating.
- There is a need to train new teachers for secondary mathematics and science, as well as the INSET (due to a lack in the number of teachers and the problem of unqualified teachers).
- Mathematics and science lecturers at the teachers' colleges are lacking in technical skills (masters 25 %, doctors 0 %) and in-service teachers are lacking in ability or quality.
- There is a lack of basic laboratory instruments, as well as an inability to operate and maintain them correctly.
- Lack in the development of teaching materials and in teaching methods
- Lack of experience in operation or evaluation of INSET
- There is a need for the INSET project in light of the revisions to the secondary education curriculum.
- Encouragement of awareness of the need for reforms (necessity of training in subjects such as school education which explores what children's development means, educational psychology, and school management and operation)

Source: Cited from the raised problems (3-2-5.) on the education contents (3-2.), pp. 17 – 19, *Report by the Preliminary Study Team for SMASSE Project.*

### 2-1-5 Signing of the R/D

On February 27, 1998, R/D and the M/M were signed by the Chief of the team of JICA for consultation on implementation, the Assistant Minister of the Ministry of Education and Human Resource Development and the Advisor to the Ministry of Finance. Table 2-5 shows the agreed outline for the project.<sup>32</sup> The requested technical cooperation includes the contents of the INSET and the development of tools. However, mechanism development such as institutional development and securing finances are not recognized in the contents of the cooperation, except in the operation and evaluation of the training.

<sup>30</sup> Interview with the Academic Advisor Takemura who participated in the preliminary study team. Also analyzed in these interviews and other surveys were the modules in which the teachers had found difficulty in teaching or students had difficulties in understanding.

<sup>31</sup> Social Development Cooperation Department, JICA (1997b).

<sup>32</sup> The M/M between the Japanese team for consultation on implementation and the Kenyan government authorities in charge on the SMASSE Project in Kenya, Social Development Cooperation Department, JICA (1998). The contents of the cooperation are: (1) curriculum development for INSET; (2) the subject contents; (3) operation and maintenance of laboratory equipment and instruments; (4) development of educational materials; (5) teaching methods; (6) operation of the training; (7) evaluation of the training; and (8) other related issues.



**Table 2-5 PDM for Phase I**

Overall goal	Capability of young Kenyans in Mathematics and Science is upgraded.
Project purpose	Quality of Mathematics and Science education at secondary level is strengthened through INSET of teachers in the Pilot District.
Outputs	<ol style="list-style-type: none"> <li>1. A system of training for the District trainers in Pilot Districts in Mathematics and Science will be established at KSTC.</li> <li>2. A system of INSET in Mathematics and Science will be established in the Pilot Districts.</li> <li>3. Role of KSTC and District INSET centers as resource centers will be strengthened.</li> </ol>
Inputs from Japan	<ol style="list-style-type: none"> <li>a. Dispatch of long-term experts.</li> <li>b. Dispatch of short-term experts when necessary.</li> <li>c. Training of Kenyan C/P personnel.</li> <li>d. Provision of equipment.</li> <li>e. Provision of equipment to KSTC using the Grant Assistance</li> <li>f. Dispatch of the Japan Overseas Cooperation Volunteers (JOCV) groups</li> </ol>
Inputs from Kenya	<ol style="list-style-type: none"> <li>a. Buildings and other facilities necessary for the project.</li> <li>b. Offices and other facilities</li> <li>c. Assignment of Kenyan full-time C/P personnel at KSTC</li> <li>d. Assignment of administrative personnel.</li> <li>e. Expenses necessary for the implementation of the Project.</li> <li>f. Expenses for Mathematics and Science teachers to attend INSET at KSTC and in the Pilot Districts</li> </ol>

Source: Composed from the “PDM second edition” in Social Development Cooperation Department, JICA (2001) *Survey Mission Report (Mid-Term Evaluation) on the Operational Guidance for Strengthening of Mathematics and Science in Secondary Education (SMASSE) Project*. For “e.” and “f.” of “Inputs from Japan” were composed from Social Development Cooperation Department, JICA (1998) *Report by the Team for Consultation on Implementation for SMASSE Project*.

The dispatch of the groups from the Japan Overseas Cooperation Volunteers (JOCV), for mathematics and science, was requested in the Phase I of the discussion on implementation, due to a lack in the number of teachers in Kenya.<sup>33</sup> The dispatch of the JOCV groups started in 1996 in order to link the efforts made by the individual schools, by strengthening the cooperation between the JOCV members, which as a whole would raise the education standard in the districts to which the JOCV members were dispatched.<sup>34</sup> Cooperation between the project and the JOCV groups who were dispatched was discussed during the visit by the preparatory study team in 1997. It was confirmed that the JOCV groups “are supposed to work independently based on the conditions of the request and their activities should be clearly separated from the project.” On the other hand, the importance of two-way cooperation between JOCV groups and the project, such as the information exchanges and feedback from the individual schools on the project’s achievements, was agreed in the discussion.<sup>35</sup>

<sup>33</sup> Interview with Teranishi, the Representative of JICA Regional Support Office for Eastern and Southern Africa, and Hayashi, the Volunteer Coordinator at JICA Kenya Office.

<sup>34</sup> Yamao, and Komine (2006).

<sup>35</sup> Social Development Cooperation Department, JICA (1997a). The project and the JOCV groups kept a loosely-linked relationship based on this policy. 53 members were dispatched as the groups from JOCVs by October 2002. They worked actively, including holding a symposium on measures for examinations in Makeni District. However, the groups’ work is now at the completion stage. The reason for completion is because of the concern that the dispatch of the JOCV groups has been discouraging the efforts of the Ministry of Education in recruiting new teachers. This concern was raised when it was found out that the lack of teachers in local areas was not because of a lack in the total number of teachers in Kenya, but because the teachers were not willing to be recruited in local areas. The discussion between the project staff and the JOCV members in November 2005 drew the shared conclusion that the Kenyan personnel who were trained through the project should take over the successful work of the JOCV members, which will contribute to capacity development in the partner country. Activities such as the symposium on measures for examinations were transferred from the JOCV members to the district-level INSET trainers. (Interview with Hayashi, the Volunteer Coordinator at JICA Kenya Office).

## 2-2 The Project Launching Stage (From Signing the Record of Discussions in March 1998 to the First Training Course)

### 2-2-1 Development of On-site System

#### (1) Appointment of Full-Time C/Ps

KSTC, which is the C/P institution for the project, started recruitment for 2 C/P lecturers for each subject in February 1998, after the R/D was signed, with one lecturer being in charge of the operation of the training and the other lecturer being in charge of creating the contents of the training.<sup>36</sup> Hardly anybody applied for the positions without the encouragement of the Principal of KSTC. The Japanese staff did not put forward any specific requests for the qualifications for the application or any points for consideration, except that the C/Ps should be engaged in the project as full time staff. The applicants were interviewed by KSTC in March and the selected individuals started their work as full time project staff in May.

The 8 selected C/Ps believed that financial incentives would be given to them, because incentive measures were mentioned in the R/D. Aid agencies generally provide incentives for their own projects. However the R/D stated that it would be the Kenyan government who would decide on the incentives. The 8 lecturers insisted to the Deputy Chief Inspector of Schools at the Ministry of Education on their right to receive incentives, backed up by the R/D. However, the Kenyan government repeatedly rejected their request due to “lack of funding.” In May 1999, the C/Ps eventually gave up their demands for money and started fully engaging in their work, after one of the lecturers suggested that they should work to bring change to Kenyan society rather than insisting on money.<sup>37</sup> A visit to a project site which was funded by other donors was conducted to learn lessons from failed projects in neighboring countries. The aims of the visit were to foster an understanding of the responsibilities of the partner country in the planning and implementation of the project, and to show that the partner country should take the initiative as the owner of the project. This led to a thorough understanding by the C/Ps of the reason why financial incentives were not provided for the project. The Academic Head of Biology Department commented, “JICA, unlike the donors in the past, did not pay money. This was in order to nurture Kenyan ownership, and this resulted in improvements in the capacities of the organization and the personnel.”

<sup>36</sup> At the time of the preliminary study in 1997, there were 15 KSTC lecturers for mathematics, 11 for physics, 12 for chemistry and 11 for biology (Social Development Cooperation Department, JICA 1997b). Two lecturers for each subject were recruited from them.

<sup>37</sup> Interview with the Physics Subject Administrator Waititu. According to the Physics Subject Administrator Waititu, it was the biology lecturer Kinyua who suggested ending the calls for financial incentives (the interview with the Physics Subject Administrator Waititu). Also according to the former Head of the INSET Unit Njuguna, Kinyua took the initiative to stop demanding incentives, after learning of the significance of the JICA technical cooperation from the Chief Advisor (interview with the former Head of the INSET Unit Njuguna).

## (2) Assignment of Japanese experts

### “Principles of the Japanese Project Experts”

The Japanese experts will form partnerships with the C/Ps and cooperate with them to achieve a common goal which is the improvement of Kenyan mathematics and science education, instead of the experts unilaterally transferring a certain technology to the C/Ps. Dialogue between the team of experts and C/Ps, as well as decision making processes involving both the experts and C/Ps will be emphasized. Through these interactions, the experts will facilitate the personnel of the partner country in nurturing their ownership and in their taking the initiative for the operation.

Source: Report by the JICA Expert Tokuda on Phase I.

Two Japanese experts were recruited (one as a Chief Advisor and one as a Project Coordinator) for long-term placements in July 1998, and then the project was launched. In August 1998, another long-term expert was recruited as a Biology Education Expert and 4 experts were dispatched for a short term to conduct a needs survey for the partner country. An Academic Advisor was also assigned in June 1999 (his area of expertise at the time was physics education).<sup>38</sup>

In the project launch period, Japanese experts had repeated lunch meetings where they shared their understandings about the significance of the independent operation of the project by the C/Ps, as well as the Japanese role as an indirect supporter. “The Japanese experts are neither to be ignored nor to take the initiative. The role of Japanese experts is comparable to a *Kuroko* who supports a theatrical play from behind the scenes, without whom the play cannot proceed. The experts should always work together with the C/Ps who try to find solutions as they go. The experts should not take the initiative but neither should they push the C/Ps too hard to act,” the Chief Advisor said.<sup>39</sup>

<sup>38</sup> Before being recruited to the project site in 1999, as a member of the basic study team in 1997 the Academic Advisor conducted research, on the modules which the teachers had found difficulties in teaching or students had difficulties in understanding, as well as analyzing the government guidelines for education, text books and teachers’ manuals of the partner country. The research results concluded that the cause of the Kenyan failure in mathematics and science education lay in the teaching methods, which did not succeed in explaining certain abstract concepts in a way that students could understand them, as well as the lack of laboratory instruments. This conclusion led to assistance being provided to the 4 national INSET trainers. They took a training course in Japan in August 1998 and drew up their training curriculums, including the selection of priority teaching items and preparation of annual teaching plans (i.e. determination of numbers of hours for each module and education methods for each lesson, for both Activity Student Experiment Improvisation (ASEI) lessons and other lessons). After being recruited to the project site, the Academic Advisor set a target for fostering personnel with a high ability in mathematics and science in Kenya and Africa, and took on the role of advising and instructing on mathematics and science education. He also advised on assessment methods in education. He assessed the present status of mathematics and science education in Kenya and Africa as well. He adhered to his position as a joint operator with the C/Ps, in order to support self-initiated efforts made by the partner country, and also acted as a guide for the C/Ps. This attitude was derived from his belief that, only with further efforts by Kenyans will it be possible to gain substantial benefits which can contribute to Kenya’s future, such as nurturing of students’ scientific thinking. (The interview with the Academic Advisor Takemura)

<sup>39</sup> Interview with the Chief Advisor Sugiyama.

The Chief Advisor also said, “Firstly, the subject experts should conduct Activity/Student/Experiment/Improvisation (ASEI)- Plan•Do•See•Improve (PDSI) (see below for the description) through preparing the training rather than acting as a role model in the training. Secondly, they should review the outcomes together with the C/Ps. Japanese experts are not choreographers or critics. However they might sometimes need to become an actor and be the subject of study for teaching methods. The experts should try producing teaching materials together with the C/Ps instead of trying to produce perfect materials by themselves.”<sup>40</sup>

### (3) Appointment of Leaders

#### “I enjoyed Being a Leader.”

I was officially nominated as the Head of the Unit by the Chief Advisor in November 1999. I actually enjoyed being a leader. I learned what the role of leader is in the 1st and 2nd year. I enjoyed the leader’s job because unlike routine work, I can put my ideas into effect and receive reaction directly.

A leader needs to present his/her perspective, be committed and have courage, as well as becoming even autocratic at times. I have argued with Japanese staff on several occasions, but we gradually came to understand each other’s positions and views, and worked together once we reached consensus. Being open and honest with each other was the key to this process. Working as a leader also requires administrative abilities and patience. I learned to guide people, who were unable to perform their duties effectively, so that they could learn from their failure. I also learned to give opportunities to other people.

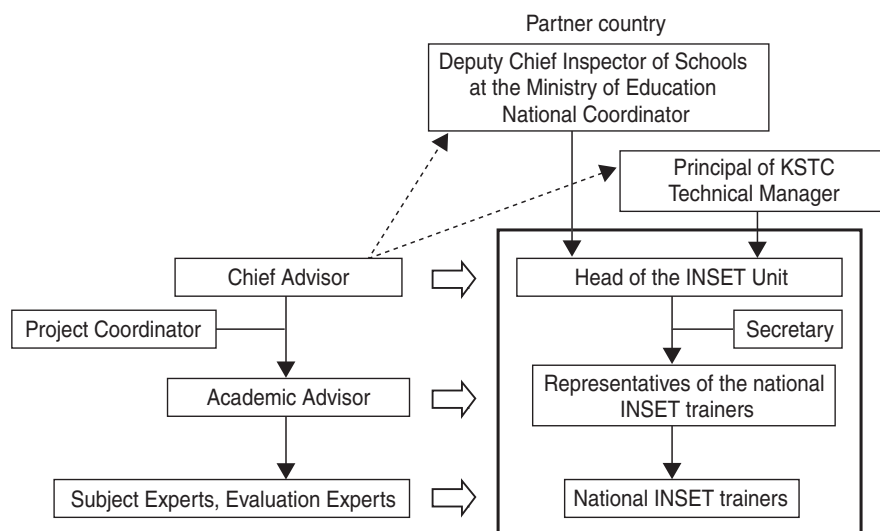
Source: Interview with the former Head of the INSET Unit Njuguna.

The implementation body for the project was the INSET Unit which was newly created at KSTC.<sup>41</sup> The Head of the INSET Unit was nominated from a list of 8 C/Ps by the Chief Advisor in November 1998. The reason for the nomination was that the nominee had the most outstanding potential leadership skills, of the 8 nominated C/Ps (see Figure 2-1 for the on-site implementation system at the national level). The Head of the Unit was appointed when the partner country accepted this nomination.

<sup>40</sup> On the other hand, the Academic Advisor said, “For example in physics, if the experts explain how to teach force in the training, the lessons learned can be applied to other items in the force module because the national INSET trainers and teachers are also experts in physics. However, applying this method in electro-magnetics is difficult. The Japanese experts therefore must be capable of training for different modules. They must also be experts in education at the same time.” He also said, “With this in mind, a combination of experts who can give comprehensive and strategic instruction and advice, and a former JOCV who are skilled in experiments and teaching methods, might be an appropriate mixture for the team of experts at the National INSET Center.”

<sup>41</sup> The M/Ms between the Japanese team for consultation on implementation and the Kenyan Government authority in charge of the project on the technical cooperation for SMASSE Project, in Social Development Cooperation Department, JICA (1998).

**Figure 2-1 On-site Implementation System (At the National Level)**



Source: Composed from M/Ms in the Social Development Cooperation Department, JICA (1998) and others.

The Chief Advisor spent some time with the Head of the Unit after work nearly every day, telling him about the ideas behind the project including the significance of ensuring sustainability, as well as instilling the idea of professionalism in him, i.e. how professionals should be committed to their work.<sup>42</sup> The result can be seen in the high esteem that the Head of the Unit is held in, which is evident in the comment of the former National Coordinator (the present Director of the School Inspection Office at the Ministry of Education), “The Head of the Unit worked so hard sparing no pains in the development of the foundations for the project” until the project ended in December 2005. The achievements of the Head of the Unit were such that his name has become a synonym for the project.

#### **(4) Incentives: Training in Japan and Third Countries**

The opportunity for training in Japan and third countries was provided as an incentive for the key actors in the project. In addition to the above mentioned training in Japan in which the Deputy Chief Inspector of Schools at the Ministry of Education and the Principal of KSTC participated (See 2-1-2), the project also provided opportunities for the Permanent Secretary of the Minister of Education to visit a third country as the Chief of the survey mission, the purpose of which was to coordinate the training in African countries and the Philippines for wider regional application. This survey served as an opportunity for the exchange of ideas with the Permanent Secretary who was normally too busy for such interactions. While waiting for planes there were

<sup>42</sup> Interview with the Chief Advisor Sugiyama. He stated, “Mainly I tried instilling the idea of professionalism into the Head of the Unit such as the idea that professionals should consider about their work even after 5 p.m., because Kenyan people prioritize the family and their private life, which is causing a shortage of personnel who are committed to their work.”

opportunities to facilitate his understanding of the project.<sup>43</sup> Many district-level INSET trainers, and the national and local administrative officers, as well as the national INSET trainers had the opportunities for training in Japan or a third country during Phase I and Phase II. The daily allowance paid during the training was one of the incentives, but more importantly, the participants embraced the training as a chance to improve their Curriculum Vitae (CVs).<sup>44</sup> Many national INSET trainers are still hoping for training to acquire master's or a doctorate degrees.<sup>45</sup> One of the features of the business trips and the training was that they place importance on individuals' capabilities rather than ensuring equality of opportunity. Staff with low positions were appointed to responsible jobs and gained opportunities for training abroad or they were dispatched as experts, depending on their ability and efforts. Thirty-five staff by September 2002 in Phase I<sup>46</sup> and 84 staff by October 2005 in Phase II<sup>47</sup> participated in the training in Japan or in third countries. The system of training and dispatch of experts served to inspire the aspirations of the C/Ps.<sup>48</sup>

**Table 2-6 Locations for Japan and Third-country Training**

	Administration officers	INSET trainers
Kenya	Training in Japan (Hiroshima University, Hiroshima Prefectural Education Center)	Training in a third country (University of the Philippines) Training in a third country (Malaysia)
SMASSE-WECSA	Training in Japan (Hiroshima University, Hiroshima Prefectural Education Center) Training in a third country (CEMASTE, * Kenya)	Training in a third country (CEMASTE, Kenya)

\* Center for Mathematics, Science and Technology Education in Africa

Source: Composed from the Draft Plan for Human Resource Development in the SMASSE Project (Attachment 1) in Social Development Cooperation Department, JICA (2005).

This training is of course not only an incentive but one of the critical components in the project because it facilitates understanding about the cooperation. For example, the trainees can be inspired by the educational opportunities which are available in Japan. Learning about the role of society in education, by observing Origami or study magazines for 1st grade primary school students' homes, led to the consideration that the lessons in schools alone might not be enough for the education to succeed.<sup>49</sup> Visiting the Philippines and Malaysia which are also developing

<sup>43</sup> Interview with the Chief Advisor Sugiyama.

<sup>44</sup> Interviews with the national INSET trainers and the questionnaire survey.

<sup>45</sup> Two mathematics lecturers and 2 chemistry lecturers are presently taking the master's course at a university in Kenya using their paid holidays, apart from the training in Japan.

<sup>46</sup> Social Development Cooperation Department, JICA (2002).

<sup>47</sup> SMASSE Project (2002).

<sup>48</sup> Interview with the staff in charge of the project at JICA Headquarters

<sup>49</sup> Interview with Baba, former JICA Expert/Assistant Professor of Hiroshima University. Otieno former Secretary General of the Secondary School Heads Association, "I visited Japan for the training in February 2000. What struck me the most was the behavior pattern of Japanese people. The walking speed alone can tell us how time is precious for them. I was also impressed with lecturers getting ready for the lecture in the classroom before the bell rang. I instructed students to walk fast for efficient use of time, and lecturers to use the full 40 minutes of the lecture time by being in the classroom before the bell rings."

countries, to see their economic development, inspired the participants' competitive spirit.<sup>50</sup>

## 2-2-2 Development of Training Content Based on the Joint Needs Assessment (Creation of ASEI-PDSI)

### “ASEI Lesson and the PDSI Approach”

In conventional lessons, teachers unilaterally give knowledge to the students, who then memorize the knowledge that they have passively received. The ASEI Lesson and the PDSI Approach are the lesson improvement policy through daily reviews and the methodology used, where teachers nurture students' practical knowledge through the proactive participation of the students. They also change the lesson method to facilitate the development of scientific and logical thinking, as well as the development of a scientific approach.

Source: Interview with the Academic Advisor Takemura.

Japanese experts on a short-term assignment and the C/Ps conducted a survey on the needs of the partner country for the development of training contents from September to November 1998, just after the project was launched. The joint survey was an important process because Kenyan involvement in the survey as the implementation body helped in creating their ownership of the training contents, although the survey took much longer than it would have taken if it had been implemented by just Japanese experts.<sup>51</sup> The survey was conducted through questionnaires, interviews and observations of the lessons. The teachers emphasized the importance of students' proactive participation in the lessons and practical activities rather than simple memorization. However, the reality was that all the lessons were one-sided lectures with the teachers' initiatives added, which showed the gap between the real situation and the teachers' intentions.<sup>52</sup> This finding suggested that the teachers needed training which would help to enable them to construct the student-centered learning methods as the teachers intended.<sup>53</sup>

The short-term experts and the C/Ps had a brainstorming session on the issues to be tackled for the creation of student-centered lessons, based on a list of needs gained through a survey. The session concluded that the points which needed to be realized were: Activity (creation of lessons in which knowledge is gained through activities); Student (shift from teacher-centered lessons to the student-centered lessons); Experiment (introduction of experiments and practicum rather than just

<sup>50</sup> Interview with the JICA Expert Naganuma.

<sup>51</sup> Interview with the Chief Advisor Sugiyama.

<sup>52</sup> Baba (2002).

<sup>53</sup> The reason why the student-centered learning methods are critical is because by realizing student-centered methods, the students will proactively participate in the lessons and accumulate practical knowledge. The lessons of the students, for the students and by the students will lead to the generation of a democratic society, and the development of natural science in freedom could lead to the further development of society. (Interview with the Academic Advisor Takemura)

lecturing); and Improvisation (introduction of simple experiments using readily available teaching materials). The short-term expert whose expertise was psychology suggested to the Chief Advisor that these points should be made into slogans because the project could potentially be a teachers' movement. Thus the slogan "ASEI" was created taking the abbreviation of the above-mentioned points.

Adding to the ASEI which expresses the elements of student-centered lessons, the daily improvement cycle "PDSI" was developed as a way of changing the lesson methods. This set the policy for the project contents, which aims to train the in-service teachers in the implementation of student-centered lessons. There is the shared recognition among the Japanese staff involved in the project that this type of lessons will contribute to the development of students' scientific and logical thinking, as well as the development of a scientific approach. It would in turn help nurturing personnel who will contribute to Kenyan development.<sup>54</sup>

At the beginning of the project, the ASEI-PDSI worked well as a slogan. However the national INSET trainers who were the C/Ps in the project, only knew what these abbreviations meant but did not have skills for their implementation. They would have known the hands-on activities but could not connect them with the concepts which should be taught. From around the end of Phase I, practical activities connecting the study contents were introduced into the lessons on a trial basis. However the lessons have not been designed to facilitate students' thinking, and the teachers still gave students the conclusions or answers at the beginning. These attempts however stimulated the C/Ps who started thinking constantly about the meaning of the ASEI-PDSI. Consequently, an unexpected result was gained, in which the ASEI-PDSI was becoming the Kenyan C/Ps' own tool, rather than one imposed by Japanese staff.<sup>55</sup> The evaluation tool which was developed through the project (Lesson Observation Instrument, ASEI-PDSI Checklist<sup>56</sup>) shows the indicators (lessons that the project aims to achieve) which evaluate the progress in the lesson improvements towards the project goal.

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<sup>54</sup> The report from the team for consultation on implementation took up the issue of elite education and universal education as a point to consider in the project implementation. The report cited the statement of the Assistant Minister of the Ministry of Education and Human Resource Development and said, "The statement stressed improving test scores in mathematics and science as well as passing the exams." However "the team clearly stated to the Kenyan government that contributing to only a few students who proceed to universities is not the project's intention. We should adhere to the principle that the project will help in providing an environment in which more students can have access to an improved mathematics and science education." The report concluded, "When looking at the larger perspective of Kenyan economic and social development, the project should pursue the education of personnel who can serve the industrial development in different parts of Kenya or who can improve their lives based on mathematics and science knowledge." (Social Development Cooperation Department, JICA (1998)).

<sup>55</sup> Interview with the JICA Expert Tokuda.

<sup>56</sup> SMASSE Project (2005).



### Box 1 Why ASEI in Africa?

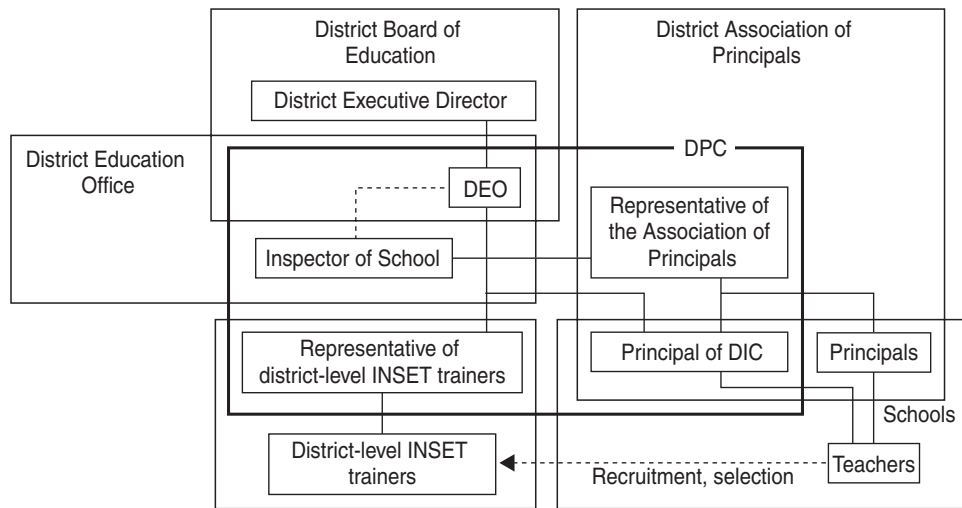
- “The ASEI aims at creating the next generation into those who can think in a scientific and logical way and personnel into those who can work efficiently and effectively. This will also create the spirit of liberty, equality and fraternity which will serve as a power force to change Africa.” (The Academic Advisor Takemura)
- “Experiments certainly facilitate students’ understanding, although the balance between experiments and acquisition of knowledge should also be considered. In Kenya, primary education does not normally involve experiments and Kenyan people do not know how to extract iron sand from sand, for example. Experiments are essential to understand phenomena, and could achieve improvements in the results of written exams in the long term. Improvements in marks cannot be expected in the short term, but the improvements in children’s scientific thinking can be achieved. Gradual change in children who previously merely copied what was on the blackboard will also change teachers and parents. During three hours of observation in the target school after the training, children seemed to enjoy the experiments and have more motivation to learn. Many children in Japan as well as Kenya know words without knowing their meanings due to an education system which disproportionately emphasizes knowledge (similarly many adults do not know the meanings of words). The mechanism of a lighter or a reflection in water can easily be explained as physical phenomena, but few people can connect them to knowledge gained in physics lessons at school. In order to overcome this situation, Science Festivals are organized and fun experiments are introduced into the science lessons in Japan.” (Tsutaoka, former JICA Expert/Prof. of Hiroshima University)
- “The slogan ASEI initially sounded odd but it was a tool for the popularization of the project. From an academic view point, there are many more approaches for the improvement of mathematics and science education other than the ASEI method. However we will carry on emphasizing ASEI for the time being, because we firmly believe that the failure of mathematics and science education on the African continent derived from the teacher-centered lessons. Most of the African countries have recognized for a long time the need for a change in the lesson practices but nothing has been done. ASEI might not raise the scores in exams, but it will certainly improve the academic abilities of the children in fifty years time. Long-term efforts are essential based on such consensus.” (The Chief Advisor Sugiyama)
- “The ASEI-PDSI would help in finding the ways to foster rational thinking in developing countries where education opportunities are extremely limited, unlike Japan where the society and the family offer various opportunities. Giving students a chance to question is the key, instead of making them memorize.” (Teranishi, the Representative of JICA Regional Support Office for Eastern and Southern Africa)
- “I learned teaching methods through work. I learned how to construct lessons and do not need to memorize. I can facilitate logical thinking and empower students in the classroom. In our teaching methods we used to create something like robots, without the power to think. My thinking was liberated thanks to SMASSE and we are now educating people. The difference between people and robots is that people think by themselves and exercise their ingenuity. What ASEI-PDSI teaches us is how to liberate our thinking.” (Njuguna, the former Head of the INSET Unit)
- “The 2 points that I would like to stress most, out of all the proposals in the project are (1) hands-on activities of ASEI and (2) importance of discussion with other people and listening to other people’s opinions. Regarding (1), I told students to use their hearts, eyes, ears and noses as well as hands in the lesson. With regard to (2), meeting and exchanging ideas with other teachers during training was also a valuable experience because there are so few opportunities for teachers to gather in one place otherwise.” (Otieno former Secretary General of the Secondary School Heads Association)

**2-2-3 Establishment of Training Mechanisms and Steps Towards Institutionalization**

**(1) The First Stakeholder Meeting**

The District Planning Committee (DPC) was organized for the implementation of district-level INSET. The District Education Officer (DEO) was appointed to be the DPC Chairperson and the District Inspector of Schools was appointed to be the District Coordinator/the DPC Secretary. The representative of the Secondary School Heads Association was appointed to be the Financial Officer. The Principal of the school which was chosen as the District INSET Center (DIC) and the representative of the district-level INSET trainers joined the DPC as members. The DPC thus involves all the main actors in the district education sector (see Figure 2-2). The 1st Stakeholder Meeting with these actors was held in April 1999.<sup>57</sup>

**Figure 2-2 DPC**



Source: Composed from SMASSE Project (2005), Social Development Cooperation Department, JICA (1997a) and others.

Firstly, the C/Ps presented the outcome of the survey on needs of the partner country. The conclusion was that the 30 days of intensive training (10 days each year for 3 years) should be conducted to attempt a breakthrough in the stagnant situation of mathematics and science education, and that the appropriate training system would be the cascade approach (see Figure 2-3) and the training contents should be ASEI-PDSI. However, there was no funding available. The stakeholders came to the decision that they themselves would discuss and find a way to implement the district-level INSET, including the funding method. The Japanese staff did not attend the meeting to avoid the obvious conclusion which was that JICA should fund the

<sup>57</sup> The project members organized this meeting targeting the DEO, the Principal of the DIC and the representative of the district-level INSET trainers. The members were invited by the Ministry of Education and 51 people attended in the meeting in Nairobi.

training.<sup>58</sup> The meeting adopted a participatory method, and each group made proposals on the themes which they took charge of, such as the budgetary measures or the disbursement method of the fund. The Ministry of Education and the counterparts were hoping to utilize part of the Development Fund which is collected from a part of the school fees as the financial resource. The Development Fund is the fund reserved from a part of the school fees that the school collects from students or the parents, which will then be used for necessary expenses in the operation of the school at the discretion of the Principal (2,000 Ksh per student per year).<sup>59</sup> The fund could be allocated to purchase school buses or to pay teachers' training costs. The use of the Development Fund is left to the exclusive prerogative of each school. The Japanese staff and the other stakeholders in the partner country both understood that the schools had to take the initiative in proposing to use the Development Fund, while also realizing it is the most realistic possibility. The Head of the INSET Unit said "I could not propose the use of the Development Fund from my position and, during the dinner in the previous evening, suggested one of the participants to propose the idea in the stakeholder meeting."<sup>60</sup> The idea of collecting the training expenses from school fees was proposed by the participant the next day and the proposal received unanimous support. One of the reasons why the proposal did not meet with strong opposition was probably because the stakeholders and the principals genuinely felt the necessity for strengthening of mathematics and science education and because it was an urgent issue to tackle. In addition, the fund for training would take up less than 10 % of the Development Fund (i.e. about 1 % of the total school fees). Thus a decision was made that the DPC would collect 70 – 150 Ksh per student from the Development Fund depending on the needs of the district. This would be used as the budget for the district-level INSET sessions which were to be held in April 2000 and onwards. DPC was also to manage the fund as the SMASSE Fund. As a result, the original intention became reality, where the schools (parents) fund the district-level INSET, the Ministry of Education funds the national INSET and JICA funds needs for equipment and materials.<sup>61</sup>

Another outcome from the meeting was the creation of the guidelines for the operation and management of the district-level INSET, including the budget guidelines.<sup>62</sup>

<sup>58</sup> "We considered that this meeting (the 1st Stakeholder Meeting) would be the key to future development. The project policy was that the project would not provide the daily allowance or accommodation fees. However we provided daily allowance and accommodation fees to the participants of this meeting from the consideration that we do not have to take a risk that far. We also invited the official in charge of the project from the Ministry of Education to whom the district officials normally cannot talk directly, to motivate the participants." (Interview with the Chief Advisor Sugiyama)

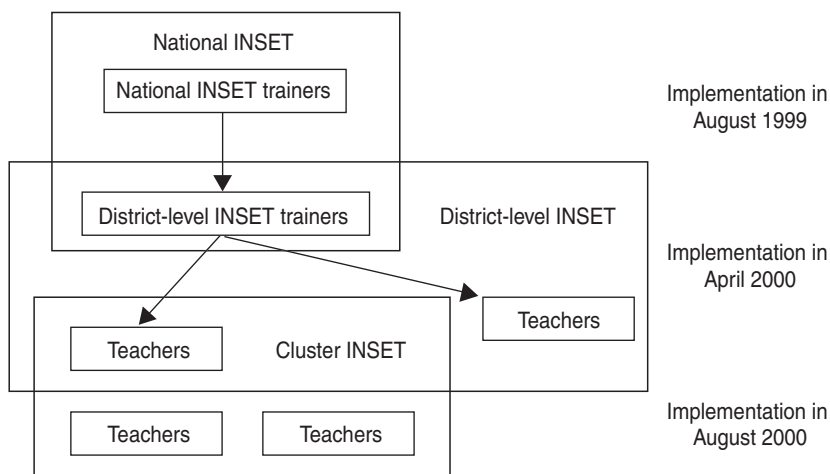
<sup>59</sup> "The present annual school fees for the secondary schools are 22,000 Ksh for the provincial boarding schools and 14,000 Ksh for the district day schools (2006). The annual school fees are used to pay the costs of textbooks, the costs of maintenance of facilities, (costs of accommodation in the case of boarding schools,) labor costs for non-academic staff and the Development Fund. Training on curricula organized by the Secondary School Heads Association has also been held using a part of the school fees." (Interview with the Local Technical Coordinator Kibe)

<sup>60</sup> "It was very helpful (for the Ministry of Education) because they did not have the budget of the national government at the time." (former Head of the INSET Unit Njuguna)

<sup>61</sup> "This decision suggests that a consensus was reached among the district stakeholders, in that they are willing to allocate a certain amount from the school fees for the improvement of teachers' abilities." (Interview with the Chief Advisor Sugiyama)

<sup>62</sup> SMASSE (2002) is presently used as the guidelines for the operation and management of the project. Attachment 1 shows the budget guidelines from SMASSE (2002).

**Figure 2-3 The Flow of National and District-level INSET as Planned Initially, and the First Training Session**



Source: Composed from Social Development Cooperation Department, JICA (1998), (2002).

## (2) Participation at the National Convention of the Secondary School Heads Associations

The then Deputy Chief Inspector of Schools at the Ministry of Education (the National Coordinator) and the Head of the INSET Unit participated at the National Convention of the Secondary School Heads Association in 1999, 2000 and 2001. Their purpose was to proactively promote the project, which included introducing the project, to the Associations of Principals, as they had a strong influence on the decision-making of the Ministry of Education. At the same time, the then Secretary General of the Secondary School Heads Association, who was the Principal at the pilot district DIC, was identified as the key person in the project and so he was sent to Japan in February 2000 where he participated in the training. The Secretary General of the Secondary School Heads Association, who was fascinated by the project, acted as a promoter of the project and “actively promoted” the project at the National Convention.<sup>63</sup> This led to Principals from all over the country having high expectations for the project, and the Secondary School Heads Associations put forward a requisition to the Ministry of Education requesting implementation of the project on a national scale in 2001.

### 2-2-4 The First Training Implementation (First Cycle)

#### (1) The First National INSET

The district-level INSET trainers were selected for each pilot district in February 1999. The national INSET trainers were involved in this process. The selected district-level INSET trainers visited KSTC in Nairobi in August 1999, to participate in the national INSET. However, the

<sup>63</sup> Interview with Otieno, former Secretary General of the Secondary School Heads Association.

budget from the Ministry of Education was not in place by the time of the 1st national INSET session.<sup>64</sup>

The training was made possible by an advance of the money from the KSTC (later paid back through the budget disbursement from the Ministry of Education) and also by the registration fees collected by the District Education Office (1,000 Ksh per district-level INSET trainer and 16,000 Ksh per district). The collection of registration fees was implemented to test the commitment of the districts, in spite of the concern that collecting fees from districts might reduce the numbers participating. As a result, 90 % of the expected number actually participated in the training.<sup>65</sup> The budgetary measures from the Ministry of Education for the national INSET were implemented without delay from the following year onwards, and the SMASSE Fund which were collected from each district were used to pay the travel expenses of the district-level INSET trainers so that they could participate in the national training sessions. The SMASSE Fund was also used to pay for costs of the district-level INSET courses. In this way the financial basis of the project was established in this period, which made the implementation of the project on a national scale possible.

After the launch of the 1st national INSET, some of the district-level INSET trainers started demanding the per diem payments for participating in the training.<sup>66</sup> The Academic Advisor (the area of his expertise at the time was physics education), who had just been recruited to the post, directly talked to the district-level INSET trainers who boycotted the training. They apparently demanded the per diem payment so that they could purchase souvenirs. The Academic Advisor reminded them that “the money paid to the district-level INSET trainers to participate in the training had originally been intended to be used for the students.” He also told them about the essence of professionalism in which “professionals are people who work for self-realization, and making efforts at lesson improvement is an obligation for teaching professionals.” The problem was solved without any further action. The fact that the district-level INSET trainers participated as representatives of the district helped in settling the problem. This experience led to the introduction of new content into the national INSET, such as team-building and morality of teachers. A lecture on wage structures was also introduced. The lecture was commissioned out to

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<sup>64</sup> “The R/D stated that the national INSET would be funded by the Kenyan government, but I was considering alternative measures because I predicted that the budget would not be implemented from the 1st year.” (Interview with the Chief Advisor Sugiyama) “The cause of this delay was the Ministry of Finance who put off the budgetary implementation plan because they had no understanding of the project. The money for the 1st training was borrowed from the KSTC. The budget was implemented in October or November 1999 after the training, and the money was paid back to the KSTC.” (Interview with former Head of the INSET Unit of KSTC Njuguna)

<sup>65</sup> 1,000 Ksh from district-level INSET trainers was to be allocated for food costs during the training.

<sup>66</sup> “Paying the daily allowance for the seminars organized by donor countries has been a common practice although the seminars held by the Kenyan government normally have not paid a daily allowance, due to lack of funding. The problem is becoming more complex because some seminars held by the Kenyan government now also pay the daily allowance.” (Interview with the Chief Advisor Sugiyama)

the Teachers Service Commission (TSC)<sup>67</sup> and this was effective in raising the awareness of TSC as a stakeholder.<sup>68</sup>

Initially the training sessions used the style of university lectures which were totally lacking in inspiration.<sup>69</sup> It was found that the reasons for this were that the INSET trainers were lacking in experience for teaching INSET because they were originally lecturers in the Teachers College, and that traditionally in Kenyan education they have neglected experiments and emphasized lectures, which led to a poor connection between lectures and experiments. There has been a separation where by the lecturers take charge of lectures and the experiments were left to the laboratory assistants. However, experiments should essentially be integrated into the lectures. Thus experiments should be designed by the teacher as a part of the curriculum, although the preparation for the experiments could be left to the laboratory assistants. Since the experience of the initial lectures, efforts were made to change the mindset of the national INSET trainers so that they would start focusing on the theme of how to improve the students' academic ability rather than using a training-style in the lectures which would simply transfer knowledge.<sup>70</sup> The training was originally planned for a total of 3 times, but a fourth training course (the fourth cycle) was added to ensure continuation of district-level INSET after the national training ended, and also to ensure that improvements would reach the students-level.

## (2) The First District-level INSET

The first district-level INSET course was held in the pilot districts in the holiday period in April 2000, which was after the first national INSET course. The first cluster training course was also held in August 2000. Some districts had difficulties collecting the SMASSE Fund for the first district-level INSET. These districts managed to hold the training by borrowing the necessary money from the schools which were designated as the DIC.<sup>71</sup> After the National Principals' Meeting concluded that the training is necessary, the project encouraged the Principals of each

<sup>67</sup> The TSC is affiliated to the Ministry of Education and manages recruitment for all the teaching professions (except for the administrative officers for education at the Ministry of Education or District Education Offices, who are managed under the Public Service Commission together with other civil servants. Not only teachers but also full-time C/Ps for the project are under the control of the TSC. When the persons under the Commission's control become the administrative officers, their last positions are favorably taken into account, but it is not the case for career changes of the officers: the officers are required to start their teaching professions from scratch (On-site research interview).

<sup>68</sup> Interview with the Academic Advisor Takemura.

<sup>69</sup> Interview with the Academic Advisor Takemura. After the first national INSET, the Japanese experts and the 8 national INSET trainers had an evaluation meeting, where they concluded that the university-style lectures should be changed to training focusing on the activities of the in-service teachers (Interview with the Physics Subject Administrator Waititu).

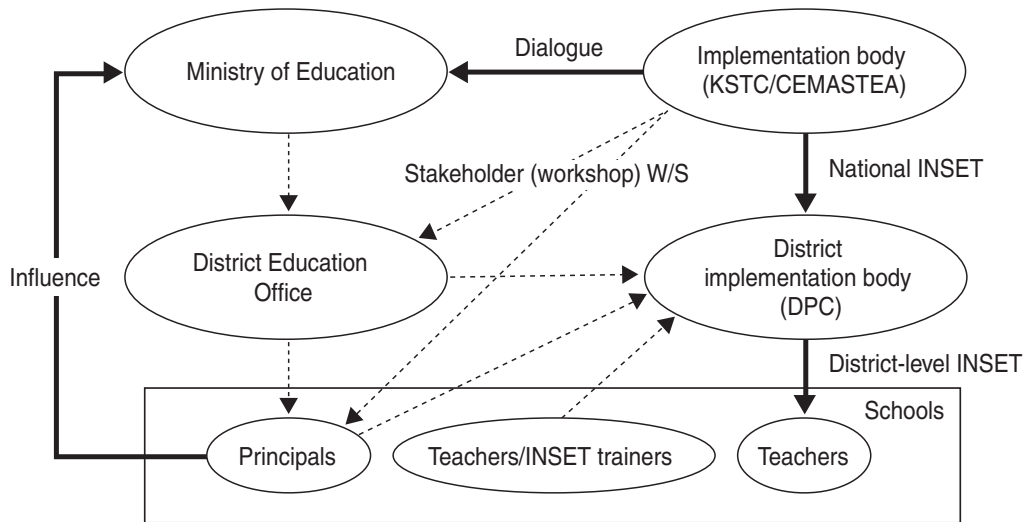
<sup>70</sup> "Preparatory experiments before the training have now become common at least among the national INSET trainers, although the degree of practice is different between individuals." (Interview with JICA Expert Hattori)

<sup>71</sup> Interview with the Chief Advisor Sugiyama. Later the monitoring efforts showed that there were dramatic improvements in lesson quality achieved at the national and district-level INSET, and there was a case where "the fund which could not be collected for the 1st training was successfully collected after the effect of the training was recognized at the school level." (Interview with Otieno, the former Secretary General of the Secondary School Heads Association)

district to examine the implementation methods themselves. The cluster training courses were also held up to in the second training cycle in 2001. However after the second cycle, the cluster training courses were stopped and district training was held only at the district level to avoid a heavy burden being put on the district for the preparation and logistics for the cluster training, as well as to avoid lowering the quality of the cluster training.

Figure 2-4 shows the project implementation structure which was established through trial and error.

**Figure 2-4 Project Implementation System**



Source: Composed by the author.

Note: CEMASTE was assigned as a center for the national INSET starting from Phase II.

Table 2-7 shows the main work during the launch period of the project.

**Table 2-7 Main Dynamics of the Project Launching Stage**

	Main events	Reference
January 1998	Training in Japan at which the then Deputy Chief Inspector of Schools at the Ministry of Education and the then the Principle of KSTC both participated	2-1-2
February 1998	Signing the R/D	2-1-3
May 1998	Recruitment of the national INSET trainers (4 for the operation and management and 4 for the development of the subject contents)	2-2-1 (1)
1 July, 1998	Launch of the project (recruitment of 2 Japanese experts)	2-2-1 (2)
August 1998	Training in Japan in which the 4 national INSET trainers (in charge of operation and management) participated	2-2-1 (4)
September – November 1998	Needs assessment of the partner country	2-2-2
January 1999	Technical exchange program (visit to the DFID* project in Uganda)	2-2-1 (1)
April 1999	Stakeholder Meeting	2-2-3 (1)
June 1999	Recruitment of the Academic Advisor (the then expert in physical education)	2-2-1 (2)
June 1999	Technical exchange program (visit to the DFID project in Uganda)	2-2-1 (1)
May – July 1999	Curriculum development for the national INSET, preparation for the first national INSET	2-2-2
July 1999	Hosting the Technical exchange program (visit to the Ghana project team)	2-3-3
July 1999	Participation in the National Convention for the Secondary School Heads Association (by the Head of the INSET Unit)	2-2-3 (2)
August 1999	The first national INSET	2-2-4 (1)
August 1999	Training in Japan in which 4 national INSET trainers (in charge of subject contents) participated	2-2-1 (4)
September 1999	Evaluation of the first national INSET (by the national INSET trainers)	2-3-1 (2)
February 2000	Training in Japan in which the then Secretary General of the Secondary School Heads Association	2-2-3 (2)
April 2000	The first district-level INSET	2-2-4 (2)

\* Department for International Development (UK)

Source: Social Development Cooperation Department, JICA (2001b).



## 2-3 Implementation Period of District-level INSET in Pilot Areas (From the First Training Course to the Launch of the In-Country Training)

### “Stimulate Motivation of the C/Ps”

The attitude of the Ministry of Education, Science and Technology,<sup>72</sup> as well as other government ministries and agencies, to the project was passive. However, knowing their unwillingness to return to their original positions, we reminded the trainers for national In-Service Training (INSET) for teachers that, if there was no plan for the future, the project would be ended, and that they would go back to their original positions as general lecturers. In this way we encouraged them to negotiate with the executive officers at the Ministry of Education for an extension of the training courses (implementation of the fourth cycle) and on the necessity of Phase II. This resulted in securing additional full-time staff and a budget increase, as well as the decision to go ahead with Phase II.

Source: Interview with the Chief Advisor Sugiyama.

### 2-3-1 Changes in the Awareness of Recipient Country Officials

#### (1) Daily Practice by the Japanese Staff and Lesson Study Approach

The awareness of the national INSET trainers, who were the C/Ps in the project, gradually changed through daily practice in the initial period of the project. Initially, they despised the visits to the local districts for the basic study, claiming that it was not their job to pay visits to the local districts, as they were the elite who had graduated from Kenyatta University.<sup>73</sup> The Japanese staff passed on to the Kenyan staff the attitude of respecting and appreciating the people surrounding them as well as an appropriate attitude towards education, through daily practice. The former JICA Expert reflected on this and said, “Our first job was to teach the C/Ps the spirit of modesty which is found in the proverb, full ears of corn hang lowest.”<sup>74</sup> One national INSET trainer commented, “That people in high job positions would have normal conversations with us is unthinkable in Kenyan society. However I had to reconsider my attitude towards the district-level INSET trainers and in-service teachers after seeing the Chief Advisor and the Academic Advisor talk to many Kenyan people in an equal manner.”<sup>75</sup>

<sup>72</sup> The Ministry of Education, Science and Technology has become the Ministry of Education since December 2005. In this report, the name “The Ministry of Education, Science and Technology” is used in the cases before December 2005, and the name “The Ministry of Education” is used in the cases after December 2005.

<sup>73</sup> Interview with Baba, the former JICA Expert/Assistant Professor at Hiroshima University.

<sup>74</sup> *Ibid.*

<sup>75</sup> Interview with Nui, the national INSET trainer. The Head of the INSET Unit Maganga also said, “I learnt time management, punctuality for a dead line, securing the quality of training and teaching materials, the attitude towards my job, how to enjoy work, and teamwork.”

The national INSET trainers did not have lesson observation skills although they had technical knowledge about their subjects. The Japanese experts visited schools in local areas to train the national INSET trainers in lesson observation. The teachers in charge of the lessons and the district-level INSET trainers also participated in the lesson study sessions, but the national INSET trainers were in fact the main target of the study. The Japanese experts tried to inspire a spirit of learning in the national INSET trainers by demonstrating teaching methods to them, while finding many points to give compliments to them while pointing out their mistakes so that their pride as elites would not be hurt.<sup>76</sup> The experts also proposed holding meetings for mathematics, to share the findings from the review of the training courses and discuss the improvement measures, and the effort for the improvements was launched.<sup>77</sup>

Lesson demonstrations by the national INSET trainers also started.<sup>78</sup> They were initially not willing to simulate lessons because they were afraid of being criticized. The Head of the INSET Unit who complied with the intentions of the Japanese experts took the visit of JICA officers as the opportunity to hold studies on the lessons. As the opportunities for visits to local districts increased, more national INSET trainers started to understand that the strengthening of mathematics and science could only be achieved when the results were seen at the class-room level. The C/Ps started paying attention to the lessons in the field. The C/Ps started to appreciate the need for understanding students' learning outcomes, which gradually encouraged their enthusiasm for studying the lessons and learning about students. They realized that lesson improvements can be achieved only when they have learnt about the students. These realizations made them ready for active discussions, which in turn provided opportunities for lesson improvements. The motivation for improvements in the lesson contents was thus created.

## (2) Monitoring and Evaluation Unit

The national INSET trainers and the Academic Advisor proposed the need for monitoring and evaluation in 1999. As a result of the survey for the operational guidance which was conducted in December 1999, the two countries agreed on setting up a taskforce and a framework for the evaluation.<sup>79</sup> The evaluations by the Japanese delegations were not sufficient in providing the opportunity to make improvements at the appropriate time. Therefore a self-improvement system was created to achieve a more appropriate implementation of the project. This system also enabled the opinions of the in-service teachers to be reflected in the project.

<sup>76</sup> Interview with Baba, the former JICA Expert/Assistant Professor of Hiroshima University.

<sup>77</sup> Interview with the JICA Expert Tokuda.

<sup>78</sup> *Ibid.* Other study methods for lessons were also gradually introduced. "Bringing out criticism of each other is still difficult because keeping harmony is emphasized in Kenyan society. Lesson demonstrations were not carried out until 2001 in mathematics, but the JICA Experts suggested trying out the newly developed teaching materials to the Mathematics Subject Administrator. Then JICA Experts and the Chief of Mathematics appointed younger trainers to start with, who then carried out the simulations." (Interview with the JICA Expert Tokuda)

<sup>79</sup> Social Development Cooperation Department, JICA (2002).

The cross-subject Monitoring and Evaluation Unit was established and the Academic Advisor was appointed to be the first Chief of the Unit. This position was later taken over by one of the national INSET trainers to address the issue of the ownership of the partner country. The national INSET trainers were not familiar with the operation of computers. Therefore the basic transfer of technology was carried out at the beginning of the project, which included the creation and distribution of questionnaires, analysis of the questionnaire results, calculation of mean values using excel and creation of charts. These functions were initially carried out by the short-term experts on teaching evaluations from JICA. The long-term experts on teaching evaluation were recruited in April 2002. Two trainers per subject, who were good at using computers, took the computer course, and then they taught the trainers of the same subjects how to use the computers. This enabled self-evaluations of the sessions, which were carried out regularly. Thus the foundation for the present evaluation culture was created. The teaching-evaluation experts explained the change in the trainers' awareness and said, "They were not accustomed to reviewing their own practices even if they made mistakes, although they might have pointed out other people's mistakes. Now they cannot wait to see the evaluation of their sessions by the participants and they start entering the questionnaire results as soon as they get back from the training sessions. They inevitably see the comments of participants in this process. This makes them further review their work."<sup>80</sup> The Head of the INSET Unit also mentioned a change in the awareness of the district-level INSET trainers. "They now believe in the effectiveness of the INSET as well as the power of the teachers. With this change in awareness, they even came to: (1) work side by side with teachers; (2) believe through the lessons at the schools that the ASEI-PDSI is the best approach; and (3) recognize the significance of hands-on-activities as well as developing a logical mind (mind-on-activity)."<sup>81</sup>

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<sup>80</sup> Interview with the JICA Expert Hattori. The national INSET sessions were held for the district-level INSET trainers every other week in Phase II. The national INSET trainers therefore had the chance to review their lessons every other week. However "the overall reviewing sessions were supposed to be held every 6 weeks but the actual implementation of the sessions is doubtful because the time for the sessions or the period which the sessions are to be discussed on is not planned." Therefore, "the issue to be tackled now is the development of a system which enables rapid solutions to be found for the problems discovered by individuals at the organizational-level." (Interview with the JICA Experts Tokuda and Hattori)

<sup>81</sup> Interview with the Head of the INSET Unit Maganga.

Table 2-8 shows the monitoring and evaluation tools presently used by the project.<sup>82</sup>

**Table 2-8 Outline of the Monitoring and Evaluation Tools**

Subject to evaluation		Evaluator	Purpose of evaluation	Contents of evaluation	
1	National level	Sessions	Participants in the training sessions	Quality of the training sessions	How to motivate participants, how to interest participants/involvement, adequacy, time management etc.
2		The national INSET trainers	Participants in the training sessions	Ability of the trainers	Planning, implementation, evaluations and improvements
3		Attitude and awareness of district-level INSET trainers	Self-evaluation by the participants in the training sessions	Effectiveness of the training	Change in attitudes or opinions towards lesson processes through the training
4	local level	Sessions	Participants in the training sessions	Quality of the training sessions	How to motivate participants, how to interest participants/involvement, adequacy, time management etc.
5		District-level INSET trainers	Participants in the training sessions	Ability of the trainers	Planning, implementation, evaluations and improvements
6		Attitude and awareness of teachers	Self-evaluation by the participants in the training sessions	Effectiveness of the training	Change in attitudes or opinions towards lesson processes through the training
7	Classroom level	Teachers	Simple tests	Knowledge of the subject	Knowledge on the subject, designing of the lesson plan
8		Lessons	Lesson observers	Lesson quality	How the lessons develop, the teaching methods
9		Lessons	Lesson observers	ASEI-PDSI	Introduction of ASEI-PDSI into the lessons
10		Student participation in the lessons	Self-evaluation by the students	Student-centered lessons	Communication, learning process, emotional aspect
11		Level of learning achievements	Simple tests	Impact (achievements in learning)	Tests for the levels achieved by students

Source: Composed from SMASSE Project (2005).

### (3) Improved Quality of the National INSET

The national INSET initially faced many problems including extended lesson times of up to 120 minutes for lessons designed to be 40 minutes long, and the failure of a chemistry experiment which was in the textbook.<sup>83</sup> However the trainers learnt the importance of rigorous preparation for the teaching materials and sessions rehearsals, taking an objective view of their failures which were recognized through the session evaluations.<sup>84</sup> The initial training sessions were also mainly lectures, with poor teaching materials and teaching methods.<sup>85</sup> However, receiving feedback made

<sup>82</sup> The project has also been promoting cooperation with the Southern African Consortium for Monitoring Education Quality (SACMEQ), which is the teaching- evaluation institute of the United Nations Educational, Scientific and Cultural Organization (UNESCO) since February 2005. This is to avoid being totally dependent on the internal evaluations (thus avoiding evaluations simply for self-aggrandizement).

<sup>83</sup> Later the failure of the chemistry experiment was found to be due to the low purity of the chemical used (interview with the former JICA Expert Miyakawa).

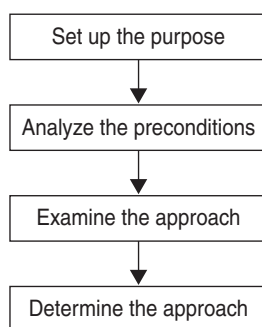
<sup>84</sup> Interview with the former JICA Expert Miyakawa.

<sup>85</sup> Evaluation by the participants of the national INSET, i.e. the district-level INSET trainers (interview with the Academic Advisor Takemura).

the national INSET trainers realize the necessity for improvements through reviewing their own sessions.<sup>86</sup> The Curriculum Review Committee was set up in 2001,<sup>87</sup> which reviewed the national INSET curricula based on the questionnaires for the district-level INSET trainers (the evaluations on the national INSET sessions). As a result of the review, the committee suggested that the national INSET sessions increase the content of hands-on-activities (learning activities with the students using their hands) with less explanation of theories, to produce more participatory sessions. The subject experts analyzed the situation and said, “Changes were observed in the awareness of the Kenyan national INSET trainers in the 3rd and 4th years of the project. The training sessions that they had taught in the first and second cycles in the 2nd and 3rd years mainly emphasized theories. They had a chance to objectively recognize that their own teaching contents were not appropriate when monitoring the district-level INSET sessions (because the district-level INSET trainers were following examples from the national INSET sessions).”<sup>88</sup>

The process for determining the approach to the training is also important for improving the quality of the training. Figure 2-5 shows the process used by the project to determine the approach to the training. This basic and simple process has succeeded in increasing the chances that the C/Ps will reach rational conclusions. For example, there is a taskforce for strengthening mathematics and science in primary education, which was set up to prepare for the launch of the training for primary education (see 2-4-2 (2)). The “purpose” of this taskforce is the development of functions to conduct INSET at the teachers’ colleges, and this training is needed for lecturers who will train in-service teachers. The realization of this training requires an analysis of the “preconditions” such as the present situation of mathematics and science in primary education (lessons and teachers’ ability). This process finally leads to the “examination of the approach”

**Figure 2-5 Process for Determining the Approach**



Source: Interview with the JICA Expert Hattori.

<sup>86</sup> Interview with the Academic Advisor Takemura.

<sup>87</sup> Several cross-subject taskforces were set up other than the subject-units to tackle various issues. For example, the issue-based taskforces presently working include one for strengthening mathematics and science in primary education as well as in vocational-training schools, and one for improvements in staff accommodation for the national INSET trainers. The Monitoring and Evaluation Unit is also one of these cross-subject taskforces (interviews in the field survey).

<sup>88</sup> Interview with the JICA Expert Tokuda.



**The present national INSET session (taken during the field survey)**

which examines the type of training that should be provided. Reaching rational conclusions through discussions is not an easy task for the C/Ps who were brought up with a rote learning education style without any training in scientific and logical thinking. Visualization of the basic pattern to follow seems to be helping to make improvements in logical thinking to some degree.<sup>89</sup> The Japanese staff are also introducing examples from Japan or from the third countries in this process.<sup>90</sup>

### **2-3-2 Preparations for Area Expansion**

#### **(1) Arrangements for Expansion on a National Scale**

A long-term perspective for the project including the possibility of expansion of the project on a national scale was presented by the Chief Advisor to the Japanese staff during the mid-term evaluation of Phase I, which was held in November 2000. This triggered the discussions on the possibility of the expansion of the project on a wider scale. The Kenyan government had already submitted a request for the expansion of the project on a national scale from the 3rd year of Phase I. The JICA Headquarters, however, assessed that it was premature for such an expansion of the project on a national scale.<sup>91</sup> In response to the clear commitment expressed by the partner

<sup>89</sup> Interview with the JICA Expert Hattori.

<sup>90</sup> “This process should also be used for cooperation with other African countries, i.e. firstly we should understand the purpose of the particular country, secondly analyze their capacity (as the preconditions), and thirdly examine and determine the appropriate approach.” (Interview with the JICA Expert Hattori.) “The approach should be adjusted individually for each target country by being sensitive to their needs. Teaching is not the right attitude to take in Ghana or South Africa for example, instead we should aim at building solidarity.” (Interview with the former JICA Kenya Office staff in charge of the project)

<sup>91</sup> Interview with the former JICA Headquarters staff in charge of the project.

country, including the President’s strong requests,<sup>92</sup> training for 6 new districts was launched in April 2001, using a different framework instead of the project framework.<sup>93</sup>

The training for the 6 new districts (hereafter called the In-Country Training) followed the pattern of the training in the pilot districts which had been implemented in Phase I. The training courses are held during one of the long holidays at KSTC (April, August or December) to ensure the availability of the accommodation.<sup>94</sup> The national INSET courses were thus held in April every year, from April 2001 (see Table 2-9).

**Table 2-9 Implementation of the In-Country Training Project**

	1999	2000		2001		2002		2003		2004		
	August	Apr.	Aug.	Apr.	Aug.	Apr.	Aug.	Apr.	Aug.	Apr.	Aug.	
Phase I: black circle (nine districts)		①		②		③		④				District-level INSET
	①		②	①	③	②	④	③		④		National INSET
In-Country Training: white circle (6 districts)					①		②		③		④	District-level INSET

Note: The circled numbers show the cycle numbers of the 4 intensive training courses.

Source: Composed from the Social Development Cooperation Department, JICA (2002) and interviews in the field survey.

This experience of conducting the In-Country Training worked as a simulation for expansion of the project to the national scale. Firstly, the numbers of the national INSET trainers increased and the standardization of the district-level INSET was proceeded, to handle the increased amount of work. The commitment to increase the number of national INSET trainers was gained from the Ministry of Education as a condition for starting the In-Country Training.<sup>95</sup> On the other hand, a decision was made to abolish the cluster training (the 3rd cascade) due to the difficulty in ensuring the quality of the training, after the second training course in 2001 (see 2-2-4 (2)). The target districts were reorganized to enable district-level INSET courses for 200 participants. This size of training ensures a minimum quality for the training even if the preparation for the training is not carried out at the local level, by using the teaching materials and equipment of the national INSET

<sup>92</sup> Request for the implementation of the project in the Baringo District, the home district of the then President, was put forward by the President through the C/Ps (the interview with the Chief Advisor Sugiyama).

<sup>93</sup> Social Development Cooperation Department, JICA (2002). For the training in the additional districts, the “budget for the localization project” was used instead of the project framework budget. This is worth noting as an example of flexible combination of various cooperation frameworks, although presently there is no need for technical cooperation projects to work out various combinations of budgets for different departments inside JICA.

<sup>94</sup> No training course is possible during December which is the Christmas holidays because many Kenyan people are Catholics.

<sup>95</sup> The officer in charge of the project at the Ministry of Education said, “We responded to the request from the SMASSE project for an increase in the number of the national INSET trainers without which, they said, they could not handle the expected amount of work because they only had 8 instructors. The request was put forward at the Joint Coordinating Committee Meeting for the launch of the In-Country Training.” (Interview with the Director of the School Inspection Office at the Ministry of Education Oyaya)

because the national training is also for 200 participants. While there was a difficulty in progressing with the localization work, the standardization of training contents worked effectively.<sup>96</sup> The district-level INSET implementation guidelines, which explained the mechanism for the training, also became more detailed as more Stakeholder Meetings were held.<sup>97</sup> These 2 standardizations made it easy to implement and operate the district-level INSET, and as a result, it enabled an early nationwide expansion of the project. Also as a result of the implementation of the In-Country Training, it was found that a further increase in the number of training facilities and in the number of national INSET trainers was required for the nationwide implementation.

At the 3rd Stakeholder Meeting held in May 2001, the necessity of INSET for teachers from all over the country was decided by the stakeholders from 15 districts (the pilot districts and the additional target districts for the In-Country Training). The Secondary School Heads Association also decided on the necessity of the nationwide implementation of the project in June 2001, and strongly called on the Ministry of Education, Science and Technology for such an expansion. Similarly the 4th Stakeholder Meeting made a proposal to make the training compulsory and resolved the proposal in May 2002.<sup>98</sup> In response to this resolution, the Joint Coordinating Committee Meeting held in 2003 discussed the possibility of the Principals assuming the obligation to ensure the participation of teachers in the INSET.<sup>99</sup> However, a further expansion of the training areas while only using KSTC is not feasible. Therefore the Deputy Chief Inspector of Schools at the Ministry of Education (the National Coordinator) and the Head of the INSET Unit took the initiative, and the search for new centers for the training started.<sup>100</sup>

## (2) Discontent Expressed by Some Teachers

More teachers started expressing their discontent about the policy of no per-diem payment as the compulsory training was enforced. The results of the questionnaire survey for teachers showed that, some teachers did not necessarily want the training although they valued the training highly, as Figure 2-6 indicates. Most teachers recognized the significance of the SMASSE INSET, but almost 30 % of the teachers said that they had no intention of participating in the training, even given that “the financial burden for the training was reduced.”

<sup>96</sup> Interview with the JICA Expert Naganuma. Significance of the INSET can only be understood when the students' performance improves by using ASEI-PDSI. More work can be done in simplifying the contents to make them easier to use. (the interview with the JICA Expert Tokuda)

<sup>97</sup> The guidelines were used in the new districts during the implementation of Phase II. The Director of the District Education Office Kericho said, “There was no problem in holding district-level INSET sessions thanks to the implementation guidelines.”

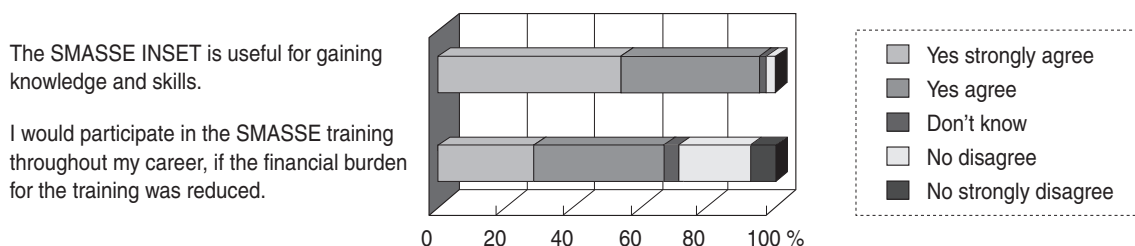
<sup>98</sup> SMASSE (2002).

<sup>99</sup> Minutes of the 5th Joint Coordinating Committee Meeting, Social Development Cooperation Department, JICA (2003). The training was made compulsory at this meeting and participation in the training was to be enforced for teachers nationwide.

<sup>100</sup> Interview with the Chief Advisor Sugiyama.



**Figure 2-6 Group of Teachers Undecided about Participation While Recognizing the Usefulness of the Training**



Source: The questionnaire collected from the field survey.

The biggest reason for teachers refusing to participate in the training is because they lose 2 weeks of their “holidays”<sup>101</sup> which are between the semesters, when they participate in the ten-day training course. Before the compulsory training was enforced, those who accepted the premise of no daily allowance participated in the training, but now there is no choice. The personnel in the Meru South District stated, “The problem of the payment for the daily allowance was brought up after the enforcement of the compulsory training.”<sup>102</sup> This was shown in the questionnaire survey for teachers, in which 6 out of 8 teachers (75 %) in the Meru South District (one of the target districts of the In-Country Training) and 14 out of 22 teachers (64 %) in the Embu District in Phase II expressed their discontent on the per-diem issue in the section for comments.<sup>103</sup> This was contrary to the Maragua District in Phase I where none out of the 12 teachers (0 %) mentioned daily allowance.

The 2nd biggest reason for teachers’ refusal to participate in the training is because teachers are required to stay in the designated accommodation, namely secondary boarding schools, during the district-level INSET to ensure the teachers’ attendance and to prevent their late arrival at the sessions. Significant number of teachers feel uncomfortable with having to stay in student dormitories.<sup>104</sup> The decision was made at the 4th Stakeholder Meeting in 2002 that allowed participants to decide whether they travel from home or stay at the school accommodation, depending on the access to the DIC.<sup>105</sup> However, most districts still principally obligate teachers to

<sup>101</sup> Similarly to the Japanese system, teachers do not have holidays during this period although the schools are on holiday. However, teachers do not recognize this fact.

<sup>102</sup> Also in August 2004, the Office of the President issued a circular aiming to standardize the scholarships as well as rates of daily allowance and the accommodation costs which varied depending on donors, as a measure for human resource development in the public sector (DPM Circular No. OP/CAB/ 2/12A of August 2, 2004). This gave the impression that only the participants of the INSET are not to be provided with a daily allowance, and contributed to the further discontentment of the teachers. As a countermeasure to this discontent, the Assistant Minister of Education issued a circular stating that the budget of the Ministry of Education, Science and Technology (MOEST) would not be able to cover the daily allowance for future participants in the training, and that the daily allowance would not be provided for the training projects of MOEST (MOEST G9/1 of November 11, 2004) in November 2004.

<sup>103</sup> Questionnaire survey for teachers.

<sup>104</sup> This was observed at the interview in the field survey and in the section for comments in the questionnaire survey.

<sup>105</sup> SMASSE (2002).



**An example of the District In-service Training Center (DIC) accommodation (taken during the field survey)**

stay at the school accommodation.<sup>106</sup> Some districts are countering teachers' discontent by explaining that "the training will end after they have participated 4 times in 4 years."<sup>107</sup>

### **(3) Future of the INSET**

The government does not possess enough financial resources for per-diem payments while the discontent towards non payment of the daily allowance is spreading. Those who are working for the project therefore have the shared recognition that the payment of a daily allowance by the project would "kill the project."<sup>108</sup> This is especially true because at present Kenya needs to train teachers not only for mathematics and science in secondary education but all in-service teachers including those in primary education to improve the quality of education. The teachers would not participate in training courses without a daily allowance once the project has started to pay a daily allowance. Ingenuity in improving the training system, which makes the system meets the needs and hopes of the teachers and thereby encourages them to participate in the project is the key to the entrenchment of the INSET in Kenya.

<sup>106</sup> Only the Maragua District allowed teachers to commute from home among the 6 districts visited during the field survey.

<sup>107</sup> The Embu District in Phase II (the interview in the field survey). As described later, a policy for the training to continue after the 4 intensive training courses have finished has not been established and therefore the districts seem to be having difficulties getting ready for future development.

<sup>108</sup> This idea is shared not only among the Japanese staff, but also among the Kenyan officers at the Ministry of Education as well as by the national INSET trainers (the interview in the field survey). For example, the former Head of the INSET Unit said, "I participated in the training sessions for many projects which provided daily allowances, and my main purpose of participating in the sessions was to receive the daily allowances. Now I understand the significance of this technical cooperation. People's demands only escalate once we start providing the daily allowance. Non payment of daily allowances is the key to securing sustainability." (Interview with the former Head of the INSET Unit Njuguna)

Further discussion is also needed on the policy for the training system after the fourth cycle (which is now in operation) ends. Presently we are waiting for the districts to take the initiative in order to nurture ownership by the local stakeholders after the fourth cycle. The resources will be available because the SMASSE Fund will continue to be collected. Districts are expected to implement the training courses as necessary using the Fund.<sup>109</sup> However, there are several issues which need urgent discussion including whether or not the training organized at the national level is necessary, whether the training courses should be compulsory and institutionalized through ministerial ordinances or circulars, and should the choice between stopping and implementing the training be left to the districts. Alternative systems to encourage teachers to participate in the training voluntarily should also be discussed such as giving qualifications.<sup>110</sup>

### 2-3-3 SMASSE-Western, Eastern, Central and Southern Africa (WECSA)

With regard to the regional expansion, the Japanese staff members have understood since the initial stages of the project that there was also a need for the strengthening of mathematics and science education in other African countries.<sup>111</sup> Based on this analysis, the project tried to understand the situation of countries in sub-Saharan Africa as well as having information and technical exchange visit programs with other projects, including visiting Uganda and hosting experts from a project in Ghana and Malawi as part of the technical exchange visit program, since the launch of Phase I. Through these activities, the project was convinced that African countries share the same problem in their mathematics and science education, and so the 1st African regional conference (SMASSE-WECSA conference) was held in 2001. At this conference, proposals including the institutionalization of INSET, improvements in the contents of teacher training and promotion of subject study groups were adopted as a mean to solve shared problems. The secretariat of the African countries' network (SMASSE-WECSA) was established within the project. After the conference, a study team (the official at the Ministry of Education was the chief of the team) was dispatched to Zambia, South Africa, Lesotho, Zimbabwe, Mozambique, Namibia and Rwanda, to have discussions with officials at the Ministry of Education of each country about their needs for training and cost sharing. As a result of the discussions, the countries agreed to fund the daily allowance for participants from their countries in the third country

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<sup>109</sup> Interview with the Chief Advisor Sugiyama and others.

<sup>110</sup> The national INSET trainers are aware of the urgent need for considerations on the measures for CEMASTE in all the districts, after the intensive training courses for the target districts in Phase II come to the end in 2007 (the interview with the national INSET trainer Gathambiri). Although they are aware of the problem, in reality they do not seem to have the time to consider it due to their work on the regional component and newly-launched training courses for lecturers at teachers' colleges for primary education as well as working on new courses for lecturers at vocational training schools (the interview with the JICA Expert Tokuda).

<sup>111</sup> Interview with the Chief Advisor Sugiyama. Also the JICA Expert Naganuma said, "Since I was recruited to this position, I have considered SMASSE to be a project which could contribute to other African countries. When I served my internship at the Department of Economic Cooperation in the Ministry of Foreign Affairs (MOFA), I was told by the officers at MOFA that a technical cooperation project should contribute to the wider region instead of being limited to a target country, and I started to believe in the idea. The other Japanese experts also share the idea that SMASSE should help not only Kenya but also other African countries which face the same problems, and we are working together on these regional activities." (Interview with the JICA Expert Naganuma)

training. This indicated a promising start to the ownership of the training system by these countries (see Box 3 of 2-4).

Another outcome of the regional activities was that the Kenyan delegates broadened their perspective<sup>112</sup> by understanding the importance of ownership<sup>113</sup> and sharing their experience with other African countries through regional activities. In March 2003, 5 Kenyan C/Ps visited the Improvement in Educational Achievement for Science, Technology and Mathematics (STM) in Basic Education in the Republic of Ghana, to have a technical exchange visit program and to have meetings about the SMASSE-WECSA conference which was to be held in June 2003. This visit was carried out as a part of the on-the-job training for the C/Ps for such things as how to prepare a business trip, how to have consultations and how to produce a report.<sup>114</sup>

## 2-4 Project Establishment Stage (From Preparation Period of Phase II to the Early Stages of Phase II)

### Strategic Development of the Project

Japanese staff members have been working as the “scriptwriters” as well as indirect supporters of the project. The project gradually expanded its target areas from the pilot districts, to become a nationwide project in Kenya and then it expanded into other African countries, as the “prophet of education.” This is where the Japanese experts made significant contributions as the “scriptwriters.”

Source: Interview with the Chief Advisor Sugiyama.

#### 2-4-1 Signing the R/D for Phase II

The Kenyan government requested the Japanese government to start “Phase II of the SMASSE Project.”<sup>115</sup> The core contents were the nationwide implementation of the INSET for teachers in Kenya and strengthening of the above-mentioned network of African countries. A stronger commitment by the Kenyan government was expressed during the process of the consultation on implementation, as shown in Table 2-10.<sup>116</sup>

<sup>112</sup> Interview with the Head of the INSET Unit Maganga. “For example in Uganda, I was impressed with Ugandan ingenuity with each group doing different experiments and sharing the results in the class due to a lack of instruments for the experiments. At the SMASSE-WECSA conference, we reached a consensus that the African countries share the same problems.” (Interview with the Head of the INSET Unit Maganga.) Sugiyama, *Report on the Trips to the Seven Countries for Preparatory Studies on Third Country Training*, from SMASSE website: [http://project.jica.go.jp/kenya/515110E1/02/edu\\_01.html](http://project.jica.go.jp/kenya/515110E1/02/edu_01.html)

<sup>113</sup> Interview with the Chief Advisor Sugiyama. “For example, the Kenyan delegates saw a project which was mainly implemented by Japanese staff in Malawi and noticed the superiority of their own project because it had been implemented with Kenyan ownership.” (Interview with the Chief Advisor Sugiyama)

<sup>114</sup> Naganuma (2003)

<sup>115</sup> Social Development Cooperation Department, JICA (2003).

<sup>116</sup> The joint coordination committee in March 2003.

**Table 2-10 Commitment of the Kenyan Government for the Launch of Phase II**

Strengthening the system for implementation of the project	<ul style="list-style-type: none"> <li>The National Working Committee<sup>117</sup> will operate the national INSET center on behalf of the Ministry of Education, Science and Technology.</li> <li>The number of the C/Ps at the national INSET center will be increased from 29 to 61.</li> <li>A district-level INSET center will be created for every 200 mathematics and science teachers.</li> </ul>
Issuance of qualifications	<ul style="list-style-type: none"> <li>Qualifications will be issued to the district-level INSET trainers.<sup>118</sup></li> </ul>
Increase in the budget	<ul style="list-style-type: none"> <li>The budget will be increased from 3.5 million Kenyan shillings (Ksh) to 20 million Ksh for the 2004/2005 budget.</li> </ul>
Obligatory participation of teachers in the training	<ul style="list-style-type: none"> <li>The Principal of each school is responsible for implementing compulsory participation of the teachers in the INSET.<sup>119</sup></li> </ul>
Continuous support for the regional activities	<ul style="list-style-type: none"> <li>The Ministry of Education and TSC* will continue their support for SMASSE-WECSA.</li> </ul>

\* Teachers Service Commission

Source: Grant Aid Management Department, JICA (2005b) p. 20. The original text is in Minutes of the 5th Joint Coordinating Committee Meeting, in Social Development Cooperation Department, JICA (2003)

As a result of the consultation, the R/D for Phase II was signed in May 2003. The R/D stated the PDM for the domestic component and the PDM for the regional component, as shown Table 2-11.

**Table 2-11 PDM for Phase II**

	The domestic component for Phase II (Kenya)	The regional component for Phase II (SMASSE-WECSA)
Overall goal	Capability of young Kenyans in Mathematics and Science is upgraded.	Quality of mathematics and science education at secondary level in member countries is strengthened.
Project purposes	Quality of mathematics and science education at secondary level is strengthened in Kenya through INSET for teachers.	ASEI-PDSI is practiced in teacher training institutions and secondary schools in member countries.
Outputs	<ul style="list-style-type: none"> <li>a. A system of training for the District trainers in mathematics and science will be strengthened at National INSET center.</li> <li>b. A system of INSET in mathematics and science will be established in the Districts.</li> <li>c. Role of SMASSE National INSET Center and District INSET Centers as resource centers will be strengthened.</li> </ul>	<ul style="list-style-type: none"> <li>a. Trainers for ASEI-PDSI based INSET will be produced in member countries.</li> <li>b. SMASSE National INSET Center will be consolidated as a resource center for mathematics and science in Africa.</li> <li>c. SMASSE National INSET Center will function as secretariat of SMASSE-WECSA.</li> </ul>
Inputs from Japan	<ul style="list-style-type: none"> <li>a. Dispatch of long-term experts</li> <li>b. Dispatch of short-term experts when necessary</li> <li>c. Training of Kenyan C/P personnel in Japan</li> <li>d. Training of Kenyan C/P personnel in the third countries</li> <li>e. Provision of equipment</li> <li>f. Expenses necessary for the implementation of the Project</li> </ul>	<ul style="list-style-type: none"> <li>a. Training of SMASSE-WECSA counterpart personnel in Kenya.</li> <li>b. Attachment of long-term Japanese experts</li> <li>c. Provision of equipment</li> <li>d. Expenses necessary for the implementation of the Project</li> </ul>
Inputs from Kenya	<ul style="list-style-type: none"> <li>a. Buildings, Offices and other facilities necessary for the project</li> <li>b. Assignment of Kenyan full-time C/P personnel at National INSET Center</li> <li>c. Assignment of administrative personnel.</li> <li>d. Expenses necessary for the implementation of the Project</li> <li>e. Expenses for mathematics and science teachers to attend INSET at National INSET Center and in the District.</li> </ul>	<ul style="list-style-type: none"> <li>a. Buildings, Offices and other facilities necessary for the project</li> <li>b. Assignment of Kenyan full-time C/P personnel at the SMASSE National INSET Center</li> <li>c. Assignment of support personnel at the SMASSE National INSET Center</li> </ul>

Source: Composed from Social Development Cooperation Department, JICA (2003)

<sup>117</sup> Present National Planning Committee. This is the committee for planning the national INSET. The Head of the INSET Unit is the chairperson of the committee, and the members include the Subject Administrators, as well as the Chief Advisor and the Academic Advisor from the Japanese side.

<sup>118</sup> No qualifications have been issued as of March 2006.

<sup>119</sup> No government order such as a ministerial ordinance has been issued to make the training compulsory at present.

## 2-4-2 Development of the Functions of National INSET

### (1) Development of the Facilities

At the same time as the consultation on implementation were being carried out, the National Coordinator at the Ministry of Education and the Head of the INSET Unit searched for new centers for INSET and negotiated with the potential facilities. The Kenyan government transferred the control of the former Center for Research and Training (CRT)<sup>120</sup> from the Ministry of Labor and Human Resource Management to the Ministry of Education, Science and Technology and changed it into the CEMASTEIA, when the new government gained power in 2002. The center of operations of the project moved to CEMASTEIA at the launch of Phase II. However, renovations were needed before the facilities could be used because they had been neglected for many years.<sup>121</sup> The national INSET courses were held using private hotels and other facilities for the accommodation until the end of 2004. CEMASTEIA started functioning as a center for the project as well as being used as the facilities for the INSET courses, from January 2005.<sup>122</sup> The minimum essential teaching materials and equipment for the national and regional INSET were provided using the field operation budget of the project.<sup>123</sup>

However, the present capacity for training at CEMASTEIA is only 92 people and not the 200 people, as was originally planned and prepared for. It does not have the facilities to make improvements in the quality of training, such as computer training courses for district-level INSET trainers. Improvement and expansion of the facilities is needed for maintaining and developing the future activities of the project, because the facilities have deteriorated badly even though they were partially renovated using the field operation budget in 2004. There is a plan to give grant aid for the improvements.<sup>124</sup> The plan is to construct facilities such as a large lecture hall for 300 people, a computer room for 50 people which will be used for the computer training courses for the district-level INSET trainers as well as a dining hall for 200 people. This is to improve the quality of the Kenyan training courses and also to upgrade the regional training courses.<sup>125</sup>

The institute will become a Semi-Autonomous Government's Agency under the Ministry of Education,<sup>126</sup> after the completion of the on-going legal procedures including land registration. Then, the Board of Directors will be officially founded and they will manage the budget and operate the training courses based on the Education Law.<sup>127</sup> According to the bill which is now

<sup>120</sup> It was constructed with aid from the United Nations Children's Fund (UNICEF) in 1974.

<sup>121</sup> The facilities were partially renovated using the project budget.

<sup>122</sup> Grant Aid Management Department, JICA (2005).

<sup>123</sup> Interview from the field survey.

<sup>124</sup> Grant Aid Management Department (2005). Preliminary study team was dispatched in June 2005, and basic design study team was dispatched in December of the same year.

<sup>125</sup> *Ibid.*

<sup>126</sup> CEMASTEIA has become a Semi-Autonomous Government Agency under the Ministry of Education since 13 April 2006, which was announced in an official gazette.

<sup>127</sup> Republic of Kenya, Ministry of Education, Science and Technology (2005)

being processed, an Advisory Council will be set up as the body to manage and operate CEMASTEА, and a chairperson will be appointed by the Minister. Foundation of a Finance and General Purpose Committee is also being planned which will be responsible for the smooth implementation of the project as well as for budget management.<sup>128</sup>

## (2) Implementation and Development of Various Types of Training

While the facilities are being improved, CEMASTEА is already recognized and used by the African countries as well as the Kenyan government, as the center for mathematics, science and technology education for the African countries. Presently 61 academic staff and 27 non-academic staff are being recruited (there are still some vacancies). The number of the staff will be expanded to total of 138 (83 academic staff and 55 non-academic staff) after the expansion of the facilities.<sup>129</sup>

In Phase II, continuous efforts are being made for the improvement of INSET in mathematics and science education. For example, it is difficult in mathematics education to practice ASEI lessons which are mainly composed of experiments and hands-on-activities. The Japanese experts are therefore proposing other types of lessons for mathematics which do not depend on experiments and hands-on activities, for instance, lessons composed of minds-on activities such as (1) posing questions to children, (2) bringing out children's ideas (misconceptions), (3) letting children discuss among themselves, and (4) leading the children to find the correct answers. In this way the lessons can be constructed while using the children's thinking processes. The JICA Expert said, "It will take some time to implement this method in the classroom at schools, but we have started to introduce innovative lesson methods rather than teaching theories. We also started facilitating students' thinking development exercises rather than hands-on-activities for mathematics."<sup>130</sup> The quality of the national INSET (intensive training with a total of 4 courses) was also dramatically improved by standardizing the time allocation for a 2 hours' training session by partitioning the session into "a 20 minute lecture (explaining the purpose of the session and raising questions), a 60 minute group discussion, a 30 minute presentation on the outcome of the discussion and finally a ten minute summary."<sup>131</sup>

<sup>128</sup> Grant Aid Management Department, JICA (2005)

<sup>129</sup> *Ibid.*

<sup>130</sup> Interview with the JICA Expert Tokuda.

<sup>131</sup> Interview with the JICA Expert Hattori. "The trainers were lecturing throughout the 2 hour lessons in Phase I, but they reached the conclusion at the evaluation meeting in 2005 that the above-mentioned lesson pattern (time allocation) was the most effective. They now show the session schedule to the participants. The training methods have been explored for a long time, but the biggest reason for the recent improvement was the participation of the new lecturers in the training in Phase II. Also in Phase I, 50 participants per subject were taking the sessions at once to accommodate a total of 200 participants on the training course, but presently only half the number of participants are taking the training course due to the capacity limitations of CEMASTEА. This is another reason why the lesson quality is improving." The Chief Advisor Sugiyama said, "The trainers reached the conclusion by themselves, after trying various forms of training, that the most effective technique is for the trainer to raise a question to the participants, who then think about it in groups, practice, present the results and establish an answer, instead of the trainer telling the participants everything. It is not easy for the trainers to become more flexible, and sessions are not yet proceeding efficiently, but the sessions are improving."

The national training in Kenya also includes workshops targeting stakeholders such as the school Principals, the District Education Officers and the District Inspectors of Schools, which are held to improve the sustainability of the training (see Table 2-12). The taskforce for strengthening mathematics and science in primary education also started to prepare for the launch of the training for primary education as well as for vocational-training schools.

**Table 2-12 Overview of W/S in CEMASTE A**

Training courses for the district-level INSET trainers for mathematics and science in secondary education	2-week program, 12 times per year (1,017 lecturers participated in 2005)
W/S for the principals in secondary education	1-week program, 2-3 times per year
W/S for the district education officers	1-week program, 1-2 times per year
W/S for the district inspectors of schools	1-week program, 2-3 times per year
W/S for the stakeholders	1-week program, once a year

Source: Abstracted from Grant Aid Management Department, JICA (2005b). Also at the planning stage is the training for lecturers of teachers colleges for primary education and the training for in-service teachers of mathematics and science at vocational training schools.

With regards to the regional component, the third country training courses (5-weeks, once a year) are held at CEMASTE A in order to strengthen mathematics and science education in African countries.

## **Box 2 Outline of the Intensive INSET for Mathematics and Science (Total of 4 Courses)**

### **1. Overall Structure**

- The present INSET for mathematics and science education in Kenya are designed as urgent intensive training courses which are needed to improve a floundering mathematics and science education system. The curriculum of 10 days per year for 4 years (a total of 40 days) is being implemented as shown below.

### **Structure of the 4 Intensive Training Courses (10 Days per Year for 4 Years)**

The first cycle	Changes in the attitudes of teachers and stakeholders
The second cycle	Hands-on-activities and ASEI lessons
The third cycle	Implementation of the lessons in the classroom at schools
The fourth cycle	Improvements in the students and transfer of impact to the students

Source: Social Development Cooperation Department, JICA (2002).

- The participants on the national INSET course arrive at CEMASTE A on Sunday, the day before the start of the training course. They participate in the 10 day courses (a total of 2 weeks including the Saturdays and Sundays which are holidays) and leave after the closing session on the 10th day. The transport costs for the participants of the national INSET are paid for from the district SMASSE Fund, and the food and accommodation costs during the training are paid for by the national government.



## 2. Program for Each Course

- The outline of the program for each cycle include: the opening session and the joint program on the 1st day; the joint programs on the 2nd and 3rd days; and the separate programs for each subject on the 3rd to the 10th days. The closing ceremony is held on the 10th day. In 2006, the third training course (the third cycle) is held in the target districts of Phase II. The following are the programs for the third training course on biology.

### Outlines of the Third National INSET Course (Biology)

The 1st and 2nd day	Plenary Sessions	<ul style="list-style-type: none"> <li>☆ Opening ceremony</li> <li>☆ District-level INSET and reports on the practice of ASEI-PDSI</li> <li>☆ Monitoring and evaluation methods</li> <li>☆ Practice of ASEI-PDSI in lessons</li> <li>☆ Communication skills and communication in the classroom</li> <li>☆ Analysis and evaluation</li> </ul>
The 3rd day	The sessions for biology	<ul style="list-style-type: none"> <li>☆ Resources for the study of biology, facilities and equipment</li> </ul>
The 4th day		<ul style="list-style-type: none"> <li>☆ “Theme 1” (Discuss the present situation and difficulties in the lessons, develop lesson plans introducing hands-on-activities, carry out lesson demonstrations and hold discussions.)</li> </ul>
The 5th day		<ul style="list-style-type: none"> <li>☆ Develop lesson plans for the ASEI lesson, and prepare the lesson which will be the subject of the study session</li> </ul>
The 6th day		<ul style="list-style-type: none"> <li>☆ “Theme 2” (same as above)</li> </ul>
The 7th day		<ul style="list-style-type: none"> <li>☆ “Theme 3” (same as above)</li> </ul>
The 8th day		<ul style="list-style-type: none"> <li>☆ Lesson study session 1 (Study the lesson and then amend the lesson plan.)</li> </ul>
The 9th day		<ul style="list-style-type: none"> <li>☆ Lesson study session 2 (Carry out the lesson based on the amended lesson plan and then study the lesson again.)</li> </ul>
The 10th day		<ul style="list-style-type: none"> <li>☆ Analysis and evaluation</li> </ul>
	Plenary session	<ul style="list-style-type: none"> <li>☆ Closing ceremony</li> </ul>

Source: Documents obtained during the field survey.

In the national INSET, the lesson demonstrations were introduced at the first training course (2 to 3 hours), demonstrations were carried out almost everyday at the second training course (5 times in total), and the lessons which were to be studied are performed on the third training course. The participants at the third training course valued the course highly, saying in the interview during the field survey that this course had given them the most motivation to participate out of the past three courses, because it was the closest to the situation in the classroom at schools and it met the needs of the in-service teachers at schools the best.

## 3. An Example of One Day in the Training Course

- The following explains the training course in more detail and shows the program for one day of the course in which “pressure” was taught in the physics section. The training course was not a unilateral transfer of knowledge, but participatory in nature where the sessions fully utilize the experience of the in-service teachers who conduct the lessons face to face with students everyday in the classroom. The course adopted an effective participatory approach where participants themselves think and reach their own conclusions, and then they reach even more insightful conclusions by discussing the results with the other participants.

### One Day of the Training Course on “Pressure” in Physics

Purposes of the session	<ul style="list-style-type: none"> <li>☆ Raise the difficulties in the lesson process for “pressure.”</li> <li>☆ Draw up the module plan for “pressure.”</li> <li>☆ Practice the experiments which can be used in the “pressure” module.</li> <li>☆ Develop new teaching materials and equipment which can be used in the “pressure” module.</li> <li>☆ Create, present and comment on each others’ draft lesson plans for “pressure.”</li> </ul>
08:30 – 09:30	Review the lesson process on “pressure.” (Review their individual experiences and share the experiences in the group.)
09:30 – 10:30	Work out the schedule for the modules and plan the experiments or activities which suite the time given for the modules (module planning).
10:30 – 11:00	Break
11:00 – 11:30	Share the module planning efforts of the individuals in the group.
11:30 – 13:00	Experiments (which were proposed in the existing teaching materials or constructed by the participants)
13:00 – 14:00	Lunch
14:00 – 15:00	Experiments (continued)
15:00 – 16:00	Develop the draft lesson plan for “pressure” (while considering how the experiments could improve the effectiveness of the lessons).
16:00 – 17:00	Share the draft lesson plan in the class.

Source: Composed from Physics Education Department, SMASSE (2005).

#### 4. Examples of Training Impacts Seen at Schools

- The following are the results of a survey carried out by the Academic Advisor on the impacts of the “pressure” training sessions which were seen at the student-level. The survey was conducted at the schools where teachers taught “pressure” to the students using the ASEI lesson method. The survey was answered by the students in the 1st grade of secondary school, which is equivalent to the 3rd grade of junior high school in the Japanese system. The survey was to see how well the students had understood the concept of “ $P$  (pressure) =  $F$  (force)/ $A$  (area)” after they took the lesson on pressure. The results show that each student was constructing the concept of pressure based on their individual experiences.

#### The Students’ Understanding of “Pressure”

- ☆ When I carry a heavy package on my head, the top of my head does not hurt at all if I put a looped cloth on my head and put the heavy package on top of it. This is because the larger contact surface area makes the pressure smaller. (This student’s understanding of “pressure” comes from a tribal custom.)
- ☆ The soles of my feet do not hurt when I walk on clay soil barefoot, but I cannot walk on gravel barefoot because it is too painful. I experienced this when I was small. This happens because the pressure changes even if my weight is the same. (The student’s own experience was clearly connected to the concept of “pressure” through academically learning the new concept.)
- ☆ When I saw a tractor working on soft land, I noticed it had very large tires with a wide tread on them. The treads bite into the soil and this prevents the tractor from slipping. I understood the reason for this by recalling the definition of pressure. (This student developed the ability to scientifically and rationally explain the phenomenon.)
- ☆ When a lady in high heels stepped on my foot at the bus stop, it hurt so much that I thought it must have punched a hole on my foot. I suppose the weight of an elephant is 40,000 newtons and the area of the bottom of the foot is 0.1 square meter, the pressure is 400,000 pascals if the elephant stands on one foot. Also I suppose the weight of the lady is 400 newtons and the area of the bottom of the high heel is a square centimeter, the pressure is 4 million pascals if she stands on one foot. Therefore, the lady’s pressure is actually 10 times more than the pressure of the elephant. (The student is scientifically arguing based on the calculation of “pressure.”)

Source: Abstracted from “Pressure (the answers of the students in the first grade of secondary school in Kenya)” in Takemura (2005d).

### Box 3 Outline of Third-country Training

#### 1. Participants

- Applications for participation are encouraged in each SMASSE-WECSA member country. The following are the countries and the number of participants involved in the past 3 training courses.

#### Countries and Participants in the Past Third Country Training Courses

	Countries participated	Number of participants (person)
2003 (the first training)	Lesotho, Malawi, Mozambique, Rwanda, Uganda, Zambia, Zimbabwe (total of 7 countries)	42
2004 (the second training)	Botswana, Burundi, Ethiopia, Madagascar, Malawi, Mauritius, Niger, Nigeria, Rwanda, Senegal, Seychelles, Swaziland, Tanzania, Uganda, Zimbabwe (total of 15 countries)	85
2005 (the third training)	Nigeria, Uganda, Gambia, Benin, Burkina Faso, Zanzibar, Senegal, Cameroon, Ivory Coast, Madagascar, Sierra Leone, Ethiopia, Seychelles, Tanzania (total of 14 countries)	96

Source: SMASSE Project (2005)

#### 2. Program

- The following is the outline of the second course of the third country training. The training program is a condensed version of the 4 intensive national INSET courses.

#### The Outline of the Second Course of the Third Country Training “Extension of ASEI-PDSI”

The 1st week	<ul style="list-style-type: none"> <li>☆ The opening ceremony, briefing on safety measures and the purpose of the training</li> <li>☆ Explanation of SMASSE and the SMASSE-WECSA projects</li> <li>☆ Reports on the situation of mathematics and science education in each country (especially reports on lesson preparation, lesson practice, participation of students in lessons, teaching materials, experiments/ observation and academic abilities)</li> <li>☆ Understanding the principles behind student-centered teaching methods, confirmation of its effectiveness and adoption of such methods</li> <li>☆ Effective use of teaching materials and equipment in lesson practices, the features of the student-centered teaching methods</li> <li>☆ Effective implementation of ASEI-PDSI (planning guidance, changes in the attitudes of students and teachers, psychology of learning and gender)</li> <li>☆ Improvements in communication abilities in the classroom</li> </ul>
The 2nd week	<ul style="list-style-type: none"> <li>☆ Demonstration of the ASEI lesson or an explanation of the draft lesson plan by the SMASSE national INSET trainers</li> <li>☆ Demonstration of ingenious experiments/observation by the SMASSE national INSET trainers</li> <li>☆ Development of teaching materials and equipment using readily available materials</li> <li>☆ Preparation for ASEI lessons, lesson practice, lesson observation and discussion on methods to improve lessons</li> </ul>
The 3rd week	<ul style="list-style-type: none"> <li>☆ Lesson practices and improvements by small groups at school (planning, preparation, practice, discussion on improvements and lesson trials)</li> <li>☆ Lesson observation and evaluation, creation of group reports on lesson practices</li> </ul>
The 4th week	<ul style="list-style-type: none"> <li>☆ Evaluation criteria for the quality of the lessons, the check-lists for ASEI-PDSI (for teachers)</li> <li>☆ Evaluation criteria for the quality of the lessons, the check-lists for ASEI-PDSI (for students)</li> <li>☆ Creation of draft ASEI lessons which meet the curriculum of each country, presentation and discussion on the draft ASEI lessons</li> <li>☆ Training for INSET trainers</li> <li>☆ Discussion on the establishment of the training systems which meet the conditions of each country</li> <li>☆ Sharing the experiences of teacher training in each country (obligations and responsibilities of the organizers of the training, training contents and evaluation of the training)</li> </ul>

The 5th week	<ul style="list-style-type: none"> <li>☆ Problems and solutions with regard to the evaluation of the students' learning achievements</li> <li>☆ How to construct the tools which can be used to evaluate the students' learning achievements</li> <li>☆ Planning, implementation, data collection, aggregation and examination methods for the impact evaluation</li> <li>☆ How to evaluate the "students' development" (in terms of recognitions, skills, interests/motivations and attitudes)</li> <li>☆ Solutions to the difficulties in the students' skills, interests/motivations and attitudes, creation of evaluation tools</li> <li>☆ Creation of evaluation tools of the "students' development")</li> <li>☆ Creation of training reports by each country</li> <li>☆ Joint discussion (future tasks and requests)</li> <li>☆ Evaluation of the training course by the participants</li> </ul>
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Source: Takemura (2005).

### 3. Cost Sharing

- The countries which participate in the training, the host country (Kenya) and the cooperating country (Japan) are sharing the costs for the implementation of the third country training, from the perspective of sustainability.

#### Cost Sharing for the Third Country Training

Funded by the countries which participate in the training	Transport costs inside each country, visa costs, daily allowances and other costs which are not included in the costs paid for by Kenya or Japan
Funded by the host country (Kenya)	Provision of training facilities including accommodation facilities, INSET trainers and miscellaneous costs
Funded by Japan	Transport costs for training including round-trip tickets for the flights, accommodation costs (including food), provision of teaching materials and assistance for medical costs through overseas travel insurance

Source: Grant Aid Management Department, JICA (2005b).

### 2-4-3 Establishment and Development of Basic Facilities of District-level INSET Centers

As mentioned in 2-1-3 (2), the national government established the DICs using the Non-Project Grant Aid and developed the basic facilities of the DICs, for the launch of Phase II. This sent a message that a strong commitment had been made by the national government. This was seen by the district administrative officers, who then committed themselves in the project. This enabled the proactive development of the project on a national scale. As a result, the partner country made a further commitment to spend 40 million Kenyan shillings in 2005, in spite of the government's poor ability to collect taxes and fund the standing expenses.<sup>132</sup>

<sup>132</sup> Interview with the Chief Advisor Sugiyama. The Chief Advisor also said, "This project succeeded in effectively using the Non-Project Grant Aid and the 2KR C/P fund for the sustainability of the project. However, these funds could undermine the intention of the partner country to accept the financial burden. These funds are a two-edged sword and need careful consideration before they are used."

## 2-4-4 Recognition of the Necessity of Inclusion of INSET for Mathematics and Science in Secondary Education within the Government's Educational Policy

### (1) Inclusion in the Legislations for Education

The necessity for the INSET for mathematics and science in secondary education was specified in the education policy through the active advocacy which came from the project.<sup>133</sup> The basic policy of the Kenyan education sector is shown in the 2005 white paper from the Ministry of Education, Science and Technology (Sessional Paper No.1 of 2005 on a Policy Framework for Education, Training and Research).<sup>134</sup> This paper recognized that 2 of the problems with the present situation in secondary education are low performance in important subjects including mathematics and science in the final exams for secondary education and also the low school attendance rate.<sup>135</sup> It also specified the use of CEMASTEAs for the improvement of the teaching abilities of the in-service teachers in mathematics, science and technology. The INSET was established from scratch and has now made a significant step towards institutionalization.<sup>136</sup>

### (2) Budgets

With the cooperation from the Permanent Secretary, the project secured a government budget for INSET to improve mathematics and science in secondary education.<sup>137</sup> The budgetary measures for CEMASTEAs were specified in the Kenya Education Sector Support Program (KESSP), which is the budgetary plan up to 2010.<sup>138</sup> The budget for the donor's project is specified in the framework for aid cooperation in the Medium Term Expenditure Framework (MTEF).<sup>139</sup> The minutes for the KESSP joint review which was held by the Ministry of Education, Science and Technology, and the aid institutes in the education sector in November 2005, stated that "the improvements through SMASSE had been successfully introduced and the target area is being expanded."<sup>140</sup>

<sup>133</sup> The project drew up the draft and submitted it to the Ministry of Education (the interview with the Chief Advisor Sugiyama).

<sup>134</sup> Republic of Kenya (2005). In the policy development, the proposals submitted to the Parliament session on education training in November 2003, as well as the "Education for All (EFA)" and the "Millennium Development Goals (MDGs)" were all considered. Also the Ninth National Development Plan which is the overall plan for Kenya, recognizes education as a significant sector for national development, and also recognizes the necessity for strengthening mathematics and science education. These have also been recognized in the 7th and 8th National Development Plans (Republic of Kenya, Ministry for Planning and National Development, 2002).

<sup>135</sup> Republic of Kenya (2005).

<sup>136</sup> KESSP explained that the Ministry of Education also transferred the function of the national INSET center to the CRT in Karen for the institutionalization of national-level INSET activities.

<sup>137</sup> Interview with the Chief Advisor Sugiyama.

<sup>138</sup> The following items for mathematics and science in secondary education were budgeted: (1) INSET; (2) curriculum review for teachers colleges; (3) district-level INSET in districts; (4) INSET for lecturers at teachers colleges; (5) INSET at CEMASTEAs; (6) curriculum review for secondary vocational training schools; (7) monitoring and evaluation; and (8) research and development (Republic of Kenya, Ministry of Education, Science and Technology, 2005). KESSP also stated that the training courses in each district would be directly financed by the schools through the Secondary School Heads Association, and JICA would provide equipment, chemicals and reference books for the district-level INSET centers until June 2008 (end of Phase II).

<sup>139</sup> Republic of Kenya, Ministry for Planning and National Development (2003).

<sup>140</sup> Republic of Kenya, Ministry of Education, Science and Technology and Development Partners (2005).

Table 2-13 shows financial burden borne by the Kenyan side in the past. The budget allocated to the Ministry of Education increased when Phase II started, and is expected to increase every year from the 40 million Ksh after fiscal year 2006/2007 taking into account an annual inflation rate of 4 %.<sup>141</sup>

**Table 2-13 Budgetary Performance of the Project (Million Ksh)**

	1998/9	1999/0	2000/1	2001/2	2002/3	2003/4	2004/5	2005/6
The Kenyan government	1.5	12.0	5.5	3.5	3.5	3.5	20.0	40.0
Districts	0.0	0.1	8.6	12.0	8.9	N/A	N/A	80.4
JICA	2.9	8.0	16.1	35.0	18.5	18.5	62.6	82.0
Percentage of Kenyan burden (%)	34.2	60.1	46.7	30.7	40.1	—	—	59.3

Source: (Up to 2002/3) Joint Evaluation Report on the Japanese Technical Cooperation for the SMASSE Project, in the Social Development Cooperation Department, JICA (2002) p. 98. (2003/4 and onward) SMASSE Project (2005) p. 69.

## 2-5 Activity Enhancements (Up to Present)

### 2-5-1 Development of National-level Activities

#### (1) Participation Rate of 90 % for the In-Service Training (INSET) for Teachers (In the Target Districts for Phase II)

The INSET for mathematics and science in secondary education, which started with the 9 target districts, has now expanded to cover 72 districts all over the country.<sup>142</sup> DICs were established for every district<sup>143</sup>, and 18,000 teachers participated in the INSET in 2005. The average participation rate in 3 of the target districts in Phase II which were visited for the local survey was more than 90 % in 2005. This shows that the School Principals have almost succeeded in making INSET compulsory.

#### (2) Launch of Individual Activities by the Districts (Target Districts for Phase I and for the In-Country Training)

The target districts for Phase I, as well as the target districts for the In-Country Training which have completed the 4 years of intensive INSET courses are now expected to develop their

<sup>141</sup> Grant Aid Management Department, JICA (2005). The budget from the Ministry of Education covers the operational costs of CEMASTEAs (utility costs, food costs for trainees, costs for business trips of the staff, and others). All the staff (except day workers in the miscellaneous services) are transferred from other posts at the Ministry of Education and the salaries are paid by TSC. Therefore no additional labor costs will be incurred at the present time or for future increases in the number of staff.

<sup>142</sup> Attachment 5 shows the implementation situation in the districts visited during the local survey.

<sup>143</sup> The SMASSE districts are principally the same as the administrative districts, but some SMASSE districts are composed of several administrative districts, so that the number of teachers participating in the INSET comes to 200, which the INSET programs are designed for (the interview with the JICA Expert Naganuma). The District Education Offices were responsible for selection of DICs for their districts, but the Head of the Unit and the Chief Advisor (or the JICA Experts) also participated in the selection process. The condition of the accommodation facilities were focused on during the selection process in Phase II, because of major complaints about the accommodation by the teachers in Phase I (the interview with the Chief Advisor Sugiyama).

own individual activities.<sup>144</sup> Out of the 15 districts which completed the intensive INSET, some are proactively planning and implementing the district-level training, while others are having difficulty in implementing the training.<sup>145</sup> However, presently CEMASTEAs are intentionally avoiding becoming involved in the districts' efforts in order to nurture their ownership of the project and facilitate the sustainability of the district-level INSET systems.<sup>146</sup> In Maragua District, one of the target districts in Phase I, the DPC has already carried out monitoring of the training courses in the fourth cycle, as well as completing a needs survey for the future training courses. They have established an action plan for 2006 as shown in Table 2-14, and are implementing the plan. They are also gradually independently proceeding with the creation of new teaching materials and at the district-level the INSET trainers are making the teaching materials for the training course (to be held in August 2006), which was planned based on a needs survey for the district. In this district, teachers organized the district teachers' association for each subject (mathematics, biology and chemistry) and are holding study meetings, to respond to a situation where the students' performance of the final exams for secondary education at the district-level has not been improving as expected. At the self study meetings, the teachers other than the district-level INSET trainers are intentionally encouraged to take the initiative and hold a symposium on ability improvements of students in mathematics for example, so that this activity gives opportunities for the teachers to use their abilities outside the classroom. The enthusiastic teachers are going to each others' lessons to observe them.<sup>147</sup>

**Table 2-14 Phase I of the Annual Plan for the Maragua District (2006)**

January	The INSET annual plan development meeting
February 21 and 23	The seminars for the Principals (2006)
March	The evaluation meeting of the seminars for the Principals, preparation for the workshop in April
April	The workshop for the district-level INSET trainers only (5 days)
May, June and July	Preparation for implementation of the district-level INSET (for each subject)
August	The district-level INSET course (for 2 weeks)
September	The evaluation meeting for the district-level INSET course and the year's activities

Source: Interview with the district-level INSET trainers in Maragua District and Wahome District. They will not have INSET activities after September because of the preparations for the final exams for secondary education and then they have to mark the exams.

<sup>144</sup> The Director of the Department of Quality Assurance and Standards at the Ministry of Education (the former National Coordinator) believes that the training should be planned according to the needs of the districts after the four-year training programs finish (the interview with the Director of the Department of Quality Assurance and Standards at the Ministry of Education Oyaya). He also believes that "all teachers should take the SMASSE INSET course and this should be one of the conditions for their career advancement (i.e. included in the questions in the interviews for promotion)." (The interview with the Director of the Department of Quality Assurance and Standards at the Ministry of Education Oyaya.)

<sup>145</sup> Interview with the national INSET trainer Gathambiri.

<sup>146</sup> Interview with the Chief Advisor Sugiyama and the CEMASTEAs administrator Kogolla. While understanding this idea, some national INSET trainers are insisting that there is a necessity for continuous training in the districts which are facing difficulties implementing the training independently. They are also proposing that there is an urgent necessity for additional national INSET or support for field-level activities for the target districts of Phase I and for the In-Country Training (the interview with the national INSET trainer Gathambiri).

<sup>147</sup> Interview with the district-level INSET trainers in Maragua and Wahome Districts. Considering the small number of teachers teaching the same subject inside each secondary school, encouragement for this kind of study meetings for each subject is expected.

In Baringo District, one of the target districts for the In-Country Training, the teachers themselves proposed the necessity for monitoring at the classroom-level during the needs survey. This is because they would not know if their classroom practices were correct even if they implemented what they had learnt on the training courses.<sup>148</sup> A needs survey is also under way in Meru South District. The results of the needs survey suggested that the districts' trainers and teachers understand the significance of monitoring and the districts' initiatives for the implementation of INSET only when they have to plan the INSET training courses by themselves. Therefore, monitoring efforts by the Education Office or DPCs are not yet active in the target districts of Phase II, but more active development is expected as the INSET activities progress.

### (3) The Situation for the collection of the SMASSE Fund

The collection rate of the SMASSE Fund in the target districts of Phase I increased as the training courses continued, as shown in the average rate for the 9 districts (40.1 % in 2000, 44.1 % in 2001 and 72.7 % in 2002).<sup>149</sup> The rate in the target districts of Phase II is very high. With regard to the target districts in Phase I, this growth in the collection rate is because of the Principals' better recognition of the significance of the INSET. With regard to the target districts in Phase II, the high collection rate is assumed to be due to the District Education Officers who recognized that the INSET is "compulsory" and in many cases sent a circular to the schools.

Nevertheless, there is a difference in the collection of the Fund between schools and no district succeeded in collecting 100 % of the Fund. This is especially true among the target districts in Phase I where the four intensive INSET courses were completed. Figure 2-7 shows the case of Barigno District, one of the target districts for the In-Country Training. The total collection rate for the 32 schools was 45 % (the average collection rate for the collection rates of 32 schools was 40 %<sup>150</sup>). There are large differences in the collection rates of the Fund between schools. One school paid 100 % of the money to the Fund, and 11 schools paid none. There were no schools which paid 40 – 60 %. This is probably because many schools paid the money into the Fund as a percentage of the collection rate of the school fees, which was 60 – 70 % in the fiscal year 2005.<sup>151</sup>

The reason why some schools do not pay money into the Fund is because the Principals and the parents do not accept the significance of the teachers' participation in INSET.<sup>152</sup> Different submission rates for the Fund by schools means that parents from different schools have different

<sup>148</sup> Interview with the representative of the district-level INSET trainers of Anguzu District.

<sup>149</sup> Social Development Cooperation Department, JICA (2002).

<sup>150</sup> The average collection rate was smaller than the total collection rate because the schools which did not pay money to the Fund at all were relatively small-scale.

<sup>151</sup> Interview with the Principal of the Kabarnet Secondary School.

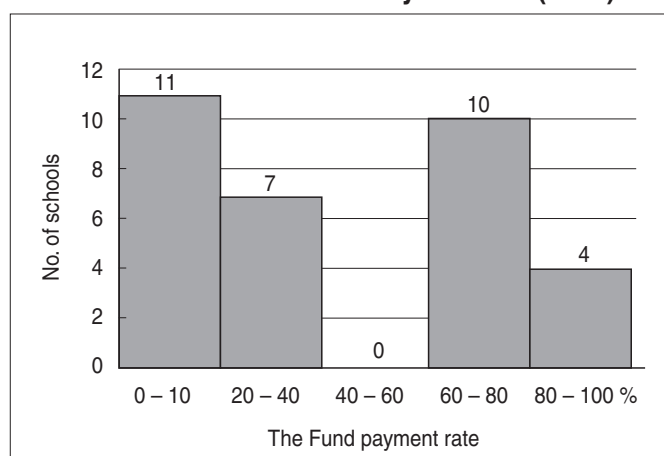
<sup>152</sup> Interview with the staff of Nakuru District Education Office.



burdens. Consideration on a mechanism which gives different levels of quality or quantity of service to different schools depending on the Funds submitted might be needed in the future.

Nakuru and Narok Districts, which are the target districts of Phase II, are encouraging the participation in INSET of teachers from the private schools because of the benefits to students, although the Fund cannot be collected from the private schools.

**Figure 2-7 Situation for the Baringo District SMASSE Fund Submission by Schools (2005)**



Source: Baringo District SMASSE Fund Account Schools with Balances for the Year 2005 (gained during the field survey).

#### (4) Trial and Error in Management of the SMASSE Fund

The management of the SMASSE Fund cannot be regarded as perfect. Observation of the budgetary planning and implementation for 2004 in the Maragua District in Phase I found the following (see Table 2-15). The trainer receives 1,000 Ksh per day as well as the honorarium for producing the teaching materials. The staff of the District Education Office also receives 1,000 Ksh per day.<sup>153</sup> The honorarium takes 18.4 % of the total budget, although according to the guidelines the maximum amount for honorariums is stipulated to be 15 % of the total budget. On the other hand, the budgetary plan did not allocate money for the equipment maintenance costs which was supposed to be a maximum of 10 % of the budget, although the DIC needed the budget for equipment maintenance.<sup>154</sup> At the present time no district has stopped collection of the Fund all together.

<sup>153</sup> The “Budget Guidelines for SMASSE INSET in the Pilot Districts,” which was created in the Stakeholder Meetings specify that the honorarium for the district-level INSET is a maximum of 500 Ksh per day, and that the districts which could afford can increase the honorarium after consulting with the national INSET center. In Maragua District (the target district for Phase I) and Baringo District (the target district for the In-Country training), the trainers were receiving 1,000 Ksh per day and so 10,000 Ksh per two-week training course (cf. the salary for mid-range teachers is 24,000 Ksh per month).

<sup>154</sup> Baringo District as well as Maragua District show the problems with the equipment maintenance cost (i.e. Baringo District did not allocate the equipment maintenance cost in their budget, either). The Sacho High School commented that they were by necessity using their photocopy machine for the district-level INSET training because the DIC’s photocopy machine had broken down (the interview with the Principal of the Sacho High School Chahiru).

**Table 2-15 Budget Implementation Situation in the Maragua District (Ksh) (2004)**

Items	Budget	Amount used	Budget implementation (%)	Designated maximum (%) <sup>155</sup>
Facilities usage fees (including food)	650,000.00	662,500.00	38.1	45
Transport costs (The participants are transported by bus.)	210,000.00	239,000.00	13.7	10
Drivers	35,000.00	40,000.00	2.3	
Honorariums for the district-level INSET trainers	250,000.00	250,000.00	14.4	15
Honorariums for the staff of the District Education Office	60,000.00	70,000.00	4.0	
Honorariums for producing the teaching materials	5,000.00	5,000.00	0.3	
Teaching material costs	229,650.00	241,821.00	13.4	15
Other teaching material costs	16,000.00	17,500.00	1.0	
Stationary purchasing costs	120,100.00	127,400.00	7.3	
Monitoring	9,000.00	20,000.00	1.1	10
Contingency expenses	79,237.50	66,878.00	3.8	5
Total	1,663,987.50	1,740,099.00	100.0	—

Note: The percentage of the budget (16 %) used for transport costs and drivers is higher than that of the designated maximum allocation (10 %), as the participants of INSET in this district take a day trip to the training course. Therefore the percentage of the budget spent on usage fee for facilities is lower.

Source: Interview with the Baringo District Education Office.

The Fund is at present properly implemented but could potentially create a new vested interest.<sup>156</sup> Future monitoring will be needed to see whether the district-level INSET courses are implemented in accordance with the rules on the utilization of the collected Fund.

## 2-5-2 Tangible Outcomes

### (1) Tangible Outcome in the Official Statistics

While there are some problems involving INSET, definite project results have started to show in some statistics. One is seen in the changes in the attitude of students towards the subjects of mathematics and science. In the final exams for secondary education in 2005,<sup>157</sup> 69,058 students out of a total of 256,825 students (27 %) chose physics, compared to 38,000 students out of a total of 167,000 students (23 %) in 1998.<sup>158</sup> The proportion of high achievers was raised in mathematics and science as shown in Table 2-16.<sup>159</sup> This is working as an incentive for the policy

<sup>155</sup> The maximum percentages are designated in Attachment 1 of the Minutes of the 4th Stakeholder Meeting “Budget Guidelines for SMASSE INSET in the Pilot Districts.”

<sup>156</sup> Interview with the Chief Advisor Sugiyama.

<sup>157</sup> Interview with the Director of the Department of Quality Assurance and Standards at the Ministry of Education Oyaya.

<sup>158</sup> The final exams for secondary education in 2005 were composed of 9 subjects including compulsory and elective subjects from total of 32 subjects. The compulsory subjects were English, Swahili and mathematics. All the students chose 2 or 3 subjects from physics, chemistry and biology (the interview during the field survey).

<sup>159</sup> Interview with the Director of the Department of Quality Assurance and Standards at the Ministry of Education Oyaya. A newspaper also reported that many students gained A grades in mathematics and science in the final exams for secondary education. It reported, “The students who had gained an A grade had increased in number for mathematics (3,644 students), biology (4,216 students), physics (3,062 students) and chemistry (7,116 students), because of the implementation of the SMASSE Program supported by JICA.” (Jakoyo, 2006)

planning officials to support the project.<sup>160</sup>

**Table 2-16 Results of Compulsory Subjects and Mathematics and Science in the Final Examination for Secondary Education in 2005**

Subject ranking	Subject		Average score (0–12)	Students who gained A grade (%)	Students who gained A- grade (%)	E grade i.e. failed (%)	No. of examinees
26	Swahili	Compulsory	5.40	0.83	1.16	0.88	256,117
27	English	Compulsory	5.40	0.22	0.95	0.53	256,116
28	Physics	Elective	5.36	4.43	2.55	3.94	69,058
29	Biology	Elective	4.89	1.81	1.92	4.69	232,112
31	Chemistry	Elective	4.05	2.84	2.04	8.54	250,490
32	Mathematics	Compulsory	2.80	1.42	0.94	40.95	256,825

Note: The exam results are tallied by the Kenya National Examination Council (KNEC). The project experts do not know how the evaluation is made, and the scores are said to be neither an absolute evaluation nor a comparative evaluation. The “subject ranking” shows the ranking for each subject out of a total of 32 subjects. Biological science was ranked 30th with 42 students taking the exam.

Source: Composed from the results of the final exams for secondary education in 2005, except for the private schools (gained from the JICA Kenya Office).

## (2) Outcome Seen in the Classroom

With regard to the outcome at the school-level, most Principals at the secondary schools interviewed during the field survey said that performance was improving in mathematics and science.<sup>161</sup> They also answered that the students’ interest in mathematics and science increased even if INSET did not lead to a direct improvement in the scores. ASEI-PDSI has not necessarily introduced into the lessons in the classroom by all the teachers.<sup>162</sup> However, the quality of the learning process has clearly improved when comparing the survey results from before and after the INSET courses took place, as shown in Figure 2-8.<sup>163</sup> These changes at the classroom-level are giving an incentive to the Principals and teachers to make continuous efforts for lesson improvements.

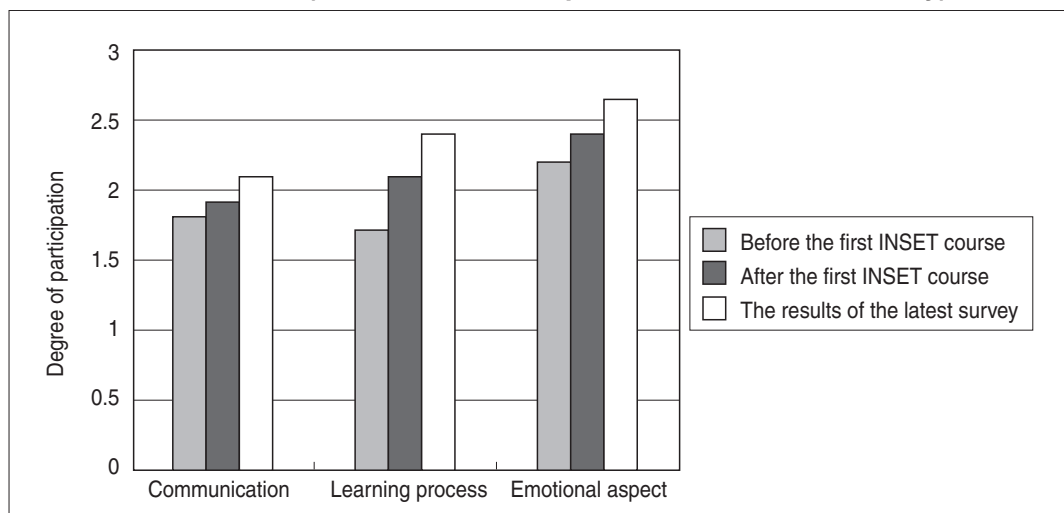
<sup>160</sup> The Permanent Secretary of the Ministry of Education said that the results of the final exams for secondary education in mathematics and science had improved nationwide, and raised the following points as the reasons: (1) the curricula were more appropriately taught because the teaching skills of teachers had improved through INSET; and (2) the teachers’ attitude had changed, i.e. they started to be actively involved in the lesson improvements (the interview with the Permanent Secretary of the Ministry of Education, Prof. Mutahi).

<sup>161</sup> The interview during the field survey. The Principal of Moi Secondary School in Nakuru District was the only Principal who gave a negative answer. The interview was conducted right after the results of the final exams for secondary education had come out. The reason for the negative answer seemed to be because the scores at his school were not as good as had been expected (see Attachment 6).

<sup>162</sup> See Attachment 6.

<sup>163</sup> The questionnaire tools developed by the monitoring and evaluation team of the SMASSE project were used for the survey. (see Attachment 4)

**Figure 2-8 The Extent of Student Participation  
(Practice of SAEI/Improvement of Lesson Quality)**



Note: Degree of participation indicates scores in the student survey in Attachment 4

Source: Questionnaire survey for students (conducted during the field survey).

A mathematics teacher who is also the district-level INSET trainer, showed his future expectations by saying, “Forcing my colleagues to introduce ASEI-PDSI is difficult, but the fact that my students’ final examination results have improved this year will draw the attention of mathematics teachers to my lessons. This will naturally spread ASEI-PDSI within the school.”<sup>164</sup> The ASEI-PDSI method is gradually spreading at the school-level at the moment, and changes are steadily coming about.

### 2-5-3 The Regional Components

#### “From Recipient Country to Donor Country: from Kenya to the Whole African Region”

When regional cooperation is carried out, I repeatedly tell the Kenyan staff involved that the Kenyan way is not necessarily the best. We, as the donor country, should step back and wait for a competitive spirit to grow between the African countries. We are watching the developments of the regional cooperation which Kenyan staff are making step-by-step, while the Japanese experts provide support for the project activities for backstopping.

Source: Interview with the Chief Advisor Sugiyama.

#### (1) SMASSE-WECSA Conferences

SMASSE-WECSA, the regional component of the project, is participated by 30 African countries, 6 of which are launching or preparing for the SMASSE project in their countries. Table

<sup>164</sup> The Interview with the district-level INSET trainer/mathematics teacher in Wahome District.

2-17 shows the history of the SMASSE-WECSA conferences. Other activities for the participating countries in SMASSE-WECSA include supporting the holding of Stakeholder Meetings or technology exchange activities in order to raise the awareness of member countries of necessity for INSET, as well as supporting the establishment of the project in third countries by dispatching the national INSET trainers from the Kenyan CEMASTEAs.<sup>165</sup>

**Table 2-17 SMASSE-WECSA Conferences**

	Host country	No. of participating countries	No. of participating people
The 1st conference (2001)	Kenya	11	—
The 2nd conference (2002)	Kenya	13	—
The 3rd conference (2003)	Ghana	18	66
The 4th conference (2004)	South Africa	21	76
The 5th conference (2005)	Rwanda	30	60

Source: Social Development Cooperation Department, JICA (2002), SMASSE Project (2005)

The Chief Advisor explained about the regional activities and commented, “We are not considering directly transferring the training system developed in Kenya to the other countries. The Japanese and Kenyan staff and other personnel involved share the stance that we will introduce Kenyan experiences such as the training periods and the utilization of the existing accommodation facilities, but will leave the establishment of the system to the countries’ own people, because the situation in each country is different. On the other hand, we should certainly share the costs for the regional activities. All the Japanese and Kenyan staff explained to the project personnel in other countries the points which are essential for sustainability such as JICA’s policy of not funding the INSET participation fees (daily allowance and accommodation fees). There is still a need for the Japanese staff to support the planning process, but the Kenyan personnel will be better at implementing the project.”

The project was requested to implement SMASSE-WECSA in the post-conflict region by the New Partnership for Africa’s Development (NEPAD), the regional institute.<sup>166</sup> The Association for

<sup>165</sup> SMASSE Project (2005).

<sup>166</sup> The following cooperation between the project and NEPAD was established for advocacy activities in the countries of the region (the interview with the JICA Expert Naganuma).

February 2004	The project had a meeting with the JICA Experts dispatched to NEPAD (to facilitate cooperation with NEPAD) when the project members visited the JICA South Africa Office in preparation for the SMASSE-WECSA conference in South Africa.
April 2004	The Education Advisor of the NEPAD Secretariat participated in the SMASSE-WECSA conference in South Africa.
June 2004	The Education Advisor of the NEPAD Secretariat visited Kenya to see the SMASSE INSET facilities and the INSET courses.
August 2004	SMASSE and NEPAD signed the agreement for cooperation.

Source: Interview with the JICA Expert Naganuma.

the Development of Education in Africa (ADEA) is also expecting CEMASTEAs to take on the role of being a resource center for mathematics and science education in Africa, and also to be the center for the Working Group on Mathematics and Science Education of ADEA.<sup>167</sup> The project's activities inside and outside Africa are giving opportunities to establish the presence of the Kenyan Ministry of Education in the international arena, including meeting with the Filipino Ministry of Education at which the Permanent Secretary of the Kenyan Ministry of Education served as the leader of the technical exchange program. This became an effective incentive for the Kenyan officials and other personnel to support the project.

## (2) C/Ps Developing into Capacity Development (CD) Supporters for the Third-countries

### **“The Sense of being Able to Contribute to the Development of Kenya and Africa is Increasing the Staff Motivation to Work for the Project”**

I made a business trip to Malawi for monitoring and evaluation from November 27 to December 28, 2005. I helped to create the teaching materials for INSET, and worked on the planning of the INSET courses and monitoring, for a two-week INSET course for 300 Malawian teachers. We are expected to give advice and support because it is important that the Malawian people themselves implement the training. Implementation of the training by the Malawians will nurture their ownership of the project. Without ownership, one can not expect sustainability. The key points here are to secure the financial basis and to train the necessary personnel. My enthusiasm to work comes from a sense of being able to contribute to the development of Kenya and Africa, although the work of a national INSET trainer is hectic and does not bring much financial reward.

Source: Interview with the national INSET trainer Muraya.

The Kenyan national INSET trainers, who were the C/Ps in the project, are now playing the part of CD supporters in the third countries. They recognize the significance of ownership by the country in question in order to bring about the sustainability of the project in that country, and so they adhere to their role as facilitators. The Kenyan national INSET trainers share a consensus that they should never take the initiative in the project. This is in order to ensure the ownership by

<sup>167</sup> Sugiyama (2005b) “JICA became a member of ADEA in March 2005 for advocacy activities in African countries and for creating personal connections and networks. Under ADEA, we created the Working Group on Mathematics and Science Education where the Head of the INSET Unit concurrently served as the chairperson.” (Interview with the JICA Expert Naganuma.) “ADEA has a role as the forum for the African Ministers for Education and the donor countries. The project had attempted approaching ADEA even before NEPAD for advocacy activities in African countries and for creating personal connections and networks, but it took some time for participation to begin because JICA needed to become a member of ADEA (an annual contribution of USD 50,000 was needed).” When the legal procedure for CEMASTEAs is completed, a body for these activities will be established inside CEMASTEAs (Grant Aid Management Department, JICA, 2005).

the third country and so ensure the sustainability of the project in that country.<sup>168</sup> They have also come to be convinced that financial incentives and daily allowances are not desirable. This is the most significant achievement of this project. The staff members of the partner country, who are once the beneficiaries of the CD assistance, are now implementing the CD assistance themselves.

To summarize, when we review in detail the approaches of the project under study, we can identify features which are considered as prerequisites but are in fact difficult to implement in many projects, have been well implemented in the said project: conduction of thorough joint needs assessment for the partner country, creation of strategies and negotiations for their implementation at an early stage, development of contents to meet the needs of the partner country, Japanese staff adhering to their role as supporters, and sharing common principles of sustainable development. The SMASSE project succeeded in robustly carrying out these features. All the activities were constructed so that they were based on the needs of the partner country. The Japanese staff reminded the staff and officials of the partner country about these needs, and they encouraged proactive action by the partner country. The Chief Advisor commented on this process and said, “We did not do anything special.” However, we can draw the conclusion that the key to the success of the project to this day has been the cooperation between the Japanese and Kenyan personnel in meeting the real needs, and the thorough implementation of the shared principles.

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<sup>168</sup> Interview with the JICA Expert Hattori. “This comes from the lessons learnt from a failure when the project dispatched 4 personnel to Malawi for the first time to support INSET. Despite the instructions given by the former Head of the Unit Njuguna that the implementation of INSET by Malawian people was essential, the 4 Kenyan staff did everything including creating the teaching materials, implementing the training, analyzing the results and reporting, because there were no full-time C/Ps in Malawi and the time was limited. They came back to Kenya in triumph. However, the former Head of the Unit strongly instructed the delegates for the later dispatches to the third country, that the Kenyans should adhere to their role as assistants, and the national INSET trainers came to realize that their experience in Malawi was a failure.” The Japanese staff is also aware that “we should try to act while considering the CD of the third country, when Kenyan personnel participate in supporting African countries’ activities. The Kenyan experience is effectively used in the regional activities. For example, there was a request from Nigeria to construct the national INSET center using Grant Aid. However, the Nigerian government stopped being obsessed with the idea of the Grant Aid when we introduced the Kenyan example where existing facilities were utilized.” Also “I was instructed by the Chief Advisor that the most important role of the study team is to consider how to realize the ideas of the partner country by using the JICA scheme.” (Interview with the JICA Expert Hattori)

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## Chapter 3 Analysis from a Capacity Development (CD) Perspective

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First getting back to the original premise that problem-solving abilities represent a complex conglomerate of capacities, this chapter confirms the following; 1) whether the project has succeeded in strengthening all the capacity factors necessary for the realization of “a sustainable system for improving teachers’ capability to conduct lessons”, including those not specified in the Project Design Matrix (PDM), and 2) how it influenced the realization of CD if the strengthening failed in some of the factors. In addition, this chapter identifies the features and measures to establish In-Service Training for Teachers (INSET) as a system (or to strengthen capacity factors) by reviewing the project approach.

### 3-1 Has the Overall Problem-solving Capacity of the Partner Country been Strengthened?

The question to be addressed here is whether, without having been planned from a CD perspective in its PDM stage, the project managed to strengthen the capacity (problem-solving abilities) for the “sustainable improvement of in-service teachers’ capability to conduct lessons” as whole. In order to grasp the progress on strengthening capacity at each level and factor, this section identifies the outcomes and pending issues specific to each, based on the capacity factors necessary for establishing “a sustainable system for improving teachers’ capability to conduct lessons (CD indicators)” in table 1-2, Chapter 1.

#### 3-1-1 Capacity Outcomes and Issues at the National Level

##### (1) The Contribution to the International Community

Although the contribution to the international society is a component included in Phase II, related outcomes were produced in the early stages of the project. Some analysis says African communities have similar problems in mathematics and science education.<sup>169</sup> Based on the analysis, the strategic activities, such as expanding third-country training accessibility or initiating activities in other countries of the area, are being developed by establishing the Strengthening of Mathematics and Science in Secondary Education (SMASSE)-Western, Eastern, Central and Southern Africa (WECSA) association in Phase I and utilizing partnerships with regional organizations in Phase II. These primitive activities, however, have problems with organizational

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<sup>169</sup> Interview with Mr. Sugiyama, JICA Chief Advisor for SMASSE Project Phase II.



structure as an intraregional institution or sustainability of activities. Regional components are expected to be strengthened in Post-Phase II.<sup>170</sup>

## (2) Societal Level

At the domestic level, great progress has been made in the institutionalization process, including the specification of INSET in policies such as the Education White Paper and the Mid-term Expenditure Framework, and the establishment of the national-level INSET system. However, in the absence of ministerial ordinances or notifications making training attendance compulsory, INSET is still lacking a formal legal framework enforcing its implementation.<sup>171</sup> During the initial period of phase I, in April 1999, without waiting for the issuing of ministerial ordinances, related parties from the 9 districts involved took a realistic approach, putting together the training implementation guidelines, and initiating training not only at the national, but also at the district level. However, training participation is ultimately dependent on decisions of teachers.<sup>172</sup> In order to truly establish INSET as a system, measures including legal “institutionalization” through governmental ordinances and notifications, and a system of certification through training attendance are required in the future.<sup>173</sup>

At the same time, the decision as to how training is to be continued after completion of the currently implemented 4 cycles is still pending. At present, training tailored to the needs of each district is being implemented after the 4 cycles in the Phase I-area, while the role of Center for Mathematics, Science and Technology Education in Africa (CEMASTEA) is limited to approval of training materials, and to monitoring and evaluation activities. It is urgently needed to decide the direction — respecting district-level initiatives and leaving the central office in charge only of the current jobs such as monitoring and evaluation, or standardizing the training by preparing/offering its programs and teaching materials and actively supporting the implementation

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<sup>170</sup> In the Mid-Term Evaluation Report of Phase II, as 3 recommendations and the amendment of PDM (5), it is stated that “SMASSE-WECSA activities so far have confirmed that the Activity Student Experiment Improvisation-Plan•Do•See•Improve (ASEI-PDSI) method is effective and beneficial for the improvement of mathematics and science education in African countries. Therefore, it is the responsibility of the Kenyan government and JICA to continue their cooperation and carry out activities through which the knowledge gained from SMASSE can lead to education improvement in other African countries.” (Human Development Department, JICA (2005)).

<sup>171</sup> At present, the act enforcing district-level training implementation and participation is the Minutes of the Stakeholders’ Meeting organized by the national INSET center, and attended by related personnel from the various districts.

<sup>172</sup> In other words, it lacks legal force. The necessity of securing teacher participation through notification by the Ministry of Education, Science and Technology is highlighted in the Minutes of the Stakeholders’ Meeting (SMASSE (2002)).

<sup>173</sup> The Permanent Secretary of the Ministry of Education considers that, the inclusion of INSET into the White Paper on Education, Science and Technology and The Kenya Education Sector Support Program (KESPP), and the fact that more than 100 district level INSET centers have been established, in conjunction with the completion of the currently ongoing procedures for the reformation of CEMASTEA into an independent administrative institution, will also mark the completion of the “institutionalization” of INSET, making ministerial ordinances and notifications unnecessary (interview with Prof. Karega Mutathi, Permanent Secretary of the Ministry of Education). However, the compulsory character of INSET attendance is specified only in the aforementioned Minutes of the Stakeholders’ Meeting (SMASSE (2002)). The Minutes of the fifth Meeting of the Joint Coordinating Committee, signed by the Undersecretary for Education as the representative of the Kenyan side, stipulate that each school principal is responsible for having teachers attend training. In other words, from the perspective of the “institutionalization” of training administration, there is no legal basis for making teacher participation compulsory.

of district-level training.<sup>174</sup>

### (3) Organizational Level

At present, 1,900 district trainers, school principals, district education officers and school inspectors, as well as regional officials involved in mathematics and science education, are trained at CEMASTEAM annually. Development of the capacity needed to implement this national-level training represents one of the most significant outcomes of the project.<sup>175</sup> In addition, the system for monitoring the situation of district-level implementation throughout the country by CEMASTEAM itself, and for providing feedback to the Ministry of Education has been consolidated. Training activities have started to spread to other countries of the region. According to the Director of the Department of Quality Assurance and Standards at the Kenya Ministry of Education, the fact that Kenya is bringing its contribution to intraregional relationship-building in the field of education, and that Kenya's role within Association for the Development of Education in Africa (ADEA), New Partnership for Africa's Development (NEPAD) and other local unions has been strengthened, while national-level trainers actively participate in intraregional cooperation, serves to enrich trainers' experience and is expected to produce valuable effects at the domestic level.<sup>176</sup>

One of the remaining issues is the necessity to strengthen the CEMASTEAM's Management Department, which, in its current state, is unable to keep pace with the expansion of the organization.<sup>177</sup> In addition, the Kenyan Government raised new issues during the mid-term evaluation for Phase II: 1) implementation of a baseline survey for trainers of primary teacher training institutions and vocational training schools, 2) training implementation for both personnel and 3) promotion of participation of private schools to the training, which the donor community expects.<sup>178</sup>

### (4) Individual Level

The training of 60 national-level trainers has been completed in terms of knowledge, skills and techniques. These trainers, who were the main target of CD aid during the 5 years of Phase I,

<sup>174</sup> Considering the possibility of teachers being employed as government officials nationwide with little economic incentives, the concrete measures to secure training sustainability might be to create an environment where training and its certificates will be standardized by CEMASTEAM and its participation becomes a criterion for recruitment without official notices from the Ministry. (although teachers are recruited and remunerated by Teachers Service Commission (TSC), schools select their own teachers through recruitment examinations). For this purpose, it is necessary that usefulness of the training is clearly seen at the classroom-level as well as well recognized by the parents and principals. Such measures can become strong incentives for teachers, equivalent to pay rises and promotions. Additional scenarios need to be developed in case the central office does not become responsible for training standardization.

<sup>175</sup> FY2004-2005, annual performance (interview with Prof. Mutathi, Permanent Secretary of the Ministry of Education).

<sup>176</sup> Interview with Mr. Oyaya, Chief Inspector of Schools, Kenya Ministry of Education.

<sup>177</sup> Suggested by a national-level trainer at the workshop held at the completion of Phase I. (Report on SMASSE National Trainers Workshop on SMASSE Project, in JICA Social Development Department (2003)).

<sup>178</sup> Education Development Partners Group (2005).

have demonstrated that they have internalized the significance of CD and can carry out cooperative activities on their own, as a supporter to the countries of the region, maintaining the emphasis on the need for ownership and sustainability. The success of the project in fostering CD supporters for third countries may be considered another of its remarkable outcomes.

A strong need for quality improvement in the field of mathematics and science education had existed on the part of the Ministry of Education, the Secondary School Heads Association and other stakeholders<sup>179</sup> from the very start. Nevertheless, while 100 % of national trainers highly appreciated Activity/Student/Experiment/Improvisation (ASEI) lessons,<sup>180</sup> some of them expressed their doubts and concerns regarding the present situation which hands responsibility for training over to the districts at the end of the fourth cycle.<sup>181</sup> Such dissatisfaction is partly due to the lack of transparency of the future direction of training.<sup>182</sup> In order to make the future vision of INSET a reality, a system capable of securing the concert efforts of national trainers is highly desirable.

### 3-1-2 Capacity Outcomes and Issues at the Local Level

#### (1) Societal Level

Based on the guidelines adopted at the Stakeholders' Meeting, district education offices and school principals became the de facto authority in making district-level training attendance compulsory. Implementation coordinators seemed to deepen the commitment of the parties involved towards training implementation by formulating implementation mechanisms in a participatory approach. Although the debate concerning the future form of training is still under way, it is expected that the ability to develop training plans at district level will be enhanced.<sup>183</sup>

<sup>179</sup> The current Permanent Secretary, previously a teacher himself, had been fully aware of the indispensability of improving mathematics and science education (interview with Mr. Njuguna, former Head of the INSET unit). An official of the Ministry of Education (currently, the Chief Inspector of Schools) talks about the personal experience which led him to strongly support the project: "As a high school student, I experienced hardships in mathematics and science classes, but I believed it was due to inadequate facilities and equipment. Since this project aims at improving lesson quality through INSET and small initiatives, it serves the interests of schools which cannot rely on financial resources." (Interview with Mr. Oyaya, Chief Inspector of Schools, Kenya Ministry of Education.) Also, the former Secretary General of the Secondary School Heads Association, a former English teacher, confesses that he not only pointed out students' poor performance in mathematics and science as a serious problem within the association, but was also aggrieved by his own students' unsatisfactory results in national examinations at the end of secondary education (interview with Mr. Otieno, former Secretary General of the Secondary School Heads Association). The fact that the necessity of a system for INSET was perceived by related parties from the very start became an essential propelling force for the project.

<sup>180</sup> 76 % of national-level trainers said they "strongly believed" they would use ASEI in their lessons once returned to their schools, in answer to the questionnaire, while 24 % answered they "believed" they would use the method (questionnaire results of the on-site study).

<sup>181</sup> Interview held as part of the on-site study.

<sup>182</sup> For example, answers to the question whether "it is necessary for lifetime educators to attend SMASSE INSET" ranged from "I strongly agree" (47 % of national trainers) and "I agree" (24 %) to "I am not sure" (6 %), "I don't agree" (18 %) and no answer (6 %). Although there was no "I strongly disagree" answer, affirmative responses were limited to 70 %, in contrast to the 100 % for ASEI lessons (questionnaire results of the on-site study).

<sup>183</sup> In the Embu district, their original annual action plan was formulated, which effectively applied the 4-cycle training system (interview with the personnel of the Embu district education office).

## (2) Organizational Level

At the local level, major outcomes included the implementation of INSET training on their own initiative in some part of the target area in Phase I and In-Country Training, as well as the institutionalization of District Implementation body District Planning Committee (DPC)/District In-service Training Center (DIC) and training implementation in the area covered in Phase II.

On the other hand, the remaining local-level issues include the need to increase the number of districts able to implement original training programs and the appropriate management of the SMASSE fund. In order to implement training independently at district level, it is necessary to take into consideration the discontent of teachers towards non payment of the daily allowance, and to secure the trust of guardians, who are the sponsors of INSET. Since the fund is a mechanism which could give rise to new interests in the future, a careful examination of management and auditing methods for the district fund needs to be carried out.

Needless to say, training implementation does not necessarily lead to lesson improvement. Numerous teachers do not start putting into practice the knowledge acquired through training until monitoring is conducted in class. For that reason, systematic district-level guidance and monitoring are critical.

In addition, plans exist for conducting computer practice as part of the monitoring support for district-level trainers, in a computer room set up at CEMASTEIA through grant aid.<sup>184</sup>

## (3) Individual Level

### [I have been empowered]

At the beginning, it was difficult to imagine that my lessons would be watched and commented upon. At the end of the second cycle, I started to feel confident and to invite my colleagues into the classroom. Now, I can observe my colleagues' lessons, and engage in discussions. I have been empowered by taking part in the project activities.

Source: Interview with trainers from the Maragua and Wahome districts. The change in the awareness of the same person at the start of the project is described in detail in Baba (2002).

Having fostered the ability of district-level trainers to train teachers in their turn, and the ability of school principals' to organize stakeholders' meetings may be considered an important achievement from the point of view of the knowledge, skills and techniques involved.

<sup>184</sup> Grant Aid Management Department, JICA (2005).

Furthermore, stakeholders who attended training in Japan are transmitting the importance of INSET and of teacher attitude to their districts. Formulation of district-level training implementation guidelines by the related local officials themselves also contributed to strengthening commitment through a participatory approach.

From the point of view of awareness, 100 % of district-level trainers consider that introducing ASEI can help to improve students' understanding,<sup>185</sup> and 95 % believe it can have a favorable influence on their performance in national examinations.<sup>186</sup> It can conclude that district-level trainers realize the significance of implementing INSET. Their discontent is caused by the fact that the district trainer certificate has not been issued yet,<sup>187</sup> despite the fact that its necessity was stated in the Minutes of the Stakeholders' Meeting.

### 3-1-3 Capacity Outcomes and Issues at the School Level

#### (1) Societal Level

While having a problem with its collecting rates, the SMASSE fund has been essentially worked into tuition (development fund). This is a significant outcome which had not been specified in the PDM. The fact that training implementation costs are covered by families (by collection from tuition fees) can be regarded as an instance of guardians assuming responsibility for education. In the context of Kenya's present situation marked by excessive education-related expenses (compared to other countries) coupled with low taxation capability, the allocation of less than 1 % of tuition fees to the SMASSE fund, on a non-incremental basis represents an extremely realistic approach, in compliance with the "beneficiary-payment principle".

#### (2) Organizational Level

Organizational activities at the school level have not been fully developed yet. Since the number of teachers in charge of the same subject within a single school is relatively small, it is expected that future activities (study group activities, monitoring, etc.) will focus not so much on the school level, but on teacher groups at the district level, following the precedent of the Maragua district.

#### (3) Individual Level

From the point of the knowledge, skills and techniques involved, the majority of teachers

<sup>185</sup> Answers to the question whether "student understanding improves as a result of ASEI introduction" were "I strongly agree" (64 %) and "I agree" (36 %) (Questionnaire for district trainers (mathematics, chemistry, physics) undergoing national-level training).

<sup>186</sup> Answers to the question whether "a greater use of ASEI lessons would result in better performance in national examinations" were "I strongly agree" (69 %), "I agree" (26 %). Of the remaining 5 %, 4 % said "they were not sure", while 1 % said "they strongly disagreed." (Questionnaire for district trainers (mathematics, chemistry, physics) undergoing national-level training.)

<sup>187</sup> Interviews in the areas where Phase I and the In-Country Training were implemented.

agreed that the training contributes to knowledge and skill acquisition.<sup>188</sup> Not only does it relate to students' better performance in mathematics and science in national examinations, it also generates changes of lessons which are perceived by students themselves at the class level. Nevertheless, lesson observation at the visited schools revealed that ASEI-PDSI practice is still insufficient in many cases. Adequate incorporation of ASEI-PDSI into teaching methods could result in further improvement in lesson quality in the future.

In their awareness, 30 % of teachers have a negative attitude towards attending training, resulting from dissatisfaction due to nonpayment of daily allowance in parallel with training becoming mandatory. This attitude needs to be taken into consideration.<sup>189</sup> Teachers' motivation to take INSET is related to their perception of training as an important capacity factor for "the sustainable improvement of teachers' capability to conduct lessons".<sup>190</sup> Teachers are willing to attend training as long as they recognize its value in relationship with all monetary and time considerations. It is therefore necessary to take steps in order to raise teachers' satisfaction levels, and to work for the improvement and enhancement of training content, through methods other than the payment of daily allowance. Responses to questionnaires indicate that the majority of teachers are positive about training content, as shown in Table 3-1. This suggests that their reluctance to attend training is not directly related to the training content. Therefore, logistic steps such as a reconsideration of the training schedule and the dormitory facilities become an important factor in effecting a change in awareness.<sup>191</sup>

**Table 3-1 Evaluation of Teachers on ASEI Lessons**

	I strongly disagree	I disagree	I am not sure	I agree	I strongly agree
Using the ASEI method in class will help improve students' understanding.	0 %	0 %	2 %	52 %	45 %
Increased use of ASEI lessons will result in better performance in national examinations.	0 %	0 %	5 %	48 %	48 %

Source: Questionnaire for teachers (see Attachment 4).

<sup>188</sup> Questionnaire for teachers.

<sup>189</sup> *Ibid.*

<sup>190</sup> Baba and Iwasaki (2001) analyze the "classroom revolution" in terms of its formal and economic factors at the societal and organizational level, and of its attitude and spiritual factors at the individual level. They consider that, for the INSET system to yield results at the classroom level and to secure its sustainability, the education administration level and the individual level should operate in close cooperation: in order for the system to maintain its vitality and sustainability, it is necessary to produce specific behavior patterns at the individual level within the institutionalization process". "Prioritizing the former may lead to participation by coercion, or motivated by economic considerations, while prioritizing the latter may lead to vulnerability to atmosphere and instability". Activities aimed at producing changes in the teachers' attitude and spirit are indispensable for a true "institutionalization" of INSET. The project under study endeavored to improve training quality through sustained efforts. Further steps need to be taken to stimulate teachers' proactive involvement through on-site guidance and creation of training mechanisms facilitating participation.

<sup>191</sup> Teachers' wishes expressed in questionnaires included an adoption of single-day schedule, and a shorter training period (responses to the on-site study questionnaire). In addition, a creative system enabling national-level trainers, district-level trainers and general trainers to switch duties according to their performance also needs consideration (On-site questionnaire for teachers).

In this manner, the capacity necessary for “the sustainable improvement of teachers’ ability to conduct lessons” in mathematics and science secondary education have been consolidated not only at the national training center (CEMASTE), or the direct beneficiary of the project, but also at the local and school levels. The importance of INSET for strengthening mathematics and science education was acknowledged by policymakers, which led to the establishment of a training implementation system covering the whole country. Furthermore, as shown by the Kenyan personnel who used the CD approach to establish a sustainable training system in other countries of the region as part of the interregional cooperation in Phase II, the project also enabled the Kenyan counterparts (C/Ps) to internalize the CD perspective. The project thus supported the recipient country to develop capacity not only to solve their own problems but also support other countries’ CD.

Capacity factors expected to be strengthened in the future still remain. Ongoing training can be seen as a booster shot for the revitalization of mathematics and science education in Kenya. INSET should ideally become rooted into the Kenyan education system as a permanent feature for education quality to continue improving in the future. Measures such as making training mandatory through governmental ordinances and notifications, or establishing a certification system can help to promote training attendance. An increase in teachers’ willingness to actively and continuously engage themselves in the process of lesson improvement is also highly desirable. To this end, it is first necessary to design training in such a way as to stimulate teachers’ willingness to participate in it. Studies of teachers’ opinions have shown that, even though they might be satisfied with training content, their discontent is related to the training schedule, dormitory facilities, and other logistic issues which are relatively easy to solve. Future efforts should be aimed not only at the continuous improvement of training content, but also at creating an environment that facilitates participation. Moreover, as previous experience has shown that in many cases training attendance does not necessarily result in direct application of acquired knowledge at the classroom level, appropriate on-site guidance and monitoring are necessary. Problems which might surface in the future, including those related to adequate fund management at local level, also need to be effectively dealt with. Level-specific outcomes and issues are shown in Table 3-2.

Table 3-2 Level-specific Outcomes; Issues and Aspects for Further Consideration

		Outcomes (improvement of problem-solving ability)	Aspects for further consideration	
National level	International contribution	<ul style="list-style-type: none"> <li>Through the medium of NEPAD, ADEA, the necessity for the strengthening of mathematics and science in secondary education has been recognized by the countries of the region and by donors, resulting in the creation of SMASSE-WECSA.</li> <li>Third-country training was implemented in cooperation with intraregional organizations.</li> <li>Kenya has developed a sense of self-awareness as CD facilitator as a result of its experience in intraregional cooperation.</li> </ul>	<ul style="list-style-type: none"> <li>Consideration of cooperation approaches based on country-specific issues and needs</li> <li>Institution-strengthening at the intraregional level</li> <li>Consolidation of Kenya's role and functions as a cooperation implementing country</li> </ul>	
	Societal	Policies	<ul style="list-style-type: none"> <li>The necessity of mathematics and science INSET and the activities of CEMASTEAs have been clearly specified in the Education White Paper.</li> <li>As a result of the reflection into the Mid-term Expenditure Framework, budgetary steps have become feasible and donor activities have gained public acknowledgment.</li> <li>Commitment for intraregional activities has been secured as part of the Mid-term Expenditure Framework.</li> </ul>	<ul style="list-style-type: none"> <li>A sustainable INSET budget operation.</li> </ul>
		Institutions	<ul style="list-style-type: none"> <li>The INSET system for mathematics and science in secondary education has been standardized for nationwide application.</li> <li>National-level training costs have been budgeted by the Ministry of Education.</li> <li>The minimum qualification for becoming a district-level training coordinator has been set at the completion of the four-cycle system.</li> </ul>	<ul style="list-style-type: none"> <li>Legal action for the reformation of CEMASTEAs into a Semi-Autonomous Government Agency.<sup>192</sup></li> <li>Making training truly mandatory through governmental decrees, etc.</li> <li>Establishing a certification framework for trainers.</li> <li>Discussion and establishment of the training system following completion of the 4 cycles, and of the certification system.</li> </ul>
	Organizational		<ul style="list-style-type: none"> <li>The training center has been established.</li> <li>Teaching materials and aid necessary for training implementation have been created.</li> <li>It has become possible to systematically implement national-level training as a four-cycle system.</li> <li>The system for monitoring and evaluation by CEMASTEAs, and for improvement by turning evaluation results into lesson content has been consolidated.</li> </ul>	<ul style="list-style-type: none"> <li>Strengthening of the CEMASTEAs Management Department.</li> <li>Clarification of the future role of CEMASTEAs (training standardization, support for district-level training, etc.)</li> <li>Consideration for the possibility to implement training for primary education and vocational training.</li> </ul>
	Individual	Knowledge Skills Techniques	<ul style="list-style-type: none"> <li>The ability necessary for the development of curricula and teaching materials in line with the findings of the baseline study has been acquired.</li> <li>60 teachers acquired the capacity to organize national INSET.</li> </ul>	<ul style="list-style-type: none"> <li>Further contribution of the subject team to the improvement of training quality.</li> <li>Establishment of training methods for French-speaking countries.</li> </ul>
Awareness		<ul style="list-style-type: none"> <li>Attitudes have changed as a result of monitoring and evaluation activities.</li> <li>Continuous efforts have been made to improve training quality.</li> </ul>	<ul style="list-style-type: none"> <li>Clearer self-awareness for each role and function.</li> </ul>	

<sup>192</sup> CEMASTEAs has become a Semi-Autonomous Government Agency under the Ministry of Education since April 2006.



## Strengthening of Mathematics and Science in Secondary Education (SMASSE) Project in Kenya

Local level	Societal (institutions)		<ul style="list-style-type: none"> <li>The procedures for making the four-cycle INSET system mandatory are under way.</li> <li>The fund raising system has been set up.</li> </ul>	<ul style="list-style-type: none"> <li>Formulation of independent training plans.</li> </ul>
	Organizational		<ul style="list-style-type: none"> <li>DPCs have been established across the country.</li> <li>DICs have been established across the country.</li> <li>Centers have been supplied with the teaching materials and aid necessary for training implementation.</li> <li>The capabilities required for district-level training implementation and management have been improved.</li> <li>Independent training costs are met through the SMASSE fund.</li> <li>In some of the districts, original training programs have been developed on the basis of the needs assessment.</li> </ul>	<ul style="list-style-type: none"> <li>Improvement of the training implementation capacity based on the four-cycle system.</li> <li>Adequate fund management.</li> <li>Development of the skills required for formulating original training programs after completion of the 4 cycles.</li> <li>Training system adjustments.</li> <li>Monitoring implementation.</li> </ul>
	Individual	Knowledge Skills Techniques	<ul style="list-style-type: none"> <li>The know-how necessary for both the implementation of district-level training and the organization of the Stakeholders' Meeting has been acquired.</li> <li>In some of the districts, original activities are unfolding after completion of the 4 cycles.</li> <li>The ASEI-PDSI method is used at the classroom level.</li> </ul>	<ul style="list-style-type: none"> <li>Improvement of training implementation skills of district-level trainers.</li> </ul>
		Awareness	<ul style="list-style-type: none"> <li>Trainers feel empowered.</li> </ul>	<ul style="list-style-type: none"> <li>Maintenance of teacher motivation.</li> </ul>
School level	Societal (institutions)		<ul style="list-style-type: none"> <li>The SMASSE fund was budgeted in real terms.</li> </ul>	<ul style="list-style-type: none"> <li>Securing impartiality in submitting funds among schools.</li> </ul>
	Organizational		<ul style="list-style-type: none"> <li>Although organizational-level activities are still at an early stage of development, an informal exchange between teachers is unfolding at schools where district-level trainers operate.</li> </ul>	<ul style="list-style-type: none"> <li>Institutionalization of training administration.</li> <li>Monitoring implementation.</li> </ul>
	Individual	Knowledge Skills Techniques	<ul style="list-style-type: none"> <li>Most mathematics and science educators are aware of the significance of the ASEI-PDSI approach and are willing to apply it in the classroom.</li> <li>After training, interaction between mathematics and science educators has intensified in some districts.</li> </ul>	<ul style="list-style-type: none"> <li>Adequate practice of ASEI-PDSI by all mathematics and science educators, and a real improvement of lesson quality.</li> </ul>
		Awareness	<ul style="list-style-type: none"> <li>School principals acknowledge training outcomes.</li> <li>Teachers acknowledge the significance of training and of applying it to their lessons.</li> </ul>	<ul style="list-style-type: none"> <li>Measures to facilitate training participation.</li> </ul>

Source: Table drawn by the author of the report based on the on-site study.

### 3-2 Project Features and Initiatives Which Led to the Institutionalization of INSET

While the project essentially succeeded in establishing “a sustainable system for improving teachers’ capability to conduct lessons”, a few issues have remained unsolved, particularly in terms of developing each individual teacher’s skills and other aspects at the school level. Such an outcome was predictable from the fact that project planning focused on the establishment of INSET implementation mechanisms at the national and local levels, while school-levels activities were not included in the

PDM objectives. However, capacity enhancement at the school level is an indispensable condition for the sustainability of the INSET system and for its ability to yield results in the classroom. Thus, this project analysis serves to confirm the importance of the complexity approach, which is emphasized from a CD perspective (and of the validity of CD indicators).

On the other hand, we have been able to identify other significant outcomes, which had not been included among the PDM activities, such as the reflection of INSET into education policies, and training budgeting SMASSE fund at the school level. Moreover, the fact that the direct C/Ps of the project (national trainers), could turn into domestic CD providers, demonstrates the internalization of capacity by the recipient country. This section will put together those project features and measures which led to outcomes exceeding those originally anticipated for the CD of the recipient country, while leaving the issue of strengthening capacity at the school level for future consideration.

### **3-2-1 Perceiving Needs on Multiple Levels**

#### **(1) Perceiving Needs Common to a Variety of Levels**

The first reason for the success of the project is to be found in the fact that the needs shared by a variety of stakeholders were identified and taken into consideration in the implementation process. Kenya is an education-conscious society, in which attending college is a shortcut towards success, and the difficulties experienced in mathematics and science in national examinations were a real bottleneck for many young people. From this point of view, the need to improve students' performance in mathematics and science was a major one, shared by school personnel and parents. On the other hand, for the officials of the Ministry of Education, strengthening mathematics and science education was a national objective inscribed in the National Development Program. There is a real need here. School officials realized that improving teacher quality could be a key to solving the problem. Thus they also knew what had to be done to meet this need.

#### **(2) The Cooperation Linking Political Intention and School Needs**

The next step towards success is political intention. Sometimes, even if there is a clear grasp of what the needs are, little can be done to solve the problem. That is where Japanese cooperation can play an important role. It is a catalytic role, speeding up changes which are meant to occur. The key persons identified at first were one of the officials of the Ministry of Education (Deputy Chief Inspector of Schools; currently, Director of the Department of Quality Assurance and Standards), the Principal of the Kenya Science Teachers' College (KSTC), where the project was based, and the Secondary School Heads Association.<sup>193</sup> The last one was especially regarded as

<sup>193</sup> Interview with Mr. Sugiyama, JICA Chief Advisor. Training in Japan has been effectively used for the establishment of cooperative relations with the key persons.

the key to extending the training for in-service teachers nationwide. Appointment of full-time C/Ps, one of the keys to the success of the project, has become possible by reminding top education officials of the need through the first two key persons. In addition, calling the full-time C/Ps' attention to those needs made it possible to virtually institutionalize district-level training and secure its financial resources.

Furthermore, after the government change in 2002, the newly appointed Permanent Secretary of the Ministry of Education successfully promoted the project in opinion exchanges during the official visits he made to other African countries with the aim of expanding the project area,<sup>194</sup> and is currently the key supporter of the project.<sup>195</sup>

### **3-2-2 Building a System Contributing to Sustainable Development**

#### **(1) The Imperative of Sustainable Development**

Cooperation must link the needs of stakeholders belonging to multiple levels. However, the success of cooperation is not guaranteed by focusing on that aspect alone. What made possible the success of the project was the consistent emphasis on the “imperative of sustainability”. All the strategies and tactics in the project have been formulated with the awareness that they should also serve to secure sustainability. Approaches were examined from the viewpoint of sustainability as early as 1995, through the joint needs assessment and the study of the institutional, financial and human basis as part of the project formulation process. A realistic approach based on the thorough analysis of existent capacity, and taking into consideration external conditions was selected as a result.

#### **(2) Appointment of Full-Time C/Ps**

The appointment of full-time C/Ps represented the first key to sustainability. Eight C/Ps were assigned as a prerequisite for launching the project. The C/P group was composed not of officials of the Ministry of Education, but of KSTC, educators directly involved in the in-service teacher system. This way of selection of the C/Ps enabled them to find incentives within the day-to-day tasks, which ultimately contributed to the establishment and maintenance of INSET. During the implementation stage, further motivating incentives were given to the C/Ps, who then actively involved a variety of stakeholders.

#### **(3) Utilization of Existing Resources**

Effective use was made of teachers and existent administrative structures in order to develop

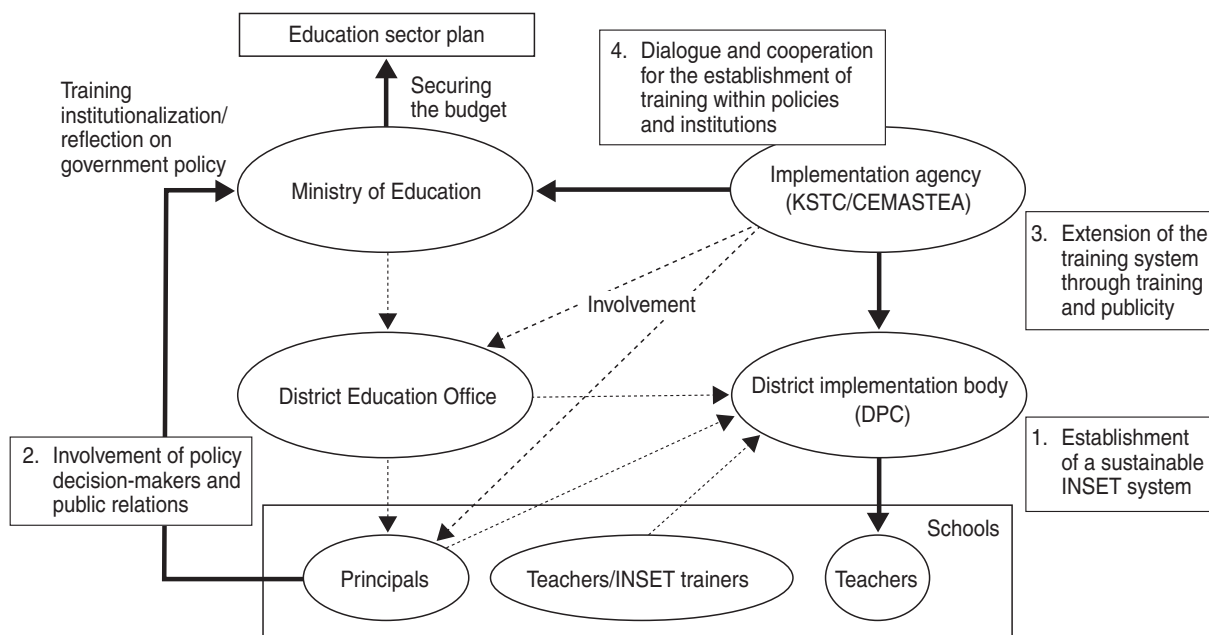
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<sup>194</sup> Interview with Mr. Sugiyama, JICA Chief Advisor.

<sup>195</sup> The Unit head stated that he would refer to the project in all kinds of meetings (Interview with Mr. Njuguna, former coordinator of the INSET unit).

the training implementation mechanism. A good understanding of the partner country's context, combined with setting up an implementation system utilizing existent resources, resulted in a smooth implementation free of unnecessary institutional tension (see Figure 3-1). At present, INSET, which started as a unit within KSTC, is expected to be reformed as a Semi-Autonomous Government Agency under the umbrella of the Ministry of Education.<sup>196</sup>

**Figure 3-1 An Implementation System Utilizing Existing Organizations**



Source: Adapted from "Overview of JICA INSET cooperation" (Mabuchi and Yokozeki, 2004).

#### (4) A Cooperation Approach Focusing on the Partner Country's Financial Basis

Kenya's low ability to bear the operating costs for the training was a concern from the start. The use of non-project grant aid was suggested several times during the preliminary study stage, and it was actually used for the funding of needs assessment and monitoring / evaluation activities. In addition, in Phase I, JICA "local adjustment budget" was used for the implementation of the In-Country Training activities.

The project secured stakeholder support in order to establish the SMASSE fund for district-level training implementation. The fund uses a mechanism by which a part of the "development fund" paid by parents to schools as tuition is used. The development fund is used to cover the various needs of school management based on the principal's decision, and had been previously allocated to the curriculum training organized by the Secondary School Heads' Association. Making use of less than 10 % of the development fund, and about 1 % of the entire

<sup>196</sup> CEMASTE has become a Semi-Autonomous Government Agency under the Ministry of Education since April 2006.

tuition amount, the SMASSE fund met with little resistance from the parties involved. Finding such modalities of using the existent financial base of the partner country may be considered an innovative aspect of the project. Since it is raised and managed by DPCs in compliance with the guidelines for district-level training management, the fund is also a model for the way it fosters ownership.

### **(5) Building an Institutional Basis for Nationwide Expansion**

In addition to securing the human resources and financial basis described above, measures had to be taken in order to establish the 3rd requisite for sustainability — an institutional basis. Given the centralized character of the Kenyan government, the generalization of training at the national level is an indispensable condition for sustainability. By adopting the “cascade approach”, and appealing to the influence of key persons such as the Secretary General of the Secondary School Heads Association, it became possible to extend the project area to the entire Kenyan territory. Thus, Phase II was launched.

Moreover, since previous cooperation in the field of secondary education had been limited among donor agencies, it was possible to contribute to the substantial “institutionalization” of the training system without incurring adjustment costs.

### **3-2-3 Nurturing Ownership**

“As ‘donor fatigue’ and ‘the limitations of development aid to Sub-Saharan Africa’ are becoming more and more apparent, failing to produce results through implementation in line with Organization for Economic Co-operation and Development (OECD)-Development Assistance Committee (DAC) principles would mean that development in Africa is a lost cause”.<sup>197</sup> In the project formulation stage, the project strategy was almost completely established as the result of a detailed preliminary study. Partner country ownership was recognized as one of the most important considerations, and Japanese staff devoted themselves to their role as partners of Kenya’s efforts.

#### **What is Ownership?**

Ownership means identifying problems and finding solutions by oneself. (Own the problems, own the solution.)

Source: Interview with Mr. Muraya, national-level trainer.

#### **(1) Own the Problems**

Although strategies were formulated by Japanese experts, C/Ps visited the districts themselves in order to assess the needs. This was a good opportunity for elite officials to

<sup>197</sup> Interview with Mr. Sugiyama, JICA Chief Advisor.

familiarize themselves with the situation at the school level, and to perceive problems as their own.

## (2) Own the Solution

Premised on the joint needs assessment, ASEI-PDSI was born out of the dialogue with the Japanese experts, and the C/Ps formulated the training plan themselves. In the absence of budget provision from the government, local governments and school-level stakeholders took the initiative of establishing the SMASSE fund. Thus, in the implementation process, Kenyan officials explored problem-solving methods by themselves and made all the “decisions”. By taking part in the decision-making process, stakeholders cultivated a feeling of responsibility and became enthusiastically involved in activities. Through having local C/Ps make decisions and thus allowing a sense of owning the decision to grow, ownership towards the decisions can be nurtured.

Moreover, a monitoring and evaluation unit was established as part of the project, and managed progress autonomously. This gave birth to a cycle in which new implementation methods were designed on the basis of the outcomes, and responsibility for the results was assumed by the Kenyan side. These activities had an influence on the awareness and attitude of partner country officials, leading to a dramatic improvement in the national-level training quality.

## (3) Incentives

### Work as Incentive

- I enjoyed my work on the project almost as much as I had enjoyed the time when I was a college student. What I learned from my work is that “anything can be done”. SMASSE started from nothing, but now it has grown so much it is spreading to other African countries (Mr. Njuguna, former head of the INSET unit).
- The incentive for national-level trainers is “challenge”. On a regular basis, we must find ways of addressing the problems we are faced with, and to decide what the next step will be. I also enjoy a lot exchanging opinions with my colleagues in meetings in order to raise the quality of our work. (Mr. Kogolla, CEMASTE representative).

Source: On-site interview.

For national-level trainers, training in Japan and in third countries, as well as field trips to other countries of the region as third-country experts, represent significant incentives because they improve the trainers’ career prospects. At the same time, new challenges inherent in the day-to-day expansion of the project scope, such as conducting activities as third-country experts, or introducing training for primary and vocational schools, are part of the excitement of work, and therefore important incentives. By having incentives for work, the level of motivation rises and thus ownership towards work can be nurtured.

Based on the notion that “paying allowances kills a project”, no C/P allowances or daily allowance for the training period was provided. Since daily allowance paid by aid agencies is a routine in Africa, the project met various difficulties at its start. However, this spirit is now understood and shared by the Ministry of Education and by national-level trainers.

#### **(4) Leadership**

Between the project-launching stage and December 2005, the Head of the INSET unit played an essential part in promoting the project. The efforts made under his leadership to introduce lesson study and teachers’ criticism of one another’s lessons in a culture which completely lacked such background, helped increase the sense of Kenyan ownership.

The head’s role was also the product of the relationship between him and the JICA Chief Advisor, the two spending a considerable amount of time together daily after working hours, frankly exchanging views on the project. The Chief Advisor considers that as a result of these exchanges, the unit leader developed a stronger sense of professionalism, and the patience necessary for giving others opportunities and guiding them when they lack adequate professional skills, while expressing his own vision and commitment.

#### **(5) Rising Presence of Kenya**

For the officials of the Kenyan Ministry of Education, strengthening the presence of the Ministry through partnerships with NEPAD and ADEA and through cooperation provided to other countries of the region, represented one of the keys to fostering ownership.<sup>198</sup> National pride helped to strengthen the sustainability of the activities.

Expansion of regional activities was made possible by the fact that the parties shared a vision for the future. The 1st project formulation study report already mentions the possibility for the project to become a model case in Africa. Prior to the formulation of the strategic scenario, discussions regarding the expansion of the covered area to surrounding African countries, led to the creation of the project which had the internal potential for expansion, a potential which later materialized as Phase II.

#### **(6) Stipulation of INSET in Education Policies, and Budgetary Measures**

The stipulation of INSET for mathematics and science secondary education, and the budgetary measures necessary for long-term implementation, were the direct result of having fostered such ownership.

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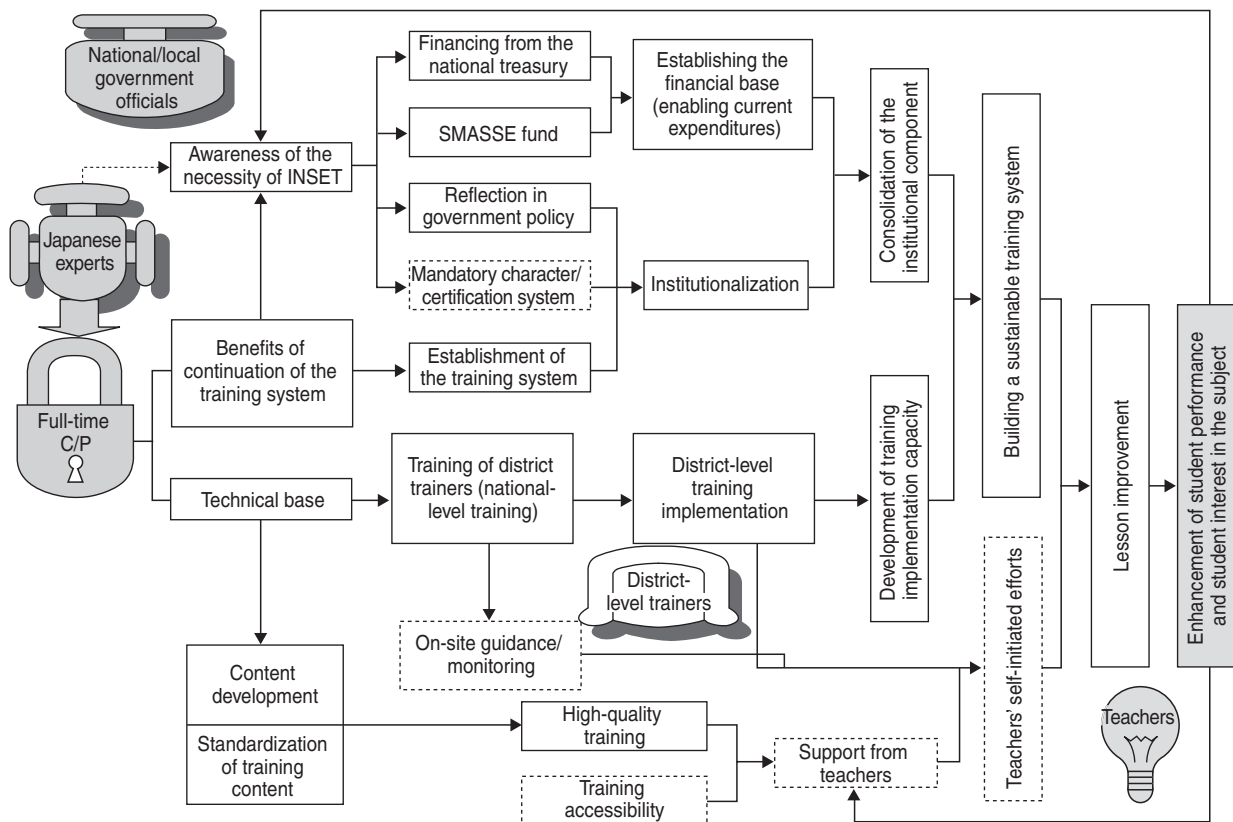
<sup>198</sup> The Kenyan Ministry of Education is expected to develop an awareness of the possibility of leading not only Kenyan development but also development in Africa (a manifestation of ownership) (JICA Kenya Office (2005)).

### 3-2-4 Tangible Outcomes

#### (1) What the Tangible Outcomes Produced

Although developing individual teachers’ capacity at the school level is still a pending issue, a wide range of positive outcomes have been achieved, including an improvement in students’ performance and an increase in their interest in the subjects. Needless to say, such achievements are part of the ultimate target of the project. The emergence of cooperation outcomes has also led to an intensification of support from teachers and national and local level officials, generating a positive cycle. (See Figure 3-2)

**Figure 3-2 Project Approach (Domestic Components)**



Note: Factors with limited effect on outcomes are indicated by a dotted frame.

Source: Created by the author.

#### (2) The Focus of Cooperation

The fact that the project focused on cooperation in “the field of mathematics and science in secondary education” helped to make outcomes even more apparent. Secondary education in Kenya is characterized by little intervention from teachers’ unions and uniform teacher capability. Moreover, having limited the scope of cooperation to mathematics and science made outcomes more clearly noticeable from comparisons with other subjects, thus proving the efficiency of cooperation.



**(3) Monitoring, Evaluation and Public Relations (Efforts to Publicize Outcomes)**

While classroom-level outcomes could be perceived through student observation and performance in national examinations, the changes in teachers' skills and attitudes which produced such outcomes formed the continuous object of study of the project monitoring and evaluation unit, who also had the role to publicize their findings. The recognition arising from constantly connecting project activities with classroom-level results was instrumental in stimulating the commitment of Kenyan officials.

**(4) Content Development and Standardization**

Ongoing efforts for content optimization, ranging from ASEI-PDSI development to the introduction of lesson study, resulted in the steady enhancement of training quality and ultimately contributed to lesson improvement. An emphasis on training quality is essential in order to motivate teachers to attend the program.

The standardization of training content and sessions also contributed to ensuring training quality. On the other hand, the development of training implementation guidelines for the government administrators in charge of implementation played an important part in simplifying their work.

**3-2-5 Support from Japanese Staff**

**(1) The “Waiting” Stance and the Long-Term Perspective**

Japanese staff of the project know that results cannot be produced in the short term, and therefore they take their time.<sup>199</sup> With this in mind, the Chief Advisor pointed out that the process of training content development, carried out by the 2 countries, took longer than the time usually needed for study and development by Japanese experts working by themselves, but this time was necessary for the Kenyan side to reach their own decisions in order to secure their ownership of training content.

Such a “waiting” stance is rooted in the attitude of the Japanese team to act as “kuroko”, discussed in 2-2-1 (2). While placing emphasis on the role of “kuroko”, the Japanese staff adopted a long-term perspective when considering issues together with their Kenyan partners.

As for the firm establishment of the training content, the Academic Advisor considers that

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<sup>199</sup> The JICA staff states that “for CD to include changes in the perspective of values, we need a project structure that makes ‘waiting’ possible. To that end, it is necessary to have a project design capable of covering a relatively long time span, and flexible enough to allow for approach adjustments as progress makes them necessary” (interview with a former staff in charge of the project at JICA Headquarters).

“although the introduction of ASEI may be considered a breakthrough, it will need 20 to 30 years to spread to classrooms throughout the country”.<sup>200</sup> Voicing a conviction shared by the Japanese staff, he points out that “Japan needed 100 years after the Meiji period to become a leader in science and technology. As teachers change on a 10 to 20-year basis, the goal of this project is to “sow the seeds” for changes which will become visible in two generations’ time”.<sup>201</sup>

## (2) The Belief in Sustainability, and the Importance of Being Bold and Flexible

Other factors which speeded up project progress were the negotiation skills required to secure the institutional, financial and human resource basis indispensable for sustainability, and the determination and flexibility of the Japanese team in understanding the president’s political concerns and in initiating the In Country Training. The unwavering conviction that “cooperation is meaningless without sustainability” ultimately led to the C/Ps growth.

## (3) Support from JICA Personnel

There is no project success right from the start. The perception of project success is built through the efforts of those involved. The first step in the project was to foster trust for JICA’s project through active public relations, and efficient operation and fund management. The next step consisted of positively introducing the project to key persons and officials of the Ministry of Foreign Affairs through JICA Kenya Office. At the same time the JICA Headquarters constantly referred to the project as representing JICA activities, not only through advertising media, but also on the occasion of intraregional expansion and aid intensification. The project site was visited by officials of the Ministry of Foreign Affairs and JICA officials, who acknowledged outcomes and made the decision of implementing Phase II. The project gained further recognition and support after the launch of Phase II, when it was granted the JICA Award, while the Academic Advisor received the Award of the Japan Society for the Study of Education and the International

<sup>200</sup> The Academic Advisor explains the reason as follows: “Japan needed 20 years to make the transition from the teacher-centered teaching system of the 1950s to the student-centered lessons of the 1970s. One of the driving forces behind the change was the establishment of democracy, and the generalization in the 60s of the mentality which no longer praised submissive students and reprimanded those who voiced their own opinions like in the 50’s, but instead started to appreciate students who spoke up in class. At the moment, the Kenyan teaching system is characterized by hierarchical relations, in which teachers are viewed as a superior entity, instructing the students, and in which submissive students are considered good students. Students lack the experience of studying by themselves or in groups. Another cause of the change in Japanese education was economic growth. It took 20 years to complete the transition from teacher-conducted experiments to experiments which were conducted by students. The period around the 1960s was a time of high economic growth for Japan, and schools suddenly had the possibility to purchase experiment equipment not only for the teacher’s use, but for students’ individual use as well” (interview with Mr. Takemura, Academic Advisor).

<sup>201</sup> Interview with Mr. Tsutaoka, former JICA expert, Hiroshima University Professor. “If we consider Japan’s experience, we realize that, during Meiji and the 1st years of the Taisho era, few experiments were conducted in the classroom, and that budget differences among prefectures were reflected in the laboratory equipment they could afford. After the war, legislation designed to promote mathematics and science education led to the establishment of education centers, which in their turn stimulated spectacular growth. The fact that it took Japan so long to internalize the lessons learned from the West demonstrates once again that changes in the educational system are like changes in technology, which needs time to mature, just as it took 30 years for transistors to finally be used in practice. Another important thing to bear in mind is that, even if we train the staff for mathematics and science education, the field will not see any major development in the absence of approaches addressing social and administrative aspects.” (interview with Mr. Tsutaoka, former JICA expert, Hiroshima University Professor.)

Contribution Award and the Chief Advisor received the Foreign Minister's Award.

This chapter analyzes the project from a CD perspective. In accordance with the hypothesis put forward in Chapter 1, the fact that the project was not initially formulated from a CD standpoint resulted into a number of capacity factors being left out of the scope of improvement. Outcomes not specified in the initial plan included, in the project formulation stage, the establishment of an implementation system aimed at "sustainability", which was the product of (1) having planned cooperation in such a way as to address multiple-level needs and (2) having secured political backup. In the implementation process, (3) special attention was paid to nurturing the ownership of full-time C/Ps and government officials, while (4) tangible outcomes attracted further support. Moreover, (5) these processes were sustained by a commitment to "waiting" on the part of Japanese experts, who maintained trust relationships with the rest of the Japanese personnel and secured their indirect support. These are some of the approaches not recorded in the PDM which we could observe in our analysis. On the basis of these findings, the following chapter will formulate a number of suggestions for future technical cooperation in general, and for cooperation in the field of INSET for mathematics and science secondary education in particular.

## Chapter 4 Aid Management Based on a Capacity Development (CD) Perspective

In the previous chapters, we examined how the Strengthening of Mathematics and Science in Secondary Education (SMASSE) project succeeded in establishing a “sustainable system for improving teachers’ capability to conduct lessons” as capacity of the recipient country.

Table 4-1 gives an overview of the way in which a CD perspective was present in the Japanese approach during the various stages of the project, starting with the project formulation stage.

**Table 4-1 The Japanese Approach from the CD Perspective During the Various Stages of the Project**

		Implementation management	Cooperation content
Formulation stage	JICA personnel	<ul style="list-style-type: none"> <li>Placement of personnel capable of grasping the real needs of the recipient country, and of developing a strategic scenario in accordance with a vision for the future.</li> <li>Nurturing of Kenyan government ownership through a participatory approach, etc.</li> <li>Building trust with government officials of the recipient country through the long-term commitment of the personnel involved.</li> <li>Taking into consideration other donors and establish strategic partnerships with them for smooth implementation.</li> </ul>	<ul style="list-style-type: none"> <li>Grasping country context.</li> <li>Understanding real needs.</li> <li>Establishing the project focus in a way that makes effects clearly visible with respect to the needs.</li> <li>Developing strategies and tactics.</li> </ul>
Launching stage	Project experts	<ul style="list-style-type: none"> <li>Foresight in examining mid- and long-term prospects.</li> <li>Development of short- to mid-term strategies.</li> <li>Support to the partner country during the execution stage.</li> <li>Fund management.</li> <li>Effective use of training in Japan for key-person involvement.</li> <li>Public relations / publicity in the recipient country and Japan.</li> </ul>	<ul style="list-style-type: none"> <li>Facilitating institutionalization (area expansion) through easily understandable slogans and standardization of content</li> <li>Academic support.</li> <li>Avoiding an instructing attitude and fostering ownership through joint activities (aid donors as facilitators).</li> <li>Utilization of existing capacity and localization of cooperation content.</li> </ul>
	Domestic personnel	—	<ul style="list-style-type: none"> <li>Academic support (dispatch of experts/ acceptance of trainees).</li> <li>Fostering experts to act as partners in joint activities.</li> </ul>
	JICA personnel	<ul style="list-style-type: none"> <li>Acting as a hub for the Japanese side, with contact and coordination functions.</li> <li>Inter-donor adjustment to support project activities.</li> </ul>	<ul style="list-style-type: none"> <li>Organization of meetings for experts from relevant fields and other activities aimed at coordination with related projects, as well as the accumulation of knowledge and experience.</li> </ul>
Expansion stage	Project experts	<ul style="list-style-type: none"> <li>Providing Kenyan partners with a variety of practical opportunities (learning by doing).</li> </ul>	<ul style="list-style-type: none"> <li>Strengthening the academic aspect.</li> </ul>
	Domestic personnel	—	<ul style="list-style-type: none"> <li>Acceptance of trainees.</li> </ul>
	JICA personnel	<ul style="list-style-type: none"> <li>Adjustment of country-specific cooperation plans in collaboration with the Ministry of Foreign Affairs and embassies in the context of regional expansion.</li> <li>Contact and coordination among local offices in the context of area expansion.</li> <li>Data gathering for the safety of Japanese and third-country experts in the context of regional expansion.</li> </ul>	—

Source: Created by the author based on on-site interviews etc.

This chapter will draw on the above analysis to highlight the lessons learned from the project, not only in the field of education but also in that of technical cooperation in general, and will relate them to the 2 key concepts of CD, “complexity” and “endogeneity”, in order to propose recommendations for JICA’s implementation system.

## **4-1 Complexity: Building a Sustainable System and the Concept of Complexity in CD Achievement**

### **4-1-1 A Plan Considering Sustainability from the Project Formulation Stage, and Building Trust Relationships with Local Counterparts (C/Ps)**

As previously mentioned, the project had not been initially designed from a CD perspective. However, examination of the project approach shows that adequate planning based on a substantial preliminary study attached great importance to “sustainability”, and that this plan was thoroughly implemented.

This was made possible through the direct participation of implementors, including the Chief Advisor, experts and domestic personnel, from the early stages of the project,<sup>202</sup> which led to the formulation of a feasible plan, as well as through the solid trust relationships with the recipient country.

### **4-1-2 Perceiving Needs on Multiple Levels through Capacity Assessment**

Grasping the organizational, institutional and societal capacity of the recipient country represents the 1st step in selecting a sustainable cooperation approach. This is because these existing capacities influence the choice of the approach to be adopted by the project. Therefore, although a particular project may have proven successful in the context of a given country, the same approach will not be effective in a context of different country.

The SMASSE project analyzed existing capacity in the recipient country in terms of the institutional basis, the financial basis and human resources basis, at the national, local and school levels.

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<sup>202</sup> The Chief Advisor’s responsibilities covered, in the project formulation study: education planning, in the 2nd project study: education planning, in the preparatory study: team leader/general affairs, in the implementation study: team leader/general affairs (report drafting for each study). The Chief Advisor points out that, although Kenyan society “seems at first sight to have modernized, features of the traditional society are still present, such as the leaders’ patronizing role in relation to other society members, and the lack of a strong sense of the notion of corruption in financial transactions. It is a society in which sharing in the authority and benefits of others is a defining characteristic of leadership”. The Academic Advisor joined the project from the one-year preparatory study prior to implementation, while Domestic Support Committee members, who were in charge of coordinating the dispatch of experts and trainee acceptance during Phase I, joined at the time of the basic study in January 1997.

Table 4-2 illustrates the perspectives which should be used in capacity assessment from the project formulation / preliminary study stage.

**Table 4-2 Capacity Assessment Perspectives (Example)**

		Institutional basis	Financial basis	Human resources
Central government	Regulatory authorities			
	Implementing agencies			
Local government				
Cooperation targets				

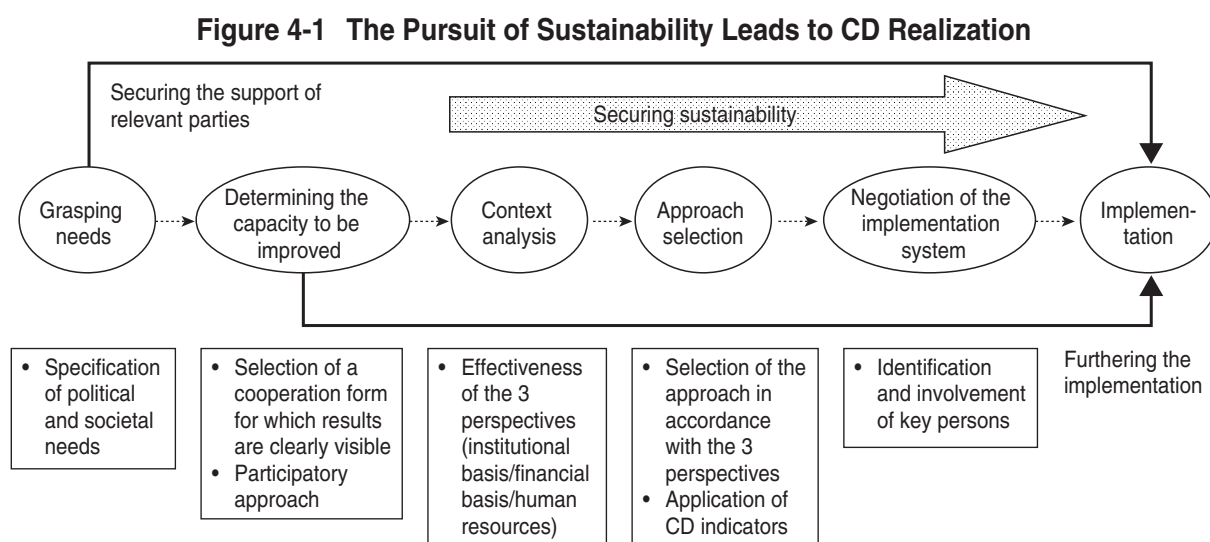
Source: Created by the author.

Capacity assessment taking into consideration 3 perspectives and 3 levels can define the problems and cooperation needs specific to each area, from those related to governmental policies to those of the project site.

**4-1-3 Selecting a Cooperation Approach Aimed at Nurturing Sustainability (Application of CD Process Indicators)**

Once multi-level needs are grasped through the above assessment, it becomes possible to secure the commitment of recipient country officials with respect to various elements of the project, and to generate a sustainable cooperation approach.

The preliminary study process used by the project to build a sustainable system is shown in Figure 4-1.



Source: Created by the author.

Nevertheless, it is not easy to formulate an entire project plan based on the concept of “complexity” in the preliminary study stage. For an adequate project formulation and implementation,

it is desirable to develop progress indicators for a variety of cooperation areas, targeting the whole series of processes, from the preliminary study to the subsequent implementation and evaluation stages.

#### **4-1-4 Involvement of Key Personnel and the Negotiation Stance (Positioning)**

The next step after the selection of the most suitable cooperation approach is the negotiation with recipient country officials. Key person identification and involvement functioned effectively in the case of the project under study. Without being limited to the staff of C/P organizations, key persons range from national-level policy makers to school-level officials, different negotiation content and approaches being needed for each category.

### **4-2 Endogeneity: Indirect Support Stimulating Developing Country-led Efforts**

#### **4-2-1 Ownership-building Mechanisms**

Government officials of the recipient country often adopt a passive attitude, expecting things to be done for them. However, the SMASSE project made use of a variety of incentives in the course of its implementation process, aiming to instill motivation in Kenyan partners and thus to foster recipient ownership.

At the start, the Ministry of Education did not show a particularly strong commitment with respect to the establishment of local full-time C/Ps. Faced with this situation, the Japanese side adopted an uncompromising attitude, not excluding even the possibility of delaying or discontinuing the project, and ultimately obtained the desired effect, given the strong need for cooperation in mathematics and science education.

In addition, various self-thinking mechanisms were contrived in order to foster C/P ownership in terms of needs assessment and content development, monitoring and evaluation activities.

A significant result of the ownership-building process as part of CD support can be seen in the fact that Kenyan national trainers could turn into third-country trainers during the regional activities in Phase II, and act as facilitators fully aware of the importance of local ownership.

This would not have been possible without the determination of the Japanese side to leave initiative and decision-making in the hands of Kenyan partners, even if it meant accepting certain detours, and to adopt a “waiting” stance, which was understood and supported by JICA personnel.

Project management has to be result-based. While balance is important and limits do exist, flexible operation management which makes “waiting” possible has the potential to contribute significantly to the CD of developing countries.

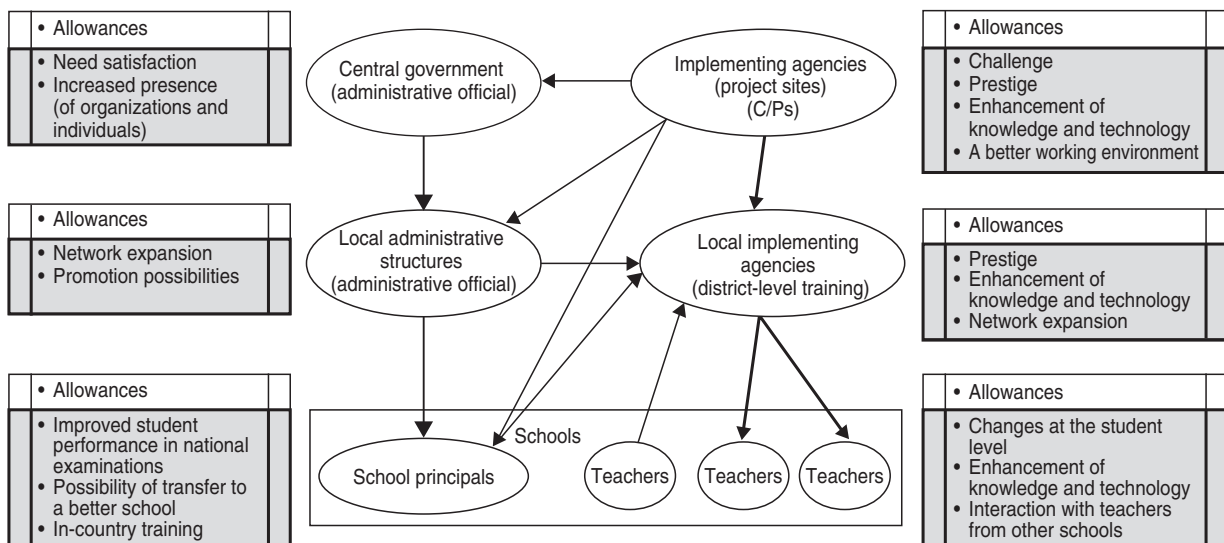
### 4-2-2 Identification of Actor-specific Incentives

Incentives can be divided roughly into economic and non-economic ones. Economic incentives are generally believed to be detrimental to the realization of sustainable cooperation. This is due to the fact that, in most cases, the government of the recipient country has limited financial resources at its disposal after the end of cooperation. It can be said, therefore, that “allowances (economic incentives) kill the project”. It is important to consider carefully what sort of incentives can be created for each actor, and to provide them based on the criterion of cooperation sustainability.

The non-economic incentives functioned within the project as “challenge” - for local full-time C/Ps, “prestige” - for district trainers, improvement in student performance and changes at the classroom level - for school officials, response to needs and a greater presence - for officials of the Ministry of Education, improved networking and the possibility of promotion (once the project has reached a successful conclusion) - for district administrators (see Figure 4-2). Creating and providing effective incentives represents a key to cooperation success.

Training in Japan and third-country training can be effectively used as incentives and opportunities leading to future career success.

**Figure 4-2 Various Actors and Their Possible Incentives (In the Case of the SMASSE Project)**



Note: Upper cells indicate economic incentives, while the thick black frame around lower cells highlights non-economic ones. A detailed analysis of roles at each organizational level, including the school level, is believed to contribute to an even more effective use of incentives.

Source: Created by the author.



### 4-2-3 Mechanisms Conducive to Tangible Outcomes

#### The Advantage of Technical Cooperation

Sector-Wide Approach (SWAP) involves financial support, but rarely succeeds in effecting change. Projects conducted by the staff of the Ministry of Education are targeted only at the Ministry of Education itself. On the other hand, since technical cooperation introduces new ideas, it has the power to radically alter part of the education sector.

Source: Interview with Mr. Njuguna, former Head of SMASSE INSET Unit.

Once cooperation outcomes become visible, commitment of the recipient country is guaranteed. The area of secondary education, which formed the focus of the project, is characterized by minimal interference from teachers' unions. At the same time, the fact that mathematics and science education is confronted with persistent problems makes outcomes easier to perceive. Selecting a specific subject also made comparisons with other subjects possible. Needless to say, performance in national examinations at the end of secondary education is a matter of national interest. All these factors were instrumental in stimulating therefore sustained commitment to the project, once outcomes became visible. It need scarcely be said that publicizing such "tangible results" played an extremely important role.

The cooperation content of the project was determined on the basis of the experience and lessons gained from cooperation in the Philippines<sup>203</sup>. Not only is the Academic Advisor an expert in physics teaching methodology, he also has vast experiences in the education system, evaluation methods and textbook development.<sup>204</sup> Aiming to promote Kenyan CD through cooperative activities, young curriculum specialists and education evaluation experts brought their contribution to content

<sup>203</sup> The Package Cooperation for the Development of Elementary and Secondary Mathematics and Science Education in the Philippines, the first Japanese project for cooperation in the field of mathematics and science education, was launched at a time when Japan lacked solid know-how regarding this type of cooperation activities (interview with Mr. Ikeda, former member of the Domestic Support Committee, Hiroshima University Professor). The experience Hiroshima University staff had gained from their cooperation in the Philippines was extremely valuable to the project. Moreover, Hiroshima University acquired rich experience in simple experiments during the period of material shortage following the atomic bomb. Thanks to the contribution of educators now in their 50s, the last generation to have received instruction in simple experiments, the development of cooperation content adequate to the context of developing countries proceeded smoothly and effectively (interview with Mr. Ikeda, former member of the Domestic Support Committee, Hiroshima University Professor).

<sup>204</sup> The following table shows the main employment background and academic society affiliations of the Academic Advisor (dispatch period: June 9, 1999 – June 30, 2006 (scheduled)).

1968 – 1977	Senior Specialist for Curriculum, Primary School Education Division, Elementary and Secondary Education Bureau, Ministry of Education, Science, Sports and Culture.
1977 – 1999	Professor, councilor, etc. (1981 – Ph. D. Hiroshima University, Faculty of Education)
1996 –	Councilor, Society of Japan Science Teaching.
1997 –	Professor, the United Nations Educational, Scientific and Cultural Organization (UNESCO) Core University Program on Science Education.
1997 –	President of World Council for Curriculum and Instruction
1997 –	Head, Japan Curriculum Research and Development Association

Source: Adapted from Takemura (1999).

improvement. Eventually, the high quality of cooperation content became the driving force that yielded tangible outcomes.

Given that cooperation for In-Service Training for teachers (INSET) in mathematics and science is under way in a large number of regions, exchanges between projects in terms of content development are expected in the future. Although planned content varies according to the differences in social and economic development and in human resources, trial-and-error components are common to all projects, and there are many things which can be shared.<sup>205</sup> As project-related knowledge and experience accumulate, they can be used in the formulation and implementation of future projects.

#### **4-2-4 Institutionalization Defining the Role of Endogenous Initiatives**

Sustainability of recipient country ownership needs to be secured through an institutional setup which ensures that activities within the projects are undertaken as endogenous efforts on the part of the recipient country.

The project has succeeded in institutionalizing training at the district level through the establishment of the SMASSE fund, creating a sustainable financial basis which places relatively little burden on the interested parties. The extension of the INSET system to cover the whole country in Phase II contributed to institutionalization, as a result of appealing visible outcomes to the Secondary School Heads Association and other key players.

Thus, promotion of institutionalization within a project period will stimulate developing country-initiated efforts to maintain and expand project outcomes on its own.

### **4-3 Lessons Learned as CD Facilitators with Respect to the Implementation System**

#### **4-3-1 The Network Linking the Headquarters, Country Offices and the Project**

The discussions on project-area expansion were held at an early stage with the participation of the JICA Headquarters and the Ministry of Foreign Affairs. The project has been characterized throughout by prompt decision-making and implementation on the Japanese side.<sup>206</sup> This was made possible by the Chief Advisor's intimate knowledge of JICA's decision making processes, as an expert in technical cooperation and international cooperation, and also by his sound grasp of the key points of activity implementation. Effective networking between JICA headquarters which provided adequate and prompt support, country offices which made efforts to coordinate themselves with the headquarters, and the project also played a crucial role in regional extension.<sup>207</sup>

<sup>205</sup> Interview with Mr. Takemura, Academic Advisor.

<sup>206</sup> Interview with JICA Headquarter staff currently in charge of the project.

<sup>207</sup> Interview with former JICA Headquarters personnel.

The sustained commitment on the part of the Japanese experts may be said to have had a positive impact on the project. Nevertheless, it is not easy for a particular member to stay involved in a project for a long period of time. The establishment of a system connecting headquarters, country offices and the project, in which relevant departments grasp the needs of the field and provide prompt and adequate support, from the formulation to the implementation and evaluation stages, is highly desirable.

#### **4-3-2 Further Training of Japanese Personnel and the Dispatch of Experts to Act as Policy Advisors**

While JICA personnel are responsible for project formulation, the actual technical cooperation is carried out by dispatched experts. For Japan to continue contributing to the CD of developing countries, it will be necessary to dispatch personnel responsible for (1) implementation management: project managers who are capable of understanding the needs of the recipient country, of developing and implementing strategic scenarios in accordance with a vision for the future, as well as activity coordination experts able to put those strategic scenarios into practice, and (2) cooperation content: experts to act as policy advisors, and other experts to participate in joint activities for the CD of the partner country.

The presence of the project manager (chief advisor) is expected to become even more important in the future, not only as administrative core of technical cooperation projects, but also in the implementation of CD assistance at the societal level, including policymaking and institution building, which are vital factors of cooperation. As for policy advisors, it is recommended to make use of the knowledge of experts with a rich experience in policy formulation and curriculum development in the education sector.<sup>208</sup>

In parallel with fostering young domestic personnel, efforts need to be made to train competent foreign personnel who can contribute to international CD in the way Kenyan C/Ps act as third-country experts, and to provide them with opportunities to carry out their activities.<sup>209</sup> JICA and its related personnel are expected to recruit, strengthen and train such competent human resources.

#### **4-3-3 Program-based Approach**

In conclusion, we may say that securing and fostering experts able to formulate strategic scenarios based on recipient needs, in cooperation with local C/Ps, is indispensable for efficient CD assistance.

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<sup>208</sup> Interview with Mr. Takemura, Academic Advisor. Specifically, “the Kenyan curriculum is designed on the premise that mathematics and science education should be part of general culture, and a condition for entering university. It is not founded on the idea that it might serve to acquire the practical knowledge necessary for industrial development. It is therefore necessary to develop a curriculum which addresses daily issues such as industry, agriculture, health-care, AIDS and nutrition. This means that we must revolutionize the curriculum from its foundations, and to change the mentality of those in charge of its development. The dispatch of Japanese experts with experience in curriculum development can have a significant catalytic effect in the process.”

<sup>209</sup> Interview with Mr. Sugiyama, Chief Advisor.

The SMASSE succeeded in creating a synergic effect of not only such human resources but also a variety of activities not originally in the Project Design Matrix (PDM), which led to its sustainability and nation-wide extension.

While great importance has been attached to fostering sustainability, the 2nd Kennedy Round (2KR) C/P fund and non-project grant aid have been used to cover the initial cost (initial investment), given that it is difficult to put too great a burden on the partner country from the start. During the implementation of Phase I, the stepping stone towards extension to the country level was set by organizing training in locations other than the pilot areas, as the In-Country Training. As training spread across the country in Phase II, grant aid was used again for remodeling the national-level training center which forms its base.

Thus, while maximizing the use of local resources, JICA's various activity menus have been systematically built into the program in order to achieve the goal of sustainability, and to ensure a comprehensive impact of CD assistance.

#### **4-3-4 Evaluation Mechanisms**

It is desired to develop a project management methodology which enables the simultaneous evaluation of the outcomes pursued in the project in parallel with the degree of CD achievement.

## Appendix 1 Background

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Appendix 1 provides a profile of Kenya and an overview of its educational sector to help with the contextual understanding of the country for which this case study has been conducted.

There are eight major background factors behind Capacity Development (CD) in Kenya that deserve attention in the context of this study: (1) the influence of tribalism on the political and social aspects of the country has not been eliminated; (2) Kenya experienced long-lasting economic stagnation until recently; and (3) the recognition of the essential need for industrialization has become shared at the national level. Also, (4) Kenya has become highly centralized to retain its national identity in the face of strong tribalism in the country. There are socio-economic factors that (5) the public places great importance on academic background; although (6) parents shoulder national educational expenses except for the salaries of the teachers, as the country lacks adequate financial resources; and (7) the government has not significantly yielded to the pressure to reduce the number of teachers in the current education system, for fear of the political implications of such a reduction. Moreover, in terms of regional cooperation, (8) the position of Kenya as a leading nation in East Africa with relatively high levels of education allows for the application of Strengthening of Mathematics and Science in Secondary Education (SMASSE) in other parts of the region.

### 1. Profile of the Republic of Kenya

#### 1-1 General Overview

The Republic of Kenya (hereinafter referred to as “Kenya”) straddles the equator, with a total land area of about 580,000 square kilometers. Much of the nation’s population, totaling some 32.4 million (as of 2004), is concentrated on the southern and coastal areas of the country. The African peoples of Kenya, who account for almost 99 percent of the population, include Kikuyu (representing 21 % of the population), Luhya (14 %), Luo (13 %), Kalenjin (11 %), Kamba (11 %) and Kisii (6 %). The remaining percentage of the population is mostly represented by non-African population of Asian, European and Arab descent. As for their religious affiliation, Christians represents 78 % of the population — 45 % Protestant and 33 % Roman Catholic. About 10 % are largely followers of various traditional religions, and another 10 % are Muslims, most of whom live in and round Mombasa, a port city on the eastern coast<sup>210</sup>.

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<sup>210</sup> Compiled from the Ministry of Foreign Affairs (2005), World Bank Group (2005), and other sources.

## 1-2 Political Situation<sup>211</sup>

### (1) Domestic Political Situation

Only the coastal area of Kenya was known to the external world until the late 19th century, when explorers from Western Europe reached the inland areas. The subsequent migration of many British settlers led to the construction of Nairobi. In 1895, Kenya became a British protectorate and in 1920 came under the direct colonial rule of the British. Movement towards gaining independence from Britain, which began to gain momentum around the WWII period, resulted in the 1960 Kenya Constitutional Conference in London, which approved freedom of political association and majority rule of the Legislative Council by Africans. This led to the establishment of two major political parties: the Kenya African National Union (KANU), a coalition between Kikuyu and Luo tribes led by Jomo Kenyatta; and the Kenya African Democratic Union (KADU), which originated from among other tribes.

KANU, led by Kenyatta, won the Legislative Council elections in May 1963. In December of the same year, the government proclaimed Kenya's independence. In December 1964, Kenya became a republic, with Kenyatta as its first president. Most KADU members joined KANU, paving the way for a functioning one-party rule. After the death of Kenyatta in August 1978, Vice President Daniel Moi from the Kalenjin tribe was elected president in October of the same year. President Moi increased his presidential powers and became increasingly autocratic. In June 1982, he revised the constitution to make Kenya officially a state ruled by a single party (KANU). Preferential treatment of the Kalenjin tribe, the assassination of the foreign minister in February 1990, and a sluggish economy resulted in increasing calls for democracy. Aid agencies also stepped up pressure on Kenya, even suggesting a halt to their aid flows. In response, the Kenyan government reinstated multiparty elections in December 1991. In the separate presidential elections in 1992 and 1997, the opposition camp was defeated due in part to internal dissension. In the December 2002 election, however, Mwai Kibaki (from the Kikuyu tribe) of the opposition National Rainbow Alliance Coalition (NARC) won 62 % of the vote, defeating Kenyatta, a son of the former president. This marked the first change of government after the country's independence from British rule.

### (2) State Machinery

Legislative power is vested in both the President and the unicameral parliament (the National Assembly), whose members are elected for a five-year term. Judicial power is exercised at different levels of courts, including the Court of Appeal, the High Court, resident magistrates'

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<sup>211</sup> Compiled from World Economic Information Services (2005), Association for Promotion of International Cooperation (1998), Embassy of the Republic of Kenya in Japan (2005), and other sources.

courts, district magistrates' courts, and Islamic courts. Yet rampant corruption raises concerns about whether the laws and regulations are implemented effectively.

Executive power rests with the President (as head of state), who is elected by popular vote. The President appoints a Vice President and ministers to form a cabinet. Kenya consists of eight regional divisions: the Nairobi Area and the Central, Coastal, Eastern, Nyanza, Rift Valley, Western, and North Eastern provinces, which are subdivided into districts. The President-appointed provincial and district governors serve as local agencies of the central government. Most of the district councils are categorized as municipalities. Municipalities have the authority to establish their own ordinances, which are subject to approval by the Minister of Home Affairs. The revenue sources of the municipalities are largely limited to land/house rents and business license fees; most revenues come from the central government. This provides clear evidence that Kenya is a highly-centralized state.

### **(3) Diplomacy**

Kenya occupied a key position in East Africa in both economic and political terms. In economic terms, the capital city of Nairobi is a transportation and communications center for the region. The port of Mombasa is a gateway to and from East Africa in the commodity distribution. In political terms, Kenya serves as a mediator in regional conflicts, contributing to peace in the region through the Organization for African Unity and the United Nations and played the role as a political and economic leader in the region.<sup>212</sup>

### **1-3 Economy**

Kenya experienced rapid economic growth for a decade after its independence. The country's Gross Domestic Product (GDP) grew at an annual average rate of 8 % during this period, thanks both to the growth of the agricultural sector that was centered on tea and coffee and to the industrialization under its import-substitution policy. After this decade, however, Kenya faced a number of challenges. For example, the 2 oil crises in the 1970s resulted in increased payments for oil imports, weighing heavily on the nation's finances. The expansionary fiscal policy that took advantage of the coffee export boom led to disproportionately large expenditures. Excessive protection of domestic industries weakened the industrial competitiveness of the country. By the early 1980s, the economic situation had deteriorated. The GDP shrank between 1982 and 1984. The budget deficits grew and inflation rose. The worsening balance of payments led to serious shortages of foreign currency reserves and eventually to difficulties in servicing foreign debts. To rectify the situation, Kenya took a number of steps. Under the long-term development plan of 1986, the country introduced a policy of trade

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<sup>212</sup> Ministry of Foreign Affairs (2006). Thanks in part to this unique position, Kenya's leading role in Phase II of the SMASSE Project was rather readily accepted by other countries in the region.

liberalization and export orientation. At the same time, Kenya requested assistance from the World Bank and International Monetary Fund (IMF), setting the stage for a structural adjustment program in the country. By the late 1980s, the economy had rebounded, with an annual growth rate of 5 % on average. After droughts slowed the economy in 1991 and 1992, Kenya launched another structural adjustment program. As a result, the economy has been on a recovery path since the late 1990s, except for 2000. Per capita Gross Domestic Income (GDI), which bottomed out at USD 250 in 1993, rose to USD 460.<sup>213</sup> This was the first time in 15 years that Kenya's GDI surpassed the 1980 level of USD 450.<sup>214</sup> Analysts point out the lack of good governance as being behind this long-lasting economic stagnation, in addition to the spread of HIV/AIDS and sluggish agricultural production due to poor weather. A range of other factors are said to be involved as well. Among these are the low savings rate and capital formation, inefficient management of the economy, the unreliable judicial system, poor infrastructure, and the deteriorating public order. The employment situation is not showing signs of improvement. Unemployment stands at 14.6 %. Young people account for 45 % of the people out of work. The labor market continues to be inflexible.<sup>215</sup>

Although it is more industrialized than many other countries in the region, Kenya largely remains dependent on the agricultural sector, which depends on coffee, tea and garden produce. 80 % of Kenyan population is in the agricultural sector, which accounts for 18 % of the wage earners in the formal sector and for the largest proportion of the workers in the informal sector.<sup>216</sup> A look at the share of each sector in the GDP shows that the agricultural sector represents 16.4 %, the industrial sector 19.0 %, and the services sector 64.6 %.<sup>217</sup> The public sector accounts for 14.5 % of the GDP.<sup>218</sup> Tourism is the second largest source of foreign currency earnings following tea. This industry has slowed due to a number of factors, including a tribal conflict in 1997, poor weather, the deteriorating road conditions, and intensifying competition with other countries for tourists. Yet it has been on a path to recovery since 2003. Kenya has been forging ahead with the liquidation and privatization of state enterprises as part of the country's structural reforms. It is worth noting that such privatization is an ongoing process, as it is one of the conditionalities of the IMF's Poverty Reduction and Growth Facility (PRGF), which was approved for Kenya in 2003.

As for the external sector, imports far exceed exports in Kenya, with chronic trade deficits. Kenya's exports are led by agricultural products such as coffee and tea, making the country vulnerable to fluctuations in the international markets for these commodities. Imports include refined petroleum products, industrial machinery, crude oil and automobiles. As a result of the government policy of luring

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<sup>213</sup> World Bank Group (2005).

<sup>214</sup> World Economic Information Services (2005).

<sup>215</sup> *Ibid.*

<sup>216</sup> *Ibid.*

<sup>217</sup> World Bank Group (2005).

<sup>218</sup> World Economic Information Services (2005).



foreign direct investment, multinational corporations play an important role in the industrial sector.

Table 1 shows selected economic indicators for Kenya.

**Table 1 Selected Economic Indicators**

	2000	2003	2004
Total population (millions)	30.1	31.9	32.4
Nominal GDP* (USD billions )	10.5	14.4	15.6
Real GDP growth (%)	- 0.2	1.8	2.1
GNI** per capita (USD)	360	400	460
Agriculture (% of GDP)	19.7	15.8	16.4
Industry (% of GDP)	18.6	19.6	19.0
Services (% of GDP)	61.7	64.7	64.6
Exports (% of GDP)	26.2	24.8	26.4
Imports (% of GDP)	35.9	29.5	32.1
Foreign direct investment (USD millions )	127.4	81.7	—
External debt (USD billions)	4.7	5.3	—

\* Gross Domestic Product

\*\* Gross National Income

Source: World Bank Group (2005).

## 1-4 Society

A global corruption survey in 2003 by Transparency International shows Kenya as one of the countries where corruption is perceived to be pervasive, ranking 11th among the 133 countries surveyed. Some experts argue that corruption in Africa should not be judged by Western values alone.<sup>219</sup> The fact remains, however, that corruption affects not only political but also economic aspects as far as Kenya is concerned. A total of one billion dollars in public funds, or one-fourth of the total government expenditures, is lost through embezzlement, contributing to the widening gap between the rich and the poor. In fact, the percentage of the poor increased from 48 % in 1990 to 56 % in 2002.<sup>220</sup> Table 2 shows selected social indicators for Kenya. Kenya is classified as a low human development country, ranking 148th out of the 177 countries (in 2004) in terms of Human Development Indicators.<sup>221</sup>

**Table 2 Selected Social Indicators for 2004**

Life expectancy at birth (years)	45.4
Infant mortality rate (per 1,000 live births)	79.0
Adult literacy rate (% of people aged 15 and above)	80.7

Source: World Bank (2006).

<sup>219</sup> Chabal, P. and Daloz J. P. (1999). This book is recommended by Sugiyama, Chief Advisor, as an important source of information for the understanding of Africa. He also recommends Meredith (2005).

<sup>220</sup> World Economic Information Services (2005).

<sup>221</sup> United Nations Development Programme (2004).

## 2. Overview of the Education Sector<sup>222</sup>

### 2-1 A Short History of Education in Kenya<sup>223</sup>

From a historical perspective, education in Kenya or other countries in Africa can be divided into three types: traditional education, colonial education, and post-independence education. In the pre-colonial period, education was largely traditional. Discipline was taught at home, and rituals and skills in the community. The small number of schools mostly consisted of mission schools designed to train African priests. The first mission school in Kenya was established in Rabai in 1846, near Mombasa on the eastern coast.

In the colonial period, there were 2 types of schools: a limited number of public schools run by the colonial government, and private schools run by various missions. The former were designed to train administrators for Britain's indirect rule (trusteeship) and laborers for the settlers. The latter regarded African traditional culture as an obstacle to propagating Christianity. This played a major role in establishing a hierarchical relationship (like a paternalistic relationship) between Whites and Africans, which has remained to this day. It also led to the widespread overemphasis on the academic aspect of education.

After independence in 1963, the overall goals of public education were to liberate individuals from their tribal culture and values and integrate them into a nation state. The new government gave priority to education for all. It places special emphasis on training skilled workers and providing equal opportunities to gain economic benefits, in order to meet the educational needs of both the people and the state. In 1964, the government established the Kenya Institute of Education (KIE) and began to develop the country's own curricula. In a move to centralize the educational system, the government in 1967 set up the Teachers Service Commission (TSC) as the only body authorized to employ teachers. The Education Act of 1968 stipulated that the education minister be responsible for all affairs related to education. The movement called "Harambee" ("let's work together"), advocated by Kenyatta, the first President of Kenya, encouraged the people to build schools as well as clinics through their self-help efforts. Secondary schools in particular have significantly increased in number.<sup>224</sup>

### 2-2 Education in Kenya Today

#### (1) Overview

Kenya's education system consists of 3 different levels: 8 years of primary education, 4 years

<sup>222</sup> The education sector in Kenya is detailed in JICA, Project Formulation Department (1995). More recent data is available from Grant Aid Management Department, JICA (2005).

<sup>223</sup> Compiled from Project Formulation Study Department, JICA (1995) and Sugiyama (2006).

<sup>224</sup> Ironically, this movement has effectively deepened people's dependence on others, as it is more often used to collect funds these days [Sugiyama (2006). "Afurika no Kyoiku"]. Of note, secondary schools totaled 300 in 1963.

of secondary education, and 4 years of higher education. Students have to pass a national examination before moving onto the next level. The score in the exam largely determines which school the students go to. In 2003, the government made primary education totally free of charge in an effort to rectify imbalances in access to and the quality of schools. The number of primary school students jumped from 5.9 million in 2002 to 7.6 million in 2005.<sup>225</sup>

Children in Kenya are brought up in their tribal language environment before going to primary school. In primary education, they learn both Swahili (the national language) and English (the official language). Mathematics and science are taught in English from primary education onward. Some primary school students may have a hard time understanding these subjects due to their English ability, rather than the degree of difficulty of the subjects themselves.<sup>226</sup>

**Table 3 Enrolment Rate for Primary and Secondary Schools**<sup>227</sup>

	1990/1991	2000 – 2002/2003
Primary school enrolment rate(net) (%)	74	67
Secondary school enrolment rate (net) (%)	—	25

Source: UNDP (2006).

## (2) Educational Administration

As part of the administrative reform following the change of government in 2002, Kenya reorganized the Ministry of Education, Science and Technology (MOEST) into five directorates: Basic Education; Policy and Planning; Higher Education (in charge of SMASSE); Technical Education; and Quality, Assurance and Standards. MOEST takes full charge of the administration and financing of education in Kenya, except that municipalities are partly responsible for the management of primary schools.<sup>228</sup> Each of the 72 districts in the country has a district education office headed by a District Education Officer (DEO).<sup>229</sup> As shown in Figure 1, the central government strictly controls the education system all the way down to the level of the teachers.

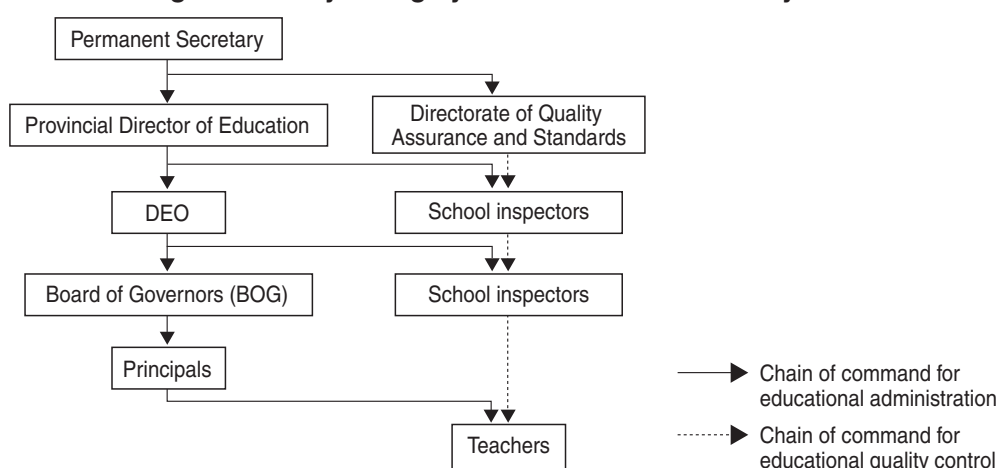
<sup>225</sup> Ministry of Education (2006).

<sup>226</sup> Ikeda (2000b).

<sup>227</sup> Sources from international organizations are used since data released by the Ministry of Education, Science and Technology of Kenya does not cover private schools, which account for 8.6 % of primary schools and 11.3 % of secondary schools in Kenya.

<sup>228</sup> Republic of Kenya (2005).

<sup>229</sup> Grant Aid Management Department, JICA (2005).

**Figure 1 Kenya's Highly-centralized Education System**

Source: Compiled chiefly from JICA, Project Formulation Study Department (1995); and JICA, Social Development Cooperation Department (1998).

### (3) Educational finances

Public expenditures on education account for 35 – 40 % of the government's current expenditures (see Table 4). The percentage accounted for by investment spending of the total expenditures on education, which had hovered around 5 %, jumped to 10 % in 2003/2004 in line with the implementation of the free primary education policy.<sup>230</sup> Under the sector-wide approach (SWAP), the MOEST in 2005 developed the Kenya Education Sector Support Programme (KESSP) — a budgeting plan up to 2010 — in cooperation with aid agencies.<sup>231</sup>

**Table 4 Indicators of Educational Finances**

	1990/1991	2000 – 2002/2003
Public expenditures on education (as % of the GDP)	6.7	7.0
Public expenditures on education (as % of current government expenditures)	—	36.8
Public budget for education (as % of government development expenditures)	—	32.3

Source: UNDP (2006).

### (4) Secondary Education

There are significant regional disparities in secondary education that result from economic factors. The enrolment rate and student performance are low both in the North Eastern Province,

<sup>230</sup> World Bank (2005).

<sup>231</sup> Republic of Kenya, Ministry of Education, Science and Technology (2005). KESSP has 3 aspects. Firstly, it is a budget implementation plan for the MOEST white paper. Secondly, it is a policy to implement the manifesto of the governing National Rainbow Alliance Coalition. Thirdly, it is an investment plan for the education sector under the national investment program called the "Economic Recovery Strategy for Wealth and Employment Creation (ERS)." ERS is based on Kenya's Poverty Reduction Strategy Paper (PRSP), a major policy paper for the country.

which is arid or semi-arid in climate<sup>232</sup>, and in slum areas, where some 60 % of the urban population is concentrated.<sup>233</sup> National school enrolment rose from 738,085 in 2000 to 934,608 in 2005, an increase of over 25 %. During the same period, the number of secondary schools (public and private combined) increased from 3,207 to 4,112, again up more than 25 %.<sup>234</sup> Due in large part to the introduction of the free compulsory education policy, recently more and more secondary schools, mostly private ones, are being established. The Ministry of Education plans to increase the percentage of students who go on to secondary schools from 57 % in 2005 to 70 % by 2008 by taking advantage of private sector initiatives.<sup>235</sup>

Public schools are divided into 3 types: national, provincial, and district schools. National schools are open to students from all parts of the country. Provincial and district schools, on the other hand, are designed to educate those within their respective provinces and districts. Which school students go to will largely depend on the student's preferences and performance in the primary education completion examination. Those who fared well in the exam generally go to national or provincial schools, which are generally well-equipped boarding schools.<sup>236</sup> The cost of four-year secondary education is shared between the government, which pays the salaries of the teachers, and the parents, who shoulder the rest, including school construction expenses.

Since its establishment in 1964, the KIE has played a key role in the development of curricula and teaching techniques. The specific functions of the KIE include developing and revising curricula at the levels of primary and secondary education, revising course contents, training and allocating teachers, and conducting research and development for the quantitative and qualitative improvement of education in Kenya. After the establishment of the 8-4-4 education system in 1967, secondary education did not undergo any major reform, except for a new mathematics education movement and a new emphasis on traditional education. In 1992, however, the academic load was reduced.<sup>237</sup> It was further reduced in 2002 in line with the popularization of secondary education.<sup>238</sup>

## (5) Development Assistance

Multilateral and bilateral aid to Kenya shifted its focus from higher education to primary

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<sup>232</sup> Jakoyo (2006).

<sup>233</sup> Grant Aid Management Department, JICA (2005).

<sup>234</sup> Ministry of Education (2006). Public schools totaled 3,547 and private schools 452 in 2003.

<sup>235</sup> An interview with Mr. Enos Oyaya, Director, Quality Assurance and Standards, Ministry of Education, Science and Technology.

<sup>236</sup> District schools that meet certain requirements regarding school facilities and other aspects are entitled to obtain the status of provincial schools. Yet some district schools decide to retain their current status in order to serve the local communities - even if they meet such requirements. One such school is Nguvu Boys Secondary School in Embu District. This boarding school is the best among all the district schools in Kenya, ranking 43rd among all the secondary schools in the country in term of the students' average score in the secondary education completion exam (according to the findings of field surveys and interviews).

<sup>237</sup> Project Formulation Study Department, JICA (1995).

<sup>238</sup> An interview with Mr. Takemura, Academic Advisor.

education around 1990. International assistance for secondary education in Kenya continued to be limited largely to the provision of instruments for science experiments by the World Bank, the African Development Bank and the Department for International Development (DFID).<sup>239</sup> Only Japan among many donors is now involved in secondary education in Kenya.<sup>240</sup> A UK program to support In-Service Training for teachers (INSET) for primary school teachers, which was launched in 1996,<sup>241</sup> has already been completed.<sup>242</sup> Donors involved in the educational sector in Kenya are now increasingly focused on budget support.<sup>243</sup>

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<sup>239</sup> Project Formulation Study Department, JICA (1995).

<sup>240</sup> Grant Aid Management Department, JICA (2005).

<sup>241</sup> Project Formulation Study Department, JICA (1996).

<sup>242</sup> A handout at a donors' meeting entitled "Education Development Partners Group-Matrix of Activities in the Education Sector" (obtained from the JICA Kenya Office).

<sup>243</sup> An interview with Ms. Saito, staff of JICA Kenya Office.

## Appendix 2 Interviewees

### Study in Japan

#### JICA personnel

Atsushi MATSUMOTO	JICA Global Plaza Preparation Office, General Affairs Department, JICA	Deputy Director	Former Deputy Resident Representative, JICA Kenya Office
Keiko SANO	Second Country Assistance Planning Division, Economic Cooperation Bureau, Ministry of Foreign Affairs	Assistant to Director	Former staff member at JICA Kenya Office
Megumi HIROSE	Planning Group, Planning and Coordination Department, JICA	Staff	Former staff member at JICA Headquarters
Minako SUGAWARA	JICA Myanmar Office	Assistant Resident Representative	Former staff member at JICA Headquarters
Naoyuki NEMOTO	Group I, Human Development Department, JICA	Staff	Former staff member at JICA Headquarters

#### Former project personnel

Hideo IKEDA	Graduate School for International Development and Cooperation, Hiroshima University	Professor	Former member of the Country Assistance Committee for Kenya
Takanori TSUTAOKA	Graduate School of Education, Hiroshima University	Professor	Former JICA Expert (short-term)
Takuya BABA	Graduate School for International Development and Cooperation, Hiroshima University	Associate Professor	Former JICA Expert (short- and long-term)
Shimboku MIYAKAWA	Operation Division, Veteran Service Overseas Co., Ltd.	Head	Former JICA Expert (long-term)

### Field Study

#### JICA personnel

Kazuhiko TOKUHASHI	JICA Kenya Office	Deputy Resident Representative	
Riko SATIO	JICA Kenya Office	Assistant Resident Representative	
Nobuhide HAYASHI	JICA Kenya Office	Volunteer Coordinator	
Yoshihide TERANISHI	JICA Regional Support Office for Eastern and Southern Africa	Resident Representative	
Yumiko YOKOZEKI	JICA Regional Support Office for Eastern and Southern Africa	Senior Advisor (Education)	
Ippe SHIMIZU	JICA Regional Support Office for Eastern and Southern Africa	Project Formulation Advisor (Education)	

#### Project personnel

Takahiko SUGIYAMA	SMASSE	Chief Advisor	
Shigekazu TAKEMURA	SMASSE	Academic Advisor	
Keiichi NAGANUMA	SMASSE	Project Coordinator	
Tomoki TOKUDA	SMASSE	Mathematics Education	
Hiromasa HATTORI	SMASSE	Education Evaluation	

#### Counterparts (C/Ps) at the Ministry of Education, etc.

Karega Mutahi	Ministry of Education	Permanent Secretary	
Enos Oyaya	Department of Quality Assurance and Standards, Ministry of Education	Director	Former National Coordinator
Bernard M. Njuguna	Vocational school	Lecturer	Former Head of the SMASSE INSET Unit
Ruth M. M. Otieno	EREGL primary school teachers training school	English teacher	Former Secretary, Kenya Secondary School Heads Association

**National INSET (selected interviewees)**

Obadiah Maganga	SMASSE	Head
Michael M. Waititu	SMASSE	Subject Administrator, Physics Department
Patrick A. Kogolla	SMASSE	Subject Administrator, Chemistry Department
Lynette G. Kisaka	SMASSE	Academic Head, Biology Department
Nancy W. Nui	SMASSE	National Trainer, Mathematics Department
Mary N. Wakhaya	SMASSE	National Trainer, Mathematics Department
Isaac Gathambiri	SMASSE	National Trainer, Chemistry Department
Daniel Muraya	SMASSE	National Trainer, Biology Department
Joseph Odhiambo	SMASSE	National Trainer, Biology Department
George Kiruja	SMASSE	National Trainer, Biology Department

**Baringo District**

Geoffrey Obare	District Education Office	School inspector	
Charles M. Maugara	District Education Office	Assistant school inspector	District coordinator
Chelono	Kabarnet High School	Principal	
Chilimo	Kabarnet High School	Mathematics teacher	
Stanley K. Tambo	Kabarnet High School	Chemistry teacher	
John M. Chahili	Sacho High School	Principal	DIC principal
Eliud Kipkorir Menjo	Sacho High School	Science department head/physics teacher	District-level INSET trainer
Magdaline Kandie	Kapropita Girls Secondary School	Vice-principal/ Swahili teacher	
Anguzu Stephen	Kapropita Girls Secondary School	Science department head/biology and chemistry teacher	Representative of District-level INSET trainers
Julias Karanei	Kapropita Girls Secondary School	Mathematics teacher	
Musundi Charles	Kapropita Girls Secondary School	Chemistry teacher	District-level INSET trainer

**Kericho District**

Mary Sangoro	District Education Office	Director	
Wilite I. R. Langat	Moi Tea Girls Secondary School	Principal	DIC principal
Magun P. M. Kaan	District Education Office	School inspector	District coordinator
Lilian C. Machogun	District Education Office	Administrator	
David K. Too	Polywek Secondary School	Principal	

**Nakuru District**

Julius Nakarichia	District Education Office	Deputy Head of Office	
Sammy Malaba	District Education Office	School inspector	
James A. Adero	District Education Office	Administrator	
Naomi Onamu	Flamingo Secondary School	Biology teacher	Representative of District-level INSET trainers
Mary W. Karitu	Moi Secondary School	Principal	
Wanjau E. Kluni	Moi Secondary School	Chemistry teacher	District-level INSET trainer
Christine C. Chumba	Bahat Girls Secondary School	Deputy-principal	
Elizabeth	Bahat Girls Secondary School	Mathematics and chemistry teacher	District-level INSET trainer

**Embu District**

Muchiri C. Njeru	District Education Office	Deputy officer	
Esiler W. Mugo	District Education Office	School inspector	
Mwangi P. W.	District Education Office	Assistant school inspector	District coordinator



## Strengthening of Mathematics and Science in Secondary Education (SMASSE) Project in Kenya

Festusin Murankith	District Education Office	ECD senior teacher
Karugu S. K.	Nguvui Boys Secondary School	Principal
Justus Rutere Ntaga	Nguvui Boys Secondary School	Deputy-principal
Felister Kariuki	Nguvui Girls Secondary School	Deputy-principal
Stella W. Kithaka	Kangaru Girls Secondary School	Principal
Jane Njuru	Kangaru Girls Secondary School	Biology teacher
Kitonga	Kyeni Girls High School	Deputy-principal

### Meru South District

Owino O. J.	District Education Office	Director	Former Butere District Education Officer
Rhirika A. H.	District association of school heads	Chairman	DPC accountant
Mbaka Njern	(Retired former teacher at Chuka Girls Secondary School)		Representative of District-level INSET trainers
N. W. Mbuko	Chuka Girls Secondary School	Principal	
John M. A. Nyaga	Kiamuriuki Secondary School	Principal	

### Maragua District

Abdalla Kurula	District Education Office	Officer	
John P. M. Maina	District Education Office	Assistant school inspector	District coordinator
Muchina	Kariguini Secondary School	Principal	
Ridegwa	Kariguini Secondary School	Deputy-principal	
Ann Kabuti	Kamahuha Girls Secondary School	Deputy-principal	
Njangi P. M.	Njiiri High School	Principal	
Alice Wahome	Njiiri High School	Mathematics teacher	District-level INSET trainer

## Appendix 3 Field Study Schedule

Date	Day of week		Schedule Items
Feb. 18, 2006	Sat.	20:30	<ul style="list-style-type: none"> <li>• Leave Narita (OZ105/C)</li> </ul>
Feb. 19, 2006	Sun.	12:10	<ul style="list-style-type: none"> <li>• Arrive at Nairobi (EK719/J)</li> </ul>
Feb. 20, 2006	Mon.	09:30 10:15 11:00 14:00	<ul style="list-style-type: none"> <li>• Pay a courtesy call on the JICA Kenya Office (and interview Mr. Tokuhashi, Deputy Resident Representative; and Ms. Saito, Assistant Resident Representative)</li> <li>• Receive briefing on safety measures</li> <li>• Pay a courtesy call on the JICA Regional Support Office For Eastern and Southern Africa (and interview Mr. Teranishi, Resident Representative; and Mr. Shimizu, Project Formulation Advisor)</li> <li>• Pay a courtesy call on SMASSE National INSET Centre, KSTC (and interview Mr. Sugiyama, Chief Advisor)</li> </ul>
Feb. 21, 2006	Tue.	08:30 10:00 14:00	<ul style="list-style-type: none"> <li>• Have a brief consultation at the SMASSE-KSTC office</li> <li>• Pay a courtesy call on SMASSE/CEMASTE A (and interview Mr. Takemura, Academic Advisor)</li> <li>• Interview Mr. Tokuda, JICA Expert (Mathematics Education)</li> </ul>
Feb. 22, 2006	Wed.	AM 16:00 17:30	<ul style="list-style-type: none"> <li>• Attend a national INSET instruction study group at CEMASTE A</li> <li>• Interview Mr. Kogolla (representing Chemistry Department) at CEMASTE A</li> <li>• Interview Mr. Naganuma, JICA Expert (Project Coordinator) at the SMASSE-KSTC office</li> </ul>
Feb. 23, 2006	Thu.	08:30 16:00 17:00	<ul style="list-style-type: none"> <li>• Interview Mr. Waititu (representing Physics Department)</li> <li>• Interview Mr. Shimizu, Project Formulation Advisor, JICA Regional Support Office for Eastern and Southern Africa</li> <li>• Interview Mr. Kibe, In-house consultant, JICA Kenya Office</li> </ul>
Feb. 24, 2006	Fri.	09:00 12:30 14:00	<ul style="list-style-type: none"> <li>• Attend a preparatory meeting for INSET for primary school teachers at CEMASTE A</li> <li>• Consult with Mary (National INSET Trainer-Mathematics) at CEMASTE A (accompanied the regional field study).</li> <li>• Attend closing ceremony of national INSET course</li> </ul>
Feb. 25, 2006	Sat.	10:00	<ul style="list-style-type: none"> <li>• Interview Mr. Naganuma, JICA Expert (Project Coordinator)</li> </ul>
Feb. 26, 2006	Sun.	AM PM	<ul style="list-style-type: none"> <li>• Make preparations for the regional study.</li> <li>• Travel</li> </ul>
Feb. 27, 2006	Mon.	08:00 10:00 14:00	<ul style="list-style-type: none"> <li>• Interview school inspectors of Baringo District</li> <li>• Visit Kabarnet High School</li> <li>• Visit Sacho High School</li> </ul>
Feb. 28, 2006	Tue.	08:00 10:00 16:00 17:00	<ul style="list-style-type: none"> <li>• Interview school inspectors of Baringo District</li> <li>• Visit Kapropita Girls Secondary School</li> <li>• Interview the principal of Moi Tea Girls Secondary School</li> <li>• Interview Head of Kericho District Education Office</li> </ul>
Mar. 01, 2006	Wed.	08:00 11:00 15:00	<ul style="list-style-type: none"> <li>• Interview a school inspector of Kericho District</li> <li>• Visit Polywek Secondary School</li> <li>• Visit Moi Tea Girls Secondary School</li> </ul>
Mar. 02, 2006	Thu.	08:00 10:00 14:30	<ul style="list-style-type: none"> <li>• Interview the Deputy Head of Education Office and others of Nakuru District</li> <li>• Visit Moi Secondary School</li> <li>• Visit Bahati Girls Secondary School</li> </ul>
Mar. 03, 2006	Fri.	AM 14:00 16:30	<ul style="list-style-type: none"> <li>• Travel</li> <li>• Interview Ms. Otieno, Former Secretary, Kenya Secondary School Heads Association</li> <li>• Report the findings of the regional study to Mr. Sugiyama, Chief Advisor</li> </ul>

**Strengthening of Mathematics and Science in Secondary Education (SMASSE) Project in Kenya**

Date	Day of week		Schedule Items
Mar. 05, 2006	Sun.	AM 13:00 PM	<ul style="list-style-type: none"> <li>• Make preparations for the (second) regional study</li> <li>• Interview Mr. Oyaya, Director, Directorate of Quality Assurance and Standards, Ministry of Education</li> <li>• Travel</li> </ul>
Mar. 06, 2006	Mon.	08:00 09:30 12:00	<ul style="list-style-type: none"> <li>• Interview the Deputy Head of Education Officer and others of Embu District</li> <li>• Visit Nguvui Boys Secondary School</li> <li>• Visit St. Angela Nguvui Girls School</li> </ul>
Mar. 07, 2006	Tue.	08:00 12:00 14:00	<ul style="list-style-type: none"> <li>• Visit Kangaru Girls Secondary School</li> <li>• Visit Kyeni Girls High School</li> <li>• Visit the education office of Meru South District</li> </ul>
Mar. 08, 2006	Wed.	08:30 11:30 14:00 PM	<ul style="list-style-type: none"> <li>• Visit Chuka Girls Secondary School</li> <li>• Visit Kiamuriuki Secondary School</li> <li>• Interview project committee members in Meru South District</li> <li>• Travel</li> </ul>
Mar. 09, 2006	Thu.	09:30 11:00 13:00 15:30	<ul style="list-style-type: none"> <li>• Interview the Head of Maragua District Education Office and others</li> <li>• Visit Kariguini Secondary School</li> <li>• Visit Kamahuha Girls Secondary School</li> <li>• Visit Njiiri High School</li> </ul>
Mar. 10, 2006	Fri.	09:00 10:00 15:00	<ul style="list-style-type: none"> <li>• Report the findings of the regional study to Mr. Sugiyama, Chief Advisor</li> <li>• Interview Mr. Maganga, Unit Head</li> <li>• Literature study (information on donors) at the JICA office</li> </ul>
Mar. 11, 2006	Sat.		<ul style="list-style-type: none"> <li>• Compile the findings of the regional study</li> </ul>
Mar. 12, 2006	Sun.		<ul style="list-style-type: none"> <li>• Draft a report summary</li> </ul>
Mar. 13, 2006	Mon.	09:00 15:00	<ul style="list-style-type: none"> <li>• Solicit comments from Mr. Sugiyama, Chief Advisor; and Mr. Hattori, JICA Expert</li> <li>• Interview Mr. Njuguna, Former Unit Head</li> </ul>
Mar. 14, 2006	Tue.	07:30 09:00 14:00	<ul style="list-style-type: none"> <li>• Interview Mr. Mutahi, Permanent Secretary, Ministry of Education</li> <li>• Solicit comments from Mr. Sugiyama, Chief Advisor</li> <li>• Solicit comments from Ms. Saito, Assistant Resident Representative, JICA Kenya Office</li> </ul>
Mar. 15, 2006	Wed.	AM 11:00 13:00 14:30 15:00 16:30	<ul style="list-style-type: none"> <li>• Revise the report summary (draft)</li> <li>• Interview Mr. Hattori, JICA Expert</li> <li>• Conduct a questionnaire survey on National INSET trainers</li> <li>• Interview Ms. Kisaka, National INSET Trainer</li> <li>• Interview Mr. Takemura, Academic Advisor</li> <li>• Interview Mr. Hayashi, Volunteer Coordinator</li> </ul>
Mar. 16, 2006	Thu.	AM 14:00 15:00 17:30	<ul style="list-style-type: none"> <li>• Draft a report summary (in English)</li> <li>• Solicit comments from Mr. Hattori, JICA Expert</li> <li>• Interview Mr. Muraya, National INSET Trainer</li> <li>• Solicit comments from Mr. Kibe, In-house consultant, JICA Kenya Office</li> </ul>
Mar. 17, 2006	Fri.	AM 12:00 13:00 14:15 15:00	<ul style="list-style-type: none"> <li>• Make preparations for the presentation on the field study</li> <li>• Report to Mr. Sugiyama, Chief Advisor</li> <li>• Solicit comments from JICA counterparts</li> <li>• Interview Ms. Yokozeki, Regional Project Formulation Advisor</li> <li>• Report to JICA Kenya Office</li> </ul>
Mar. 18, 2006	Sat.	18:20	<ul style="list-style-type: none"> <li>• Leave Nairobi (EK720/J)</li> </ul>
Mar. 19, 2006	Sun.	19:35	<ul style="list-style-type: none"> <li>• Arrive at Haneda (JL1316/Y)</li> </ul>

## Appendix 4 Outline of the Questionnaire Survey as Part of the Field Study

### • Objective

This questionnaire survey was conducted to assess how the stakeholders in Strengthening of Mathematics and Science in Secondary Education (SMASSE) feel about the project. Although the number of samples is rather limited, the findings shown below provide important clues as to the general feelings toward SMASSE (the contents of the “comments” column is omitted).

### • Target Groups and the Number of Samples

Target group	Estimated total number of stakeholders	Number of samples	% of samples
National INSET trainers	53	17	32.1
District-level INSET trainers (Phase II)	980	95	9.7
Teachers	18,000	42	0.23
Students (3rd graders, plus a few 2nd graders)	250,000 (per grade)	223	0.09

Note: Third graders have been selected because, since they entered secondary school, they have largely been taught based on the teaching method that has been introduced under Phase II of the SMASSE. This year marks the 3rd year since the 2nd phase was launched. First and second graders have generally been excluded because they may not yet be accustomed to the new teaching method.

### • Responses from national INSET trainers (The figures represent %)

(The study team surveyed those who were making preparations for their lectures.)

#### ■ Practice

		Never	Seldom	Sometimes	Often	Always	N/A
1	I incorporate district trainers' practical experience/ideas when planning lessons.	0.0	5.9	17.6	47.1	29.4	0.0
2	I innovate and incorporate minds-on and/or practical activities with the facilities available in CEMASTEAs.	0.0	0.0	5.9	23.5	70.6	0.0
3	I encourage district trainers to make their own predictions/hypotheses during the lesson.	0.0	0.0	11.8	5.9	82.4	0.0
4	I provide district trainers with comprehensive instruction that includes what to do, how to do it and when and why to do it.	0.0	5.9	17.6	29.4	41.2	5.9
5	I pay individual attention to district trainers during the lesson.	0.0	0.0	23.5	58.8	17.6	0.0

#### ■ Opinion

		Strongly disagree	Disagree	Hard to tell	Agree	Strongly agree	N/A
6	When going back to the school, I will introduce the ASEI into the lesson.	0.0	0.0	0.0	23.5	76.5	0.0
7	If teachers use the ASEI lesson more, students could perform better in the KCSE.	0.0	0.0	5.9	11.8	82.4	0.0
8	It is necessary for teachers to attend the SMASSE INSET permanently.	0.0	17.6	5.9	23.5	47.1	5.9
9	Working for the SMASSE/CEMASTEAs helps me to develop my professional skill and/or knowledge.	0.0	0.0	5.9	29.4	64.7	0.0

• **Responses from district-level INSET trainers (The figures represent %)**

(The study team surveyed those who were attending the third cycle of National INSET, excluding chemistry teachers.)

■ **Practice**

		Never	Seldom	Sometimes	Often	Always	N/A
1	I incorporate students' practical experience/ideas when planning lessons.	0.0	2.1	22.1	46.3	28.4	1.1
2	I introduce class discussion and/or practical activities with the facilities available in school.	0.0	0.0	13.7	40.0	46.3	0.0
3	I encourage students to make their own predictions/hypotheses during the lesson.	0.0	2.1	21.1	45.3	31.6	0.0
4	I provide students with comprehensive instruction that includes what to do, how to do it and when and why to do it.	0.0	3.2	13.7	32.6	50.5	0.0
5	I pay individual attention to students during the lesson.	1.1	3.2	29.5	28.4	36.8	1.1

■ **Opinion**

		Strongly disagree	Disagree	Hard to tell	Agree	Strongly agree	N/A
6	When I introduce the ASEI into the lesson, students understand it better.	0.0	0.0	0.0	35.8	64.2	0.0
7	If teachers use the ASEI lesson more, students could perform better in the KCSE.	1.1	0.0	4.2	25.3	69.5	0.0
8	The SMASSE INSET helps me to develop my professional skill and/or knowledge.	0.0	0.0	0.0	17.9	82.1	0.0
9	It is necessary to attend the SMASSE INSET every year.	1.1	5.3	3.2	24.2	63.2	3.2
10	I will attend the SMASSE INSET permanently, if it would be modified/less burdened.	5.3	3.2	9.5	44.2	37.9	0.0

• **Responses (to the same questionnaire as the one for district-level INSET trainers) from teachers (the figures represent %)**

(The study team surveyed those who were preparing the next class at schools they visited during the 2nd week of the field survey.)

■ **Practice**

		Never	Seldom	Sometimes	Often	Always	N/A
1	I incorporate students practical experience/ideas when planning lessons.	0.0	0.0	21.4	59.5	19.0	0.0
2	I introduce class discussion and/or practical activities with the facilities available in school.	0.0	0.0	11.9	33.3	54.8	0.0
3	I encourage students to make their own predictions/hypotheses during the lesson.	2.4	2.4	19.0	33.3	40.5	2.4
4	I provide students with comprehensive instruction that includes what to do, how to do it and when and why to do it.	0.0	0.0	7.1	33.3	59.5	0.0
5	I pay individual attention to students during the lesson.	0.0	0.0	28.6	28.6	40.5	2.4

■ **Opinion**

		Strongly disagree	Disagree	Hard to tell	Agree	Strongly agree	N/A
6	When I introduce the ASEI into the lesson, students understand it better.	0.0	0.0	2.4	52.4	45.3	0.0
7	If teachers use the ASEI lesson more, students could perform better in the KCSE.	0.0	0.0	4.8	47.6	47.6	0.0
8	The SMASSE INSET helps me to develop my professional skill and/or knowledge.	0.0	2.4	2.4	40.5	54.8	0.0
9	It is necessary to attend the SMASSE INSET every year.	4.8	16.7	2.4	59.5	16.7	0.0
10	I will attend the SMASSE INSET permanently, if it would be modified/less burdened.	7.1	21.4	4.8	38.1	28.6	0.0

- **Responses from students (based on the self-evaluation form on class participation prepared by SMASSE; the figures represent %)**

(The study team randomly selected and asked 3rd-grade mathematics and science classes — plus one 2nd-grade class — to respond to the questionnaire after the lesson at schools they visited during the second week of the field survey.)

No participation: 0

Minimal participation: 1

Average participation: 2

Above average: 3

Maximum participation: 4

To what extent did you participate in each of the following?		Average score	
C1	Asking questions	2.02	2.09
C2	Seeking clarification on areas not understood	2.35	
C3	Answering questions posed by the teacher	2.63	
C4	Offering explanations to others	2.27	
C5	Making constructive criticism	1.66	
C6	Presenting a report on a group activity	1.77	
C7	Demonstrating to others	1.94	
P1	Suggesting possible outcomes of an experiment/activity	2.06	2.40
P2	Suggesting how to carry out an experiment/activity	1.98	
P3	Making observations/taking measurements	2.57	
P4	Recording observations/measurements/data	2.65	
P5	Analyzing observations/measurements/data	2.37	
P6	Discussing results and drawing conclusions	2.60	
P7	Writing your own notes in addition to those given by the teacher	3.11	
P8	Writing a report of an experiment/activity	1.97	
P9	Interpreting information (data, graphs, pictures/diagrams)	2.29	
A1	Exercising care and ensuring safety of yourself and others during practical work	3.01	2.65
A2	Encouraging other students to make and record observation	2.48	
A3	Helping the group to stay focused on class activity	2.48	
A4	Exercising patience in making observation, listening, explaining an idea, etc.	2.68	
A5	Making an honest record of your observations and calculations	2.69	
A6	Accepting criticism from the teacher or from other students	2.48	
A7	Volunteering to clean the working area after the practical activity	2.58	
A8	Making the practical activity interesting	2.80	

## Appendix 5 Implementation Status of Strengthening of Mathematics and Science in Secondary Education (SMASSE) at the Districts Visited during the Field Survey (2005)

Stage	District	No. of schools	No. of participating schools	No. of mathematics and science teachers	Comments from the principals (or Deputy-principals) on SMASSE implementation status
Phase I	Maragua (2DIC)	88	83	436	<ul style="list-style-type: none"> <li>The collection rate of the SMASSE Fund was 80 % in 2005.</li> <li>Only public schools participated.</li> <li>Training was limited to one day in duration since the teachers were dissatisfied with the lodging facilities.</li> <li>A one-day seminar was held for principals in 2006.</li> <li>As the students showed little sign of significant improvement in their performance, some teachers organized a study group on their own to improve their teaching skills.</li> </ul>
In-Country Training	Baringo (1DIC)	42	37	180	<ul style="list-style-type: none"> <li>The collection rate of contributions to the Fund was 45 %.</li> <li>Last year, a one-day awareness-raising seminar was organized separately for principals and teachers.</li> <li>The seminar for teachers was open only to those who had not attended the second cycle of training (80 participants), partly because it was held around the time when a DEO seminar for mathematics and science teachers was held.</li> </ul>
	Meru South (1DIC)	70	—	—	<ul style="list-style-type: none"> <li>Contributions to the Fund were not collected in 2005 because an official letter authorizing such collection was not obtained from the Ministry of Education. In 2006, the district education office plans to collect them based on signed approval from the district education board.</li> <li>Some teachers were dissatisfied with the daily allowance and that their participation in such sessions was not reflected in their salaries.</li> </ul>
Phase II	Kericho (2DIC)	80	80	442	<ul style="list-style-type: none"> <li>Some 84 % of teachers participated in INSET in 2005.</li> <li>The collection rate of contributions to the Fund was 78 %.</li> <li>Stakeholder seminars were held.</li> <li>Head of District Education Office exercised strong leadership.</li> <li>In addition to the existing one, another DTC was built last year to cope with the large number of teachers.</li> <li>In addition to the existing one, another DTC was built last year to cope with the large number of teachers.</li> </ul>
	Nakuru • Narok (6DIC)	About 210 (in Nakuru only)	—	About 1,300	<ul style="list-style-type: none"> <li>The collection rate of contributions to the Fund was more than 80 % as far as Nakuru is concerned.</li> <li>Private schools have problems with collecting contributions to the Fund.</li> <li>Over 97 % of teachers at public schools in Nakuru participated in INSET.</li> <li>Seminars for the board of education and PTAs were organized.</li> <li>In addition to the efficient use of DICs, hard work and dedication by district-level INSET trainers was observed.</li> </ul>
	Embu (2DIC)	75	75	—	<ul style="list-style-type: none"> <li>The collection rate of contributions to the Fund was about 70 %.</li> <li>Contributions to the Fund were not deducted from the tuition fees to schools; they were collected directly from the parents (same as in other district education offices).</li> <li>In principle all the teachers participated in INSET.</li> <li>Dissatisfaction with the daily allowance and the selection of INSET trainers was observed among the teachers.</li> </ul>

Source: Interviews with officers and others at district education offices during the field survey.

## Appendix 6 Implementation Status of Strengthening of Mathematics and Science in Secondary Education (SMASSE) at the Schools Visited during the Field Survey

Stage	School (District)	Type (and national ranking in 2005)	No. of students	No. of DTs	% of prescribed contributions to the Fund paid	Description of SMASSE implementation
Phase I	Karigu-ini Secondary School (Maragua)	No-boarding/ division-based/ co-educational	295	0	100 %	<ul style="list-style-type: none"> <li>This general school has difficulty collecting tuition fees as it is mostly attended by children of small farmers near a medium-sized regional city.</li> <li>SMASSE has resulted in better student performance in mathematics and chemistry.</li> <li>The school has not used a DIC.</li> <li>A 3rd-grade chemistry class that the study team observed was ingeniously designed, but students seemed to have much difficulty following it.</li> </ul>
	Kamahua Girls Secondary School [DIC] (Maragua)	Boarding/ provincial/ all-girl	610	3	—	<ul style="list-style-type: none"> <li>A middle-level school in a suburb of a medium-sized regional city.</li> <li>The school boasts 3 district-level INSET trainers, including the principal.</li> <li>Some teachers say that ASEI-PDSI takes up too much of their class time to complete their syllabuses.</li> <li>The school encourages teachers at other schools in the area to use the DIC. Yet the management of equipment and consumables at the facility is inadequate.</li> </ul>
	Nijiri High School [DIC] (Maragua)	Boarding/ provincial/ all-boy (38th)	858	1	100 %	<ul style="list-style-type: none"> <li>Located in a suburb of a medium-sized regional city; No. 1 school in the area.</li> <li>Student performance improved significantly this year.</li> <li>The principal recognizes that improved teaching skills have made SMASSE a success in the school.</li> <li>The district-level INSET trainer at the school's self evaluation says that ASEI-PDSI is not adequately practiced at the classroom level.</li> <li>Equipment management at the DIC is inadequate.</li> <li>The study team observed a high level of student performance in a 3rd-grade physics class that reviewed the unit test.</li> </ul>
In-Country Training	Kabarnet High School (Baringo)	Provincial/ all-boy	665	1	60 %	<ul style="list-style-type: none"> <li>A middle-level school in a small regional city.</li> <li>SMASSE has resulted in improved student performance in mathematics and science and more students wanting to take physics classes.</li> <li>On the other hand, mathematics teachers say ASEI-PDSI implementation is difficult in the face of their syllabuses.</li> <li>In fact, they had hard time introducing ASEI in the 1st-grade and 3rd-grade classes.</li> </ul>
	Kapropita Girls Secondary School (Baringo)	Provincial/ all-girl	595	3	67 %	<ul style="list-style-type: none"> <li>A middle-level school in a small regional city</li> <li>SMASSE has resulted in better student performance in mathematics and science.</li> <li>The school understands that applications for the military were partly responsible for the increased number of students taking physics classes.</li> <li>Teachers were quite eager to introduce ASEI-PDSI in their classes.</li> <li>A former principal and a mathematics teacher at the school now serve as national INSET trainers.</li> <li>The study team observed a weak link between theory and practice in a mathematics class for 4 graders. A 3rd-grade chemistry class focused only on practice.</li> </ul>



**Strengthening of Mathematics and Science in Secondary Education (SMASSE) Project in Kenya**

Stage	School (District)	Type (and national ranking in 2005)	No. of students	No. of DTs	% of prescribed contributions to the Fund paid	Description of SMASSE implementation
In-Country Training	Sacho High School [DIC] (Baringo)	Boarding/private/co-educational (31st)	About 600	2	—	<ul style="list-style-type: none"> <li>Located in a suburb of a small regional city, this school attracts students from many parts of the country as a leading school.</li> <li>SMASSE has resulted in better student performance in mathematics and science. In the physics classes, 2 hours are allocated to experiments every week.</li> <li>The principal once visited Japan for JICA training. The project manager of SMASSE experienced JICA training in the Philippines.</li> <li>The DIC seemed underused.</li> <li>In a class the study team observed, the teacher seemed to have hurriedly switched to an ASEI-based lesson.</li> </ul>
	Chuka Girls Secondary School [DIC] (Meru South)	Boarding/provincial/all-girl	550	1	100 %	<ul style="list-style-type: none"> <li>A middle-level school in a medium-sized regional city.</li> <li>The principal exercises strong leadership in SMASSE.</li> <li>After being transferred to this school, the principal instructed teachers to translate what they had learned in INSET fully into practice in their classes. This significantly improved student performance in science.</li> <li>The challenge is how to improve student performance in mathematics.</li> <li>In a 3rd-grade mathematics class that the study team observed, the teacher tried to solicit active participation from students, although the lesson was largely based on the textbook.</li> </ul>
	Kianuriuki Secondary School (Meru South)	No-boarding/division-based/co-educational	142	0	10 %	<ul style="list-style-type: none"> <li>This school was founded in 2000, with landless farmers near a medium-sized regional city playing the central role. In 2002, it was placed under the jurisdiction of the district.</li> <li>The school is attended by children in the local division, who range from lower-level to upper-level students who are preparing to go to university after graduation.</li> <li>Some 50 % of the tuition fees in total are overdue this year.</li> <li>A science laboratory is under construction.</li> <li>SMASSE has improved student performance somewhat and invited active participation from the students.</li> <li>It seemed that INSET was not fully reflected in a 3rd-grade biology class that the study team observed.</li> </ul>
Phase II	Polywek Secondary School (Kericho)	No-boarding/division-based/co-educational	350	0	100 %	<ul style="list-style-type: none"> <li>Located in a rather remote area not far from a small regional city, this general school is attended by children in the local division.</li> <li>The young principal comes from the local division.</li> <li>Most mathematics and science teachers are old. They may have difficulty practicing what they have learned from INSET.</li> <li>In a 1st-grade biology class that the study team observed, the teacher seemed eager to introduce ASEI, but the content of the lesson itself was at the elementary level.</li> </ul>
	Moi Tea Girls Secondary School [DIC] (Kericho)	Provincial/all-girl	372	0	100 %	<ul style="list-style-type: none"> <li>This school is at the upper-middle level, located in a suburb of a small regional city.</li> <li>The principal says that student performance in mathematics and science has generally been improving despite a setback this year.</li> <li>The principal (also a biology teacher) and other teachers are proactive in introducing experiments and observation components into their classes.</li> <li>The DIC seemed underused.</li> </ul>

Stage	School (District)	Type (and national ranking in 2005)	No. of students	No. of DTs	% of prescribed contributions to the Fund paid	Description of SMASSE implementation
Phase II	Moi Secondary School (Nakuru-Narok)	Division-based/co-educational	546	1	100 %	<ul style="list-style-type: none"> <li>Located in a medium-sized regional city, this school seemed to make little progress on learning.</li> <li>The principal was not so supportive. The teachers showed little eagerness to practice what they had learned from INSET in the class.</li> <li>Many teachers cited time constraints. This may have to do with the fact that the school is located in the center of the city, where there are many opportunities for side jobs.</li> <li>In a 4th-grade chemistry class that the study team observed, the teacher, who was a district-level INSET trainer, tried to solicit active participation from the students, but the lesson remained rather teacher-centered.</li> </ul>
	Bahat Girls Secondary School [DIC] (Nakuru-Narok)	Boarding/provincial/all-girl (7th; the dormitory is run by a church)	336	1	100 %	<ul style="list-style-type: none"> <li>Located in a suburb of a medium-sized regional city; No. 1 school in the area.</li> <li>As a missionary school, the teachers are mostly Christians. They are committed to student-centered approaches.</li> <li>More than 80 % of the students go to university after graduation.</li> <li>The DIC is put to good use by teachers of this school and a small number of teachers at other schools in the area.</li> <li>The 4th-grade chemistry class that the study team observed was excellent; the experiments were perfectly articulated with the theory.</li> </ul>
	Nguviu Boys Secondary School [DIC] (Embu)	Boarding/division-based/all-boy (43rd)	769	3	100 %	<ul style="list-style-type: none"> <li>One of the best provincial district school, located in a suburb of a medium-sized regional city.</li> <li>The principal also gives lessons.</li> <li>Because of its location, the DIC may not be accessible for teachers at other schools.</li> <li>Teachers are dissatisfied with the daily allowance of INSET and the selection of INSET trainers.</li> </ul>
	Nguviu Girls Secondary School (Embu)	Boarding/division-based/all-girl	520	2	75 %	<ul style="list-style-type: none"> <li>A middle-level school in a suburb of a medium-sized regional city.</li> <li>Attended by students of varying academic levels.</li> <li>Contributions to the Fund have already been collected from 2nd graders upward.</li> <li>Teachers showed dissatisfaction with the daily allowance of INSET, but they were committed to practicing ASEI in class.</li> <li>The 3rd-grade chemistry class that the study team observed was ASEI-based, introducing a model experiment in the forty-minute lesson.</li> </ul>
	Kangaru Girls Secondary School (Embu)	Boarding/provincial/all-girl	526	0	100 %	<ul style="list-style-type: none"> <li>A middle-level school in a medium-sized regional city.</li> <li>The principal serves as a secretary to the district association of school principals.</li> <li>Both the principal and teachers showed eagerness to practice ASEI, but their eagerness was not fully reflected in the class.</li> <li>Student performance is slow in mathematics and science classes as a whole.</li> <li>The 3rd-grade chemistry class that the study team observed included a component of the observation of "real things," but there was room for improvement in the lesson organization.</li> </ul>

**Strengthening of Mathematics and Science in Secondary Education (SMASSE) Project in Kenya**

Stage	School (District)	Type (and national ranking in 2005)	No. of students	No. of DTs	% of prescribed contributions to the Fund paid	Description of SMASSE implementation
Phase II	Kyeni Girls High School [DIC] (Embu)	Boarding/ provincial/ all-girl (63rd)	570	2	100 %	<ul style="list-style-type: none"> <li>• Located in a suburb of a medium-sized regional city; one of the best school in the area.</li> <li>• The principal was in Japan for JICA training when the study team visited the school.</li> <li>• The existence of two district-level INSET trainers benefited the school.</li> <li>• Mathematics and science teachers showed their commitment to INSET.</li> </ul>

Source: Interviews during the field study.

## List of Abbreviations

<b>2KR</b>	Second Kennedy Round
<b>ADEA</b>	Association for the Development of Education in Africa
<b>ASEI</b>	Activity • Student • Experiment • Improvisation
<b>C/P</b>	counterpart
<b>CD</b>	Capacity Development
<b>CEMASTE</b>	Center for Mathematics, Science and Technology Education in Africa
<b>CRT</b>	Center for Research and Training
<b>DAC</b>	Development Assistance Committee
<b>DEO</b>	District Education Officer
<b>DIC</b>	District In-service Training Center
<b>DPC</b>	District Planning Committee
<b>GDI</b>	Gross Domestic Income
<b>GDP</b>	Gross Domestic Product
<b>IMF</b>	International Monetary Fund
<b>INSET</b>	In-service Education and Training (In-service Training for Teachers)
<b>JCC</b>	Joint Coordinating Committee
<b>JICA</b>	Japan International Cooperation Agency
<b>JOCV</b>	Japan Overseas Cooperation Volunteers
<b>KADU</b>	Kenya African Democratic Union
<b>KANU</b>	Kenya African National Union
<b>KIE</b>	Kenya Institute of Education
<b>KNEC</b>	Kenya National Examination Council
<b>KESSP</b>	Kenya Education Sector Support Programme
<b>Ksh</b>	Kenyan Shilling
<b>KSTC</b>	Kenya Science Teachers College
<b>M/M</b>	Minutes of Meetings
<b>MTEF</b>	Medium term Expenditure Framework
<b>NEPAD</b>	New Partnership for Africa's Development
<b>OECD</b>	Organization for Economic Co-operation and Development
<b>PCM</b>	Project Cycle management
<b>PDM</b>	Project Design Matrix
<b>PDSI</b>	Plan • Do • See • Improve

<b>PRGF</b>	Poverty Reduction and Growth Facility
<b>PRSP</b>	Poverty Reduction Strategy Paper
<b>R/D</b>	Record of Discussion
<b>SACMEQ</b>	Southern African Consortium for Monitoring Education Quality
<b>SMASSE</b>	Strengthening of Mathematics and Science in Secondary Education
<b>SMASSE WECSA</b>	SMASSE Western, Eastern, Central and Southern Africa
<b>STM</b>	Science, technology and Mathematics
<b>SWAP</b>	Sector-Wide Approach
<b>TICAD</b>	Tokyo International Conference on African Development
<b>TSC</b>	Teachers Service Commission
<b>UNCTAD</b>	United Nations Conference on Trade and Development
<b>UNDP</b>	United Nations Development Programme
<b>UNESCO</b>	United Nations Educational, Scientific and Cultural Organization
<b>W/S</b>	Workshop

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