

Country Name	The project for Sustainable Smallholder Irrigation Development and Management in Central and Southern Kenya (SIDEMAN)
Republic of Kenya	

I. Project Outline

Background	<p>In Kenya, although the population living below the poverty line (the poverty ratio) was estimated at 48% in 1990, it increased to 56% in 2001. To defuse the situation, the Economic Recovery Strategy for Wealth and Employment Creation (ERS) was put forward to promote the economic development of Kenya. As the ERS stated, growth in the agricultural sector was pivotal to the economic development and seeking the irrigation potential was self-explanatory significant. However, the growth rate of the agricultural sector had deteriorated from 6.7% in the 1980s to 0.7% in 2002. Further, the population growth rate remained as high as 2.8%. While about 80% of the national land is low rainfall, known as Arid or Semi-Arid land (ASAL), only about 17% of the land was suitable for crop production. Thus, national food security often suffered whenever crop was damaged from unexpected drought. Under such conditions, irrigation development was considered a very effective solution.</p>										
Objectives of the Project	<p>Through the follow-up of the methodology tested and verified in the previous Mini-project, namely, improved irrigation infrastructure and capacity development of Irrigation Water User Associations (IWUAs), Department of Irrigation, Drainage and Water Storage, Ministry of Water and Irrigation (IDD) and farmers, the project aims at establishing smallholder irrigation development and management, thereby contributing to promoting the productivity of agriculture and poverty reduction in Kenya.</p> <ol style="list-style-type: none"> Overall Goal: The methodology established through the Project will be used for other smallholder irrigation scheme* development. Project Purpose: Methodology for the development of sustainable smallholder irrigation system is verified in the selected schemes. <p>*Irrigated area that delegated IWUAs is responsible for its operation and management</p>										
Activities of the Project	<ol style="list-style-type: none"> Project Site: 5 counties (6 Schemes): Kirinyaga (Kiarukungu), Embu - Mbeere (Kiambindu), Makueni (kyeekolo), Loitokitok (Kisioki), Narok - Narok South (Kanunka B, Koseka) Main Activities: i) Based on the planned and implemented studies, irrigation infrastructures were constructed and tested along with the organization and sensitization of IWUAs (Irrigation Water Users Associations), and ii) training for IDD staff and farmers. Inputs (to carry out above activities) <table border="0"> <tr> <td>Japanese Side</td> <td>Kenyan Side</td> </tr> <tr> <td>1) Experts: 7 persons</td> <td>1) Staff Allocated: 25 persons</td> </tr> <tr> <td>2) Trainees Received: 4 persons</td> <td>2) Land and Facilities: Office space for the experts</td> </tr> <tr> <td>3) Equipment: vehicles, PC, audio-visual aid etc.</td> <td>3) Local cost: running cost for the office</td> </tr> </table>			Japanese Side	Kenyan Side	1) Experts: 7 persons	1) Staff Allocated: 25 persons	2) Trainees Received: 4 persons	2) Land and Facilities: Office space for the experts	3) Equipment: vehicles, PC, audio-visual aid etc.	3) Local cost: running cost for the office
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Project Period	Dec. 2005 – Dec. 2010	Project Cost	(ex-ante) 380 million yen, (actual) 369 million yen								
Implementing Agency	State Department for Irrigation (SDI) , Ministry of Agriculture, Livestock, Fisheries and Irrigation (MoALF&I) (It was renamed from the Ministry of Water and Irrigation in 2013.)										
Cooperation Agency in Japan	JICA Tsukuba International Center										

II. Result of the Evaluation

<Special Perspectives Considered in the Ex-Post Evaluation >

- It was essential to conduct a site visit in Kiarukungu, Kiambindu, Kanunka B and Koseka to be directly observed in the survey of the ex-post evaluation, as in those 4 schemes, they could not finish a part of the planned construction of irrigation infrastructure by the time of terminal evaluation. Thus, it was to confirm if they were able to finish the infrastructure on their own in light of potential benefit anticipated in the project and was to verify the applicability and feasibility of the methodology despite the inherent differences in socio-economic fundamentals in each of the schemes.

1 Relevance

<Consistency with the Development Policy of Kenya at the Time of Ex-Ante Evaluation and Project Completion>

The project was consistent with Kenyan development policies as “Economic Recovery Strategy for Wealth and Employment Creation (ERS) 2003-2007” had addressed the irrigation development as one of the interventions that were necessary to restore growth in the agricultural sector for food security, income generation, employment creation, and poverty reduction. It was also highlighted in the “Strategy for National Transformation (SNT) 2008-2012” under the “Vision 2030”, which stated that the area under irrigation was expected to increase from 125,000 ha to 300,000 ha in five years.

<Consistency with the Development Needs of Kenya at the Time of Ex-Ante Evaluation and Project Completion >

The project was consistent with Kenyan development needs of improving agricultural productivity by irrigation development and smallholder community irrigation schemes. There was no change in the needs by the time of project completion.

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

The project was consistent with Japan’s ODA policy toward Kenya, the “Country Assistance Program for Kenya in 2000”. In the agricultural sector, upgrading the productivity, the establishment of workable irrigation and rural development in the ASAL area were particularly emphasized in the assistance.

<Evaluation Result>

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

2 Effectiveness/Impact

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

The project purpose was partially achieved. Although the planned construction work was not completed by the end of the project period, increase in production¹ of all schemes both in terms of the volumes and varieties indicated that increase in income of pilot scheme farmers. However, under the circumstances, time series data could not be compiled and therefore the above information could only partially be confirmed. (Indicator 1). Further, according to the performance rating table to measure IWUA functionality, the result confirms that they exceeded more than a qualifying score of 50% (Indicator 2). At the time of project completion, existing self-help groups in all schemes have been trained to function as Common Interest Groups (CIG) for water management (Indicator 3). Finally, regarding whether reliable water supply to targeted farmers improve (Indicator 4) was attested by the fact that the number of farmers who perceived that they received adequate water for their farming from the scheme had increased from 29% in 2007 and 40% in 2010 on average.

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

The project effects have partially continued after the project completion. According to the survey result, although the increase in income of pilot scheme farmers was not confirmed by data, farmers responded that they perceived their improved general well-being and household consumption were due to the increased farm productivity as a result of expanding irrigated agriculture (Indicator 1). With regard to Indicator 2, most of IWUAs have been functioning at the irrigation schemes surveyed by the ex-post evaluation. Although the number of CIG established within scheme was unknown (Indicator 3), all self-help groups interviewed scored highly in terms of ownership, governance, operation, and maintenance. Furthermore, from both data in Table 1 and Table 2, as scheme infrastructure constructions progress, the amount of water has almost proportionally increased and the percentage of farmers receiving water has increased to 98%.

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

The Overall Goal has been achieved at the time of ex-post evaluation. Within three years after the project completion, 15 or more schemes across the country had adopted the SIDEMAN methodology (Indicator 1). It was because of the successor project SIDEMAN SAL in 2012 and deliberate action by MWI based on the proven success of SIDEMAN methodology which has been able to empower farmers to manage their own schemes and water resources.

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

Gender relations among participating farmers have been improved. Quite a number of female farmers have taken active roles in running committees in the schemes. In addition, emerging fish farming with significant success for a few farmers in Kiambindu was the unexpected positive impact of irrigation water provided by the project. Use of various irrigation techniques may have far-reaching implications for farmers in the downstream; many farmers in the upstream have used sprinklers such as in the case of Kiambindu, while the use of flood/basin irrigation has been commonly practiced in Koseka and Kanunka B. In the meantime, no negative impact was observed.

<Evaluation Result>

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

Achievement of Project Purpose and Overall Goal

Aim	Indicators	Results																																						
(Project Purpose) Methodology for the development of sustainable smallholder irrigation system is verified in the selected schemes.	(Indicator 1) The income of pilot scheme farmers is increased	<p>Status of the Achievement: partially achieved (partially continued) (Project Completion) All surveyed irrigation schemes had continued the construction of the unfinished works, and maintenance of the constructed areas. Kiarukungu and Kiambindu had continued with fee collection and the membership had been increasing. Production of all schemes had increased in terms of the volumes and varieties.</p> <p>(Ex-post Evaluation) For Kisioki scheme, farmers continued with the construction of canals and the number of farmers utilizing the water for irrigation increased. However, for Kyeekolo scheme, construction did not continue and in fact the water reservoir is in a state of disrepair and cannot store water. The increase in acreage of irrigation is attributed to stable water supply enabled by the project and the increased membership to IWUAs to some extent. They, however, do not keep a record of their incomes. The improved well-being can be attested by the consistent fee collections/payments (Kiarukungu and Kiambindu), improved housing, new office building/land (Kiambindu), enabled to help out with household expenses such as new motorbikes, school fees, electricity, etc.</p> <p>Table 1: Construction Status of each Scheme and Acreage under Irrigation</p> <table border="1"> <thead> <tr> <th rowspan="2">Scheme</th> <th colspan="3">Irrigation Structure</th> <th rowspan="2">Irrigation (acres)</th> </tr> <tr> <th>Planned Item</th> <th>2010</th> <th>2018</th> </tr> </thead> <tbody> <tr> <td rowspan="5">Kiarukungu</td> <td>Intake weir (No.)</td> <td>1</td> <td>1</td> <td rowspan="5">128</td> </tr> <tr> <td>Main canal (m)</td> <td>1,500</td> <td>2500</td> </tr> <tr> <td>Additional line (m)</td> <td>--</td> <td>1924</td> </tr> <tr> <td>Pipeline (m)</td> <td>--</td> <td>800</td> </tr> <tr> <td>River crossing (m.)</td> <td>--</td> <td>25</td> </tr> <tr> <td>Kiambindu</td> <td>Main pipe (m)</td> <td>1,950</td> <td>5050</td> <td>120²</td> </tr> <tr> <td rowspan="2">kyeekolo</td> <td>Intake weir (No.)</td> <td>1</td> <td>N/A</td> <td rowspan="2">N/A</td> </tr> <tr> <td>Reservoir (No.)</td> <td>0</td> <td>N/A</td> </tr> </tbody> </table>	Scheme	Irrigation Structure			Irrigation (acres)	Planned Item	2010	2018	Kiarukungu	Intake weir (No.)	1	1	128	Main canal (m)	1,500	2500	Additional line (m)	--	1924	Pipeline (m)	--	800	River crossing (m.)	--	25	Kiambindu	Main pipe (m)	1,950	5050	120 ²	kyeekolo	Intake weir (No.)	1	N/A	N/A	Reservoir (No.)	0	N/A
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¹ In the Project Design Matrix, there was no indicator about production level. It can be assumed that the choice of the indicator was based on the presumption that if increase in irrigation rate would bring about the increase in production more or less in parallel.

² According to the survey result, in 2011, it was only 24.8 acre in Kiambindu.

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(Indicator 2) Functional O&M by IWUA in the pilot schemes in place	Status of the Achievement: achieved (continued) (Project Completion) According to the performance rating table prepared by the Project, score more than 50% considered mostly qualified. The scores of IWUA functionality; Kiambindu 84%, Kisioki 77%, Koseka 73%, Kanunka B 69%, Kyeekolo 63%, Kiarukungu 62%. (Ex-post Evaluation) Kiambindu 90%, Kiarukungu 80%, Koseka 70%, Kanunka B 65%.																																							
(Indicator 3) The number of CIG ³ (Common Interest Group) established within schemes should increase.	Status of the Achievement: partially achieved (partially continued) (Project Completion) Existing self-help groups in all 6 schemes had been trained through the Project to function as CIGs for water management. (Ex-post Evaluation) All self-help groups interviewed scored highly in terms of ownership, governance, operation & maintenance, however, the number of CIG established within schemes since the project completion is uncertain.																																							
(Indicator 4) Reliable water supply to targeted farmers improve.	Status of the Achievement: achieved (continued) (Project Completion) The number of farmers who answered that they received adequate water for their farming from the scheme constructed /rehabilitated had been increased from 29% in 2007 and 40% in 2010 on average. (Ex-post Evaluation) <p style="text-align: center;">Table 2: Water Supply in each Scheme</p> <table border="1"> <thead> <tr> <th rowspan="2">Scheme</th> <th colspan="2">Water conveyed (litre/second)</th> <th colspan="2">Percentage of farmers receiving water in each scheme (%)</th> </tr> <tr> <th>2010</th> <th>2018</th> <th>2010</th> <th>2018</th> </tr> </thead> <tbody> <tr> <td>Kiarukungu</td> <td>110</td> <td>137</td> <td>N/A</td> <td>50</td> </tr> <tr> <td>Kiambindu</td> <td>135</td> <td>161</td> <td>97</td> <td>98</td> </tr> <tr> <td>kyeekolo</td> <td>9</td> <td>N/A</td> <td>5</td> <td>N/A</td> </tr> <tr> <td>Kisioki</td> <td>80</td> <td>N/A</td> <td>93</td> <td>N/A</td> </tr> <tr> <td>Koseka</td> <td>78</td> <td>78</td> <td>N/A</td> <td>98</td> </tr> <tr> <td>Kanunka B</td> <td>60</td> <td>60</td> <td>N/A</td> <td>98</td> </tr> </tbody> </table>	Scheme	Water conveyed (litre/second)		Percentage of farmers receiving water in each scheme (%)		2010	2018	2010	2018	Kiarukungu	110	137	N/A	50	Kiambindu	135	161	97	98	kyeekolo	9	N/A	5	N/A	Kisioki	80	N/A	93	N/A	Koseka	78	78	N/A	98	Kanunka B	60	60	N/A	98
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(Overall Goal) The methodology established through the Project will be used for other smallholder irrigation scheme development.	(Indicator 1) The percent of schemes applying the methodology increase. (Ex-post Evaluation) achieved 12 districts/sub-counties adopted the SIDEMAN Methodology in 2012. The methodology was further adopted by other schemes between 2014 and 2017 supported by MWI as below. <ul style="list-style-type: none"> • Mwingi (Integrated and Food Security Project) • Kagaari, Kyeni, Gaturi (Irrigation Development Project Phase 1) • Githura-Kimathin, AJibika, Naarosoru (Irrigation Project) Thus, 15 districts adopted the SIDEMAN Methodology in total by the year of 2017.																																							

Source : Interviews and questionnaire responses (SDI)

3 Efficiency

The project period was as planned (ratio against the plan: 100%), and the project cost was within the plan (ratio against the plan: 97%). The outputs were produced as planned. Therefore, the efficiency of the project is high.

4 Sustainability

<Policy Aspect>

Promotion of irrigation development has remained one of the major thrusts of the national development policy. “The Agricultural Sector Development Strategy, 2010-2020” and the two consecutive the “Medium-Term Plan (MTP)” of 2013-2017 and 2018-2020 have positioned the agricultural sector as a key driver for delivering the 10 percent annual economic growth rate envisaged under the economic pillar of the Vision. In terms of agricultural water management, MTP 2013-2017 gave the top priority to expand irrigated agriculture in order to reduce the country’s dependence on rain-fed agriculture. The plan also has specifically targeted 404,800 ha to be farmed under irrigated agriculture within the implementation period. Furthermore, “the Agricultural Sector Transformation and Growth Strategy 2018-

³ At the field survey of the ex-post evaluation study, it was confirmed that self-help groups had the same role of the CIG.

2028” has sought to sustainably expand up to 50,000 ha for new irrigation through alternative water supply approaches, which is intended to minimize reliance on large dam construction projects. Also, “the National Expanded Irrigation Program (NEIP) 2011-2019”; has entailed rehabilitation and expansion of existing irrigation schemes, design, and construction of new irrigation schemes with a focus on the arid areas and modernization of schemes for enhanced water utilization.

<Institutional Aspect>

Notably, in this period after the Project, there was a fundamental shuffle in the government institutional structure and administrative division. “The Constitution of Kenya 2010” created a decentralized system of government wherein two of the three arms of government; namely, the Legislature and the Executive were devolved to the 47 Political and Administrative Counties. The “Irrigation Policy 2017” and “Water act 2016” have established new institutions to support to expand irrigation under the new structure, particularly at the county and scheme level. Nonetheless, the role and responsibility of the State Department for Irrigation, SDI (previously MWI) have not significantly changed as it has been supporting schemes to manage water resources. According to the survey result, SDI currently assigns 4 staff to support the irrigation policy, inter alia, SIDEMAN. By the same token, the new system of government is deemed to enable Counties to focus more on supporting farmers in terms of resources and personnel. 5 respective Counties (Embu, Kirinyaga, Narok, Kajiado, Makueni), formerly located in 3 pilot Provinces, have increased the number of personnel to manage water resources and to support irrigation. Currently, each county has 2 staff to support SIDEMAN. Furthermore, in former 5 pilot districts, now in total 4 sub-counties, Mbeere North and Mwea east have 2 staff, Narok south and Oloitokitok have 1 staff who are to provide technical assistance and conduct monitoring for the schemes. At the scheme level, each IWUA has various roles including O&M of irrigation structure, financing, marketing as its services for member farmers as well as regulatory and disciplinary power over them. Kiarukungu has 75 IWUA members, Kiambindu: 20, kyeekolo: 40, Kisioki: 22 Koseka: 32, and Kanunka B: 50. In some schemes, there are concerns that they need to resolve water shortages prone to occur during the dry season, also management issues such as illegal abstractions, and difficulties in fee collection and measurement of water consumption in order to make a set of appropriate regulations and rules. Nonetheless, new institutions along with the devolved structure have taken over to ensure support to farmers, however, they have not yet provided a mechanism for effective coordination, monitoring, and reporting to create a virtuous circle on a sustainable basis.

<Technical Aspect>

According to the survey results, most of the ex-counterpart personnel are still actively working within their capacities to promote the SIDEMAN methodology as to respond to demands of ever-increasing farmer population. However, due to frequent staff turnover and SDI has only a few of them as a result of the devolution. Moreover, the devolution caused inevitable personnel transfer of trained staff to County governments, yet, the pilot Counties have not had enough skilled personnel to support schemes. There has not been sufficient progress monitoring and reporting taken place on the implementation of projects or operations in the schemes. Thus, it should be indispensable to continue providing the training course for newly recruited staff as well as refresher training for staff to broaden the capacity base. For the matter, the Kenya Water Institute (KEWI) can offer their accredited training programs to capacitate staff. Specifically, district irrigation officers (DIOs)-now Sub-county Irrigation officers, in this regard, they are the frontline officers who can directly interact with farmers. They are expected to have a technical skill to design optimal irrigation structures by utilizing Auto CAD and Civil 3D before actual construction.

<Financial Aspect>

As participatory smallholder irrigation has remained to be a key policy of the government manifested by the MWI’s ambitious plan to support it, the government budgetary support for agriculture has been growing at 8% per year, it has been up to a 2.3% share of the entire government expenditure. However, donors have covered 55.2% of the costs for on-going irrigation projects, while the National and County governments have been able to fund 35.1% of them. The National government has disbursed 12,092 million Kenyan Shilling (2015), 15,000 million KSh (2016), 9577 million KSh (2017). Furthermore, at the scheme level, increased fee collection and membership ratios at Kiarukungu and Kiambindu would have contributed to the good governance, strict enforcement of regulations, assured market outlet/ increased benefits from irrigated agriculture. However, at Koseka and Kanunka, there have been considerable market challenges, illegal abstractions. And to some extent, their illiteracy level would have caused somewhat low fee collection ratio, although it is confirmed that the membership ratio has increased in all schemes.

<Evaluation Result>

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

5 Summary of the Evaluation

The project partially achieved the Project Purpose and achieved the Overall Goal. As for sustainability, they have not yet established an effective coordination mechanism to support irrigation and water management, and technically challenging to provide technical support to schemes based on the growing demand from farmers. Also, the national budget has not been sufficiently secured for further expansion of irrigation, however the increase in membership ratios and fee collection in some schemes presents a prospect of a key driver for irrigated agriculture. Considering all of the above points, this project is evaluated to be satisfactory.

III. Recommendations & Lessons Learned

Recommendations for Implementing Agency:

- To enhance the project effects and to ensure the sustainability, liaising with the National Irrigation Board, the County governments should deploy financial and human resources to effectively promote irrigation at the scheme level within the current Mid-Term Plan (2017-2022). Furthermore, it is essential to collaborate with the Water Resources Authority (WRA) as it has a special role to manage and regulate the efficient use of water resources. Any successful implementation of development programmes requires timely and accurate feedback and information-sharing among those key stakeholders so that further appropriate interventions can be made. Also, technical support to schemes to promote water-efficient irrigation technologies is critical especially in view of the unpredictable climate change. Under the circumstances, the application of modern technology for optimal water use in agriculture, such as drip and sprinkler systems, will be a potential area to effectively increase agricultural productivity.

Lessons Learned for JICA:

- In the case of a Country like Kenya, where governance has been devolved, promotion of an irrigation scheme should be coupled with deliberate scheme-specific planning by the County, underpinned by appropriate budget support by the County government. Sound

ownership on the part of both farmers and County is key to the successful implementation of any programme/project. Moreover, there are several key areas that should be emphasized in any project based on the experience; (1) at the commencement, every project must set well-marked indicators and targets for all the stakeholders, (2) a participatory monitoring and evaluation mechanism must be properly included in the design of the project, (3) the role of every stakeholder needed to be clarified and explicitly consented to it at the outset of the project implementation to avoid any false expectation and misunderstanding, (4) at the commencement of the project, precarious assumptions such as maintenance and on-farm water management which would be realized after construction of the irrigation facilities should be avoided as it may lead to uncompleted works/unfinished structures due to cost overruns. It is thus recommended that JICA should deliberately verify the situation to meet every possible contingency and consequence that is likely to adversely affect the outcome of the project. Also, in the process of monitoring the progress, the assumption should be verified to properly adjust the plan in a timely manner as needed.



A farm belonging to a member of Kiambindu Irrigation Scheme



A water canal constructed by members of Kanunka B scheme