



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
<http://ageconsearch.umn.edu>
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

A WAY FORWARD TO SUSTAINABLE INTERNATIONAL FORESTRY COOPERATION: A CASE STUDY OF THE 'GREENBELT PLANTATION PROJECT IN MONGOLIA'*

LEE DAESEOB**

AHN GYUMI***

Keywords

ODA, sustainable management, international development cooperation, project evaluation, forestry

Abstract

The purpose of this study is to identify lessons that can be learned from a recent Official Development Assistance (ODA) project and present suggestions for improving performance in future ODA projects in the forestry sector. The study offers a mid-term assessment of an international cooperation project for the Greenbelt Plantation in Mongolia and seeks ways of improving effects and sustainability of the project in the latter half of implementation period and after completion.

To ensure sustainable management of the ODA projects in the forestry sector, it is crucial to develop associated businesses which attract broad public attention in partner countries. Participation of central and local government institutions in partner countries contributes to the sustainable management of development, and effective communication between the governments encourages their active participation.

* This study utilized a part of the study "ODA project evaluation for the Greenbelt Plantation Project in Mongolia", and was financially supported by the Korea Forestry Service.

** Senior Research Fellow, Korea Rural Economic Institute, Naju-si, Jeollanam-do, Korea.
Corresponding author. e-mail: ldaeoseb@krei.re.kr

*** Researcher, Korea Rural Economic Institute, Naju-si, Jeollanam-do, Korea.

I. Introduction

Forests play an important role in reducing the potential damage from desertification and mitigating threats caused by climate change, both of which pose serious threats to the environment. The international community, aware of the importance of protecting forests that reduce the emission of GHGs, has already invested much effort to reach an agreement that will bind global actors to jointly implement mechanisms for reducing greenhouse gases such as REDD+.

Meanwhile, the World Bank (2004) has reported that there are 350 million people who are partially or entirely dependent on economic activities in the forests for their livelihood. Nonetheless, these people residing in forest communities are easily marginalized from major social services and infrastructure, which makes it difficult to produce value-added forest products. This impoverished population tends to be more dependent on natural resources to increase its income, thus, there is a close correlation between poverty and higher economic dependency on natural resources (Kauppi 2013). Moreover, the lack of services and facilities for production often leads to the failure of ODA (Official Development Assistance) projects in forests or in the forestry sector (Lee et al. 2015).

Korea has also been implementing various ODA projects in this sector for more than two decades. Korea's non-governmental organizations were the first to implement small-scale projects such as plantation. Public and private institutions such as the Korea Forest Service and Future Forest initially developed small-scale projects and proceeded to develop larger-scale, complementary projects. As these agencies accumulated more experience, they performed general evaluations of previous projects to identify useful lessons applicable to future projects.

Many of the projects implemented by the Korean institutions were found to have several issues that must be addressed, such as the need to secure an adequate budget and to improve sustainability in order to generate a positive and enduring impact. Although various public institutions from a variety of sectors in the country began to implement its own ODA projects in forestry sector, they lack the sufficient budget for implementing such projects properly, since their funding still relies on limited allocations from the government. This is the main reason why there has been a fierce geographical concentration of projects. When the major components of ODA projects in this sector were examined, it was found that a high percentage of the budget had been allotted to projects intended to transfer technol-

ogy for the development of forestry in partner countries. The portfolio of these programs, however, was relatively lacking in initiatives to build public officials' policy-making and public administration skills relevant to the forestry sector. These activities are very important since they contribute to strengthening the capabilities of the project administration and management, leading to enhanced governance and sustainable management of projects after completion. Attempts to evaluate the use of the budget were limited because the budgets allocated for these projects were prone to change depending on contingencies in the implementing agency or partner countries. Changes in the amount of the budget and its utilization were not attributable to a lack of proper preparation, but rather, mainly to the fact that various changes of status occurred between the time when the plans were established and the time when they were to be implemented.

Most of public institutions that rushed to join the trend of delivering international cooperation projects were preoccupied with securing an adequate budget rather than focusing on improving the quality of assistance. However, the international community also stresses the importance of sustainability and inclusiveness in cooperation for development and there has been a shift in the development paradigm, from Millenium Development Goals (MDGs) to Sustainable Development Goals (SDGs). To address these national and international priorities, it is time for Koreas' forestry sector to shape proper strategies that will produce more effective results and a stronger impact and that correspond to the real needs of our partner countries, focusing on sustainability.

Many scholars have already emphasized the importance of fostering and managing forests. Heo et al. (2013) stressed that the active participation of partner countries plays a crucial role in the success of projects. If implementing agencies in the partner countries do not share a common goal, projects are more likely to fail to fulfill their initial objectives.

There have also been studies that investigated the social and environmental conditions that promote the effective delivery of ODA projects in the forestry and environmental sector (Subak 2000).

Jo et al. (2014) examined agroforestry strategies that satisfy local residents' economic needs and while being simultaneously compatible with ecological conditions. Adopting this so-called 'agroforestry' approach to ODA projects in the forestry sector has been proved to encourage the active participation of the local residents and ultimately strengthen the positive impact of the projects.

Several studies identified the optimal environmental conditions for seed

germination, plantation or cultivation of seedlings applicable to specific ODA forestry projects (Viémont J-D and Crabbé 2000; Tanaka-Oda, Kenzo and Fukuda 2009). Tanaka-Oda, Kenzo and Fukuda (2009) aimed to understand the biological traits of several major plants which are to be used for plantation and suggested pre-treatment measures which help seed germination in project sites that have harsh conditions.

A closer look at major ODA projects yields insights regarding how to improve current practices in implementation to enhance sustainability. In this paper, we examined the evaluation of “Greenbelt Plantation Project in Mongolia,” which is one of the representative ODA projects in the forestry sector, in order to understand the difficulties that occurred during the implementation and suggest measures that need to be taken to ensure successful and sustainable management hereafter.

The general quality and results of ODA projects can be improved through the process of evaluating each stage of the project and obtaining feedback to improve practice in the next stage or similar future projects. This paper departs slightly from preceding studies as it focuses on a long-term ODA project before completion in order to suggest effective business models which can be closely linked to the current ODA project. The goal is to ensure that the project is managed sustainably even after the entire project is transferred to the government of the partner country.

This paper is organized as follows. We first delineate the plantation project, stating the objectives of the project, its scope and limits and finally the evaluation methods. Next, we highlight Mongolia’s forestry policy and the current status of international cooperation undertaken between Mongolia and the international community, including the partnership with Korea. Major results of the evaluation are classified based on the five evaluation criteria suggested by OECD/DAC. This paper ultimately aims to propose strategies to increase the sustainability of international cooperation in the forestry sector. In particular, we offer strategies for development cooperation which directly or indirectly contribute to reducing poverty.

II. Methodological Discussion

1. Overview of the Project

This paper evaluates the ‘Greenbelt Plantation Project in Mongolia to Combat Desertification and Mitigate Dust and Sandstorms,’ a project conducted by the Korea Forest Service (KFS) and the Mongolian Ministry of Environment and Green Growth (MEGG). The major implementing agency of this project is called the ‘Korea and Mongolia’s Greenbelt Management Unit.’ The project was planned to be implemented over the course of 10 years, from 2007 to 2016, with a total budget of 9.5 million USD.

The major objectives of the project is to reduce the environmental damage caused by yellow dust and to combat desertification. The project mainly consists of establishing tree plantation, offering training courses and expert advice, joint research, holding symposium and workshops, and performing evaluations.

The Korea Forest Research Institute (KFRI) and the Institute of Geo-ecology of Mongolia (IGM) have been in charge of technical cooperation and joint research, while the Forest Agency of Mongolia of the MEGG is responsible for managing the plantation. In fact, even though the Mongolian institutions have supported the administration of the project and helped mobilize local workforce, the actual management of the plantation mostly carried out by the Plantation Management Team of KFRI. KFRI and IGM jointly conducted research in the project sites to properly select the tree species that are adapted to the climate and soil characteristics of the region, establish a tree nursery, disease and pest control system, and conduct grassland testing and soil improvement.

2. Components of the Project

2.1. Plantation and Cultivation of Seedlings

The plantation sites are located in Lun, Dalanzadgad and Bayanzag. Pilot projects for establishing plantations, tree nurseries and forest technology centers have been operated in the region within a 2-hour driving distance from Ulaanbaatar, the capital city of Mongolia. In Dalanzadgad, the cultivation of the seedlings and refor-

estation have been carried out at the same time, but what distinguishes this region from others is that it has plots to cultivate crops on forest land, a type of agriculture which is broadly known as 'Agroforestry.' Meanwhile, the reforestation of Saxaul is in progress in the region called Bayanzag, located within 2 hours of driving distance from Dalanzadgad. The initial plan was to complete a plantation of 3,000 ha only in Lun Soum and Dalanzadgad. During the course of implementation, the plan was revised to include reforestation Saxaul, in order to meet the initial target of creating a plantation over an area of 3,000 ha.

The latter part of the plantation project is being implemented through two approaches: the establishment of new plantations and the management of existing plantation sites. The task of creating a new plantation has involved expanding the reforestation area in Lun Soum, Dalanzadgad and Bayanzag. A pilot plantation has been standardized with plantation belts, rows and paths. In the case of Lun and Dalanzadgad, fences were installed to minimize damages by rodents and the grazing livestock of nomads. From 2007 to 2013, planting was performed on 1,498 ha in the 3 regions and the budget spent during the period totaled 6 million dollars. The outcome of the plantation was assessed based on the survival rate of seedlings, which is reported by project managers and field supervisors by calculating the ratio of trees that remain alive compared to the total planted.

2.2. Training and Education

Training and education promotes technical cooperation and consultation. This project requires us to dispatch experts to the project sites for a long period of time and offer invitational training courses and arrange degree programs, training programs for Mongolian local experts and joint research.

The Korea Forest Service and KOICA are respectively responsible for the dispatch of long-term experts. The experts from the Korea Forest Service take a role of operating the Plantation Management Team and another expert from KOICA, with a doctorate in forestry technology, provides advice and consultations. In addition, the Management Team also operates a short-term expert dispatch program for sessions lasting one or two weeks twice a year. The main activities of those experts include supervising the progress of the project, particularly inspecting the plantation, the cultivation of seedlings, the soil management, the Clean Development Mechanism (CDM), and the land restoration as well as providing sug-

gestions for improving the tree nurseries, and giving technical advice to other project managers.

The invitational training course is mostly intended for the staff of the Forest Service of Mongolia or local governments, forestry students, and the staff of the Plantation Management Team or other local NGOs. The course consists of a short-term training program that includes visits to Korean institutions relevant to the development of forestry and field trips that allow participants to observe effective ways of planting trees, cultivating seeds, and applying new technologies, and introduces them to the 2-year masters degree program in forestry available at Korean universities.

The joint research aims at promoting research cooperation between two countries and establishing technological bases for the efficient delivery of the Greenbelt Plantation Project. Specific topics of the research are as follows: (1) soil improvement, (2) testing species for plantation, (3) selection of tree species for creating forests, (4) identification of the most appropriate irrigation method, (5) development of preventive measures against disease and pests in plantation sites and tree nurseries, and (6) preventative measures against rodents that cause damage to planted trees.

In addition, we offered assistance with the facilities and equipment necessary for the plantation, mainly concentrating our support on ensuring that the infrastructure and machines for the operation of the project are in place.

3. Evaluation Design

The outcomes of the project are analyzed by means of literature reviews, on-site observations, interviews with focus groups in an international workshop and surveys. An evaluation team made visits to the project sites, the Korea International Cooperation Agency (KOICA) office in Mongolia and several Mongolian government institutions to conduct interviews about the progress of the project and collect data needed for an evaluation. During the visits to the project sites, the staff split into two teams and one monitored the plantation plots, while the other carried out a survey to assess the level of awareness among local residents.

Responses were collected from 200 randomly selected survey participants, including both beneficiaries and non-beneficiaries residing in the region of Lun Soum, Bayanzak, Dalanzadgad and Ulaanbaatar. The respondents gave their answers through surveys in written form or in interviews.

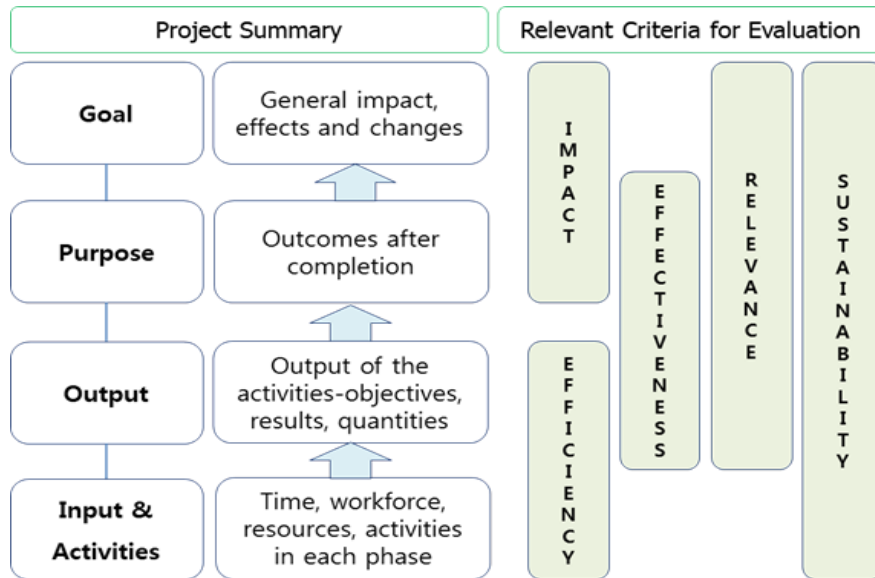
Survey questions were divided into those that addressed the respondent's "understanding of the project" and "satisfaction with the project." To see to what extent Mongolian people understood the project, respondents were first asked if they were familiar with major issues in forestry and the environment, such as desertification and the yellow dust in East Asia. They were also asked if they thought tree plantations were urgently needed and whether they were aware of the 'Greenbelt Plantation Project in Mongolia,' implemented by the Korean government. Multiple-choice questions were used to assess public awareness of these environmental concerns, previous ODA projects implemented in Mongolia and the urgent need to take actions against environmental threats.

In order to see if people were satisfied with the implementation of the project, respondents were asked if they found the project to be supportive of the Mongolian governments' policies, what they mainly expected from the project and whether they noticed any impact from the project. Respondents were additionally asked if they had any former experience participating in ODA projects and whether they were willing to participate in future Korean ODA projects. Other multiple choice questions were also included, regarding impacts, changes, benefits and transfer of knowledge and technology resulting from the project. The respondents were also invited to give their opinions on Korea's participation in ODA projects and other related issues.

One of the most critical limits of relying on the survey on public awareness is that baseline surveys in the initial stage of the project were not conducted and therefore it is difficult to track whether any changes were brought about by the implementation of the project. This makes it difficult to determine whether the project influenced the changes in local people's views and opinions.

As the Greenbelt Plantation project has been implemented as a pilot project in accordance with the Mongolian policy of establishing the green-belt and was limited to a specified area within the vast plain regions that span the country, neither of the governments were able to collect major quantified baseline data, including the plantation area, numbers of nurseries and public awareness.

Figure 1. Logic of Qualitative Evaluation Based on the OECD/DAC Criteria



Source: Lee et al. (2014).

In this study, we adopted the evaluation criteria* provided by the OECD Development Assistance Committee (DAC) to complement the quantitative assessment based on the survey on public awareness (Figure 1). In addition, the results of the on-site monitoring and surveys were analyzed within the frame of the OECD/DAC criteria. In the case of programs with results that could not be easily quantified, a quantitative evaluation was performed instead. When outcomes could not be measured in figures, a qualitative evaluation method to determine the results and impact was applied, weighing up the achievements against the goals and objectives and examining the cause-and-effect relationship in the outcomes.

* A land use system in which trees or shrubs grow on land for agricultural purpose with other crops and the agricultural and forestry technologies are utilized together to generate sustainable, profitable and diverse ecological environment

III. Results

1. Public Awareness Survey

The public awareness survey was conducted to understand how local residents and the project's stakeholders understood the impact of the project and to use the survey results for evaluating the projects' impact. Survey questionnaires were given to the respondents or the questions provided in an interview format. The sample pool consisted of 200 respondents, including both beneficiaries and non-beneficiaries who reside in Lun Soum, Bayanzag, Dalanzadgad and Ulaanbaatar (Table 1).

Table 1. Overview of the Public Awareness Survey

Design of the survey	Method	<ul style="list-style-type: none"> - Public awareness survey for measuring the understanding of the project and for evaluating the impact of the project - Responses from survey questionnaires and interviews - Size of sample pool: 200 residents (both beneficiaries and non-beneficiaries) - Sites: Lun Soum, Bayanzag, Dalanzadgad, Ulaanbaatar
	Performance	<ul style="list-style-type: none"> - Interviews conducted by surveyors who completed training programs organized by evaluation agencies
Survey items	Understanding of the project	<ul style="list-style-type: none"> - Awareness of the gravity of major environmental issues - Awareness of the necessity of plantation - Experiences related to international development aid - Awareness of the plantation project implemented by the Korean government
	Satisfaction with the project	<ul style="list-style-type: none"> - Contribution of the project to the Mongolian government, society and people - Expected outcomes and impact of the project - Perception regarding the influences of the project
Results of the survey	Measurement of results	<ul style="list-style-type: none"> - Use of equal-interval scales - Category of the extent of understanding of the project "1 = not interested, 2 = unaware, 3 = heard of but not well aware, 4 = aware, 5 = very aware" and the extent of satisfaction with the project "1 = very unsatisfied, 2 = unsatisfied, 3 = not satisfied, 4 = satisfied, 5 = very satisfied,

The survey examined the perception of destruction of Mongolian forests and environment, awareness of the importance of reducing the environmental damage caused by desertification and the yellow dust. All respondents answered that they were aware of the environmental destruction and 51% of the respondents recognized an urgent need to reduce further damage.

Regarding the perceived value of the forests as well as the perceived need for the plantation, 94% of the respondents stated that they recognized the value of forests, and among them, 71% stated that they believe forests have made the air cleaner and fresher. 92% of the respondents said there is a high necessity for reforestation and 64% answered that plantation needs to be scaled up in the future.

In order to assess the level of recognition regarding the Greenbelt Plantation Project, surveyors asked if the respondents had heard of the project and its details, and whether they believed the project is in line with the Mongolian government's plans of reforestation and performing countermeasures against desertification. 83% of the respondents said they are aware of the project and 26% were well informed of the components and the project sites. 25% also recognised the project's goals and objectives. Respondents in general shared the view that the project provides advisory and technical support to the Mongolian government's national plantation schemes (Table 2).

Table 2. Survey Results on the Understanding Regarding the Project

	Questions	Results
Importance of addressing issues in the forestry	Aware of the damages to forests and the environment	<ul style="list-style-type: none"> • Perceives damages: 100% • Notes damages: 52%
	Recognizes an urgent need to reduce the pace of desertification and the yellow dust	<ul style="list-style-type: none"> • Recognizes the need: 100% • Strong intervention needed: 51%
Necessity of planting tree and creating forests	Benefits from the forests	<ul style="list-style-type: none"> • Recognizes general benefits: 100% • Improved air condition: 51%
	Benefits of planting trees	<ul style="list-style-type: none"> • Perceives general benefits: 94% • Air condition improved: 71%
Experiences in international development projects	Need for foreign aid	<ul style="list-style-type: none"> • Recognizes the need: 72%
	Information on donor countries and/or institutions in cooperation with the Mongolian government	<ul style="list-style-type: none"> • Informed of ongoing international cooperation: 68%, Korea(195), Germany (13), Japan (9), Others (5)

(continued)

	Questions	Results
Recognition on the Greenbelt Plantation Project by Korea	Awareness of the project	• Informed: 83%
	Awareness of the components of the project	• Components of the project: 26% • Purpose of the project: 25%
	Benefits from the project for the Mongolian govt.	• Recognizes benefits: 88%

Source: Lee et al. (2014).

To gauge satisfaction with the project, the survey investigated whether respondents recognized its benefits and impact. First, respondents were asked if the project has been supportive of the government and the public, and which part of the project they have found most helpful. Most respondents said almost all the activities included in the project have offered practical support and contributed to plantation and they found cultivation of seedlings most helpful among the various activities. Secondly, the survey also asked about the impact of reducing the pace of desertification and benefits from the project, to further analyze respondents' satisfaction with the project. 99% of the respondents said they perceived positive impacts: they noted that the project had created jobs, generated additional income and improved the environmental conditions related to slowing the pace of desertification and reducing yellow dust. Thirdly, the included questions about the impacts of the project. All the respondents answered that they benefited from the project as they sensed an improvement in the environment, and some of them acquired forestry technologies, such as skills in planting and the cultivation of seedlings. Among those who acquired new technology, 88% said they disseminated the technology to their family, friends, and colleagues (Table 3).

Table 3. Results of the Survey on Satisfaction with the Project

	Questions	Results
Practical support to the Mongolian people and the government	Practical support given to local residents and the Mongolian government through each activity of the project	• Plantation: 89% • Operating nurseries: 88% • Education and training: 73% • Expert advisory service: 73% • Joint research: 77% • Symposium and workshops: 69%
	Activities of the project ranked by usefulness	• 1st: Plantation • 2nd: Nurseries for seedlings

(continued)

	Questions	Results
Expected effects from the project	Positive impact of the project on reducing yellow dust and slowing the pace of desertification	<ul style="list-style-type: none"> • Positive influences: 99% (improved environment with newly created forests, generation of income and jobs, improved outside air, 36, 32, 27% respectively)
	Significant benefits of the project (plural responses)	<ul style="list-style-type: none"> • 1st: Improved environment • 2nd: Acquisition of knowledge and technology • Others: reduction of greenhouse gases and yellow dust and slowing the pace of desertification, active public participation in planting trees
Perception of the influence of the Greenbelt Plantation Project	Positive or negative impact of the project	<ul style="list-style-type: none"> • Perceives the benefits: 100% (improved environment, acquisition of knowledge, generation of job and income, 36, 32, 27% respectively)
	Acquisition and dissemination of knowledge and technology transferred throughout the project	<ul style="list-style-type: none"> • Disseminated knowledge and technology: 88% • Transferred to family, acquaintances and neighbourhood in person: 70%
Experiences of involvement in international cooperation projects	Respondent's experience of participation in any ODA project	<ul style="list-style-type: none"> • Having been participated: 60%
	Sector and type of the ODA project(s) in which the respondent previously participated (if applicable)	<ul style="list-style-type: none"> • Informed of the components and sites of the project: 26% • Informed of the objectives of the project: 25%
	Changes in attitudes towards international cooperation project (if participated)	<ul style="list-style-type: none"> • Aware of the benefits: 88%
Willingness to participate in Korean cooperation projects	Willingness to participate in future Korean ODA or other types of cooperation projects	<ul style="list-style-type: none"> • Willing to participate: 89%

Source: Lee et al. (2014).

2. Evaluation of the Project by OECD Criteria

2.1. *Relevance*

OECD/DAC defines “relevance” as “the extent to which the objectives of a development intervention are consistent with beneficiaries’ requirements, country needs, global priorities and the partner’s and donor’s policies” (OECD 2002: 32).

We examined the Mongolian national development goals and priorities in this sector to assess whether the objectives of the project were still valid and consistent with the overall goal and direction of the Mongolian government’s own development policies and strategies. The Mongolian government recognizes the magnitude of desertification and strives to combat its impact through effective policies and countermeasures. The government established the ‘21st century Mongolian Action Plan’ corresponding to the international community’s environmental agenda as well as other policies regarding forest and environment management for sustainable development. The government has also established plans for building capacity to tackle further desertification, raising public awareness, reinforcing research capacities and systemization and utilization of pasture land. We therefore concluded that the Greenbelt Plantation Project in Mongolia is in accordance with the Mongolian government’s policy. The Mongolian government and the international community have consistently called for assistance in combatting desertification. In this context, the Greenbelt Plantation project contributes to the establishment of plantation belts, which is a goal pursued by the Mongolian government. The principles of the implementation of the project are mostly grounded on Korea’s public plans in the environment sector, which were created to minimize damage from climate change, yellow dust and any other environmental risks. Thus, the project is assessed to have high relevance to the partner country’s policies as well as to those of the donor country.

The project seeks to address growing public concerns regarding the threats of desertification among many members of the international community as well as local residents in Mongolia, where 72% of the Mongolian territory has reportedly fallen under the influence of desertification, exacerbating the destruction of vegetation and reducing land productivity. One of the main activities of the project is afforestation and reforestation by creating a plantation belt, as an effort to deter the progress of desertification. Tree nurseries are operated in order to adequately supply seedlings to the plantation sites. Experts have been dispatched to provide the

actors in Mongolia with their expertise and advice regarding plantation management. Capability building programs were conducted for the participants of the project in Lun and Gobi regions where the main and artery roads of the green-belt built by the Mongolian government are located. The target regions for the project were selected based on the results of on-site studies performed by the Mongolian government. A major feature that distinguishes the target districts from other ordinary plantation plots is that they have adopted pot planting and a drip irrigation system. These methods were intended to enhance the seedlings' survival rates and the results showed that they have actually done so. However, several obstacles remain, such as the high initial costs of constructing the infrastructure and its deviation from the traditional Mongolian planting methods.

Meanwhile, in recent years, desertification in Mongolia has been aggravated by yellow dust, which causes environmental, economic, social and cultural changes. As the desertification progresses, it results in economic losses such as the following: decreases in crop yield and the number of farms, damages to railways and highways, rising water levels due to sedimentation and the increased risk of flooding. These ecological impacts consequentially affect the society and the living environment, and may even result in forcing migration due to natural disasters and the impoverishment of the regions (Korea Forest Research Institute 2004: 24). The Greenbelt Plantation Project primarily aims to reduce the yellow dust and combat desertification by establishing a forest belt of around 3,000 ha arid regions over the course of 10 years. The project not only includes the plantation and cultivation of seedlings, but also provides research for technical support and offers training programs. The project, therefore, has been evaluated to be highly relevant in terms of addressing current environmental needs and assisting with ecological recovery and rehabilitation.

2.2. Efficiency

According to OECD/DAC, "efficiency" is "a measure of how economically resources and inputs (funds, expertise, time, etc.) are converted to results" (OECD 2002: 21). Evaluation on the efficiency of the project mainly measures how inputs including time, technology, expertise and funds are turned into results. A cost-benefit analysis may be generally applied to assess the economic efficiency of a project. However, in the case of reforestation projects which create impacts, intended or unintended, over long period of time, it is difficult to measure the projects' benefits

very precisely due to the time and budget constraints. In addition, the results of cost-benefit analysis do not always properly reflect the economic efficiency of the project. Instead of measuring economic benefits, we used the data from the annual monitoring to assess whether the activities of the project were performed in an efficient way.

The budget operation was analyzed to assess how efficient the project has been in obtaining results from the initial resources. An initial budget had been established for this project, mainly focusing on management of plantation, cultivation of seedlings, training, joint research and other operational costs. When the budget plan was established, Korea did not have much experience implementing long-term ODA projects. There were few examples of similar budget plans to use as reference and, consequently, this plantation project partly failed to establish countermeasures for contingencies such as inflation, increase in personnel expenses and oil and seedling prices over the long period of time. Significant revisions to the initial budget plans were needed to provide a greater budget for plantation and the cultivation of seedlings, while cutting down on the costs for joint research and equipment.

Much of the budget for the establishment of facilities and machineries was spent on input for plantation, such as generators, water tanks, measuring instrument, pumps (submerged/water lift) and office supplies such as laptops, camera and printers. The cost of constructing the irrigation system was quite high, but the system was helpful for improving the survival rates of seedlings. The irrigation system was judged to be cost-effective. However, due to unexpected additional costs from inflation and rising tree prices, cuts were made to the budget for machinery purchases, and thus the budget was not managed as efficiently as initially planned.

Meanwhile, a joint operation committee served as a channel of communication and helped keep the project consistent and effective. Experts in policy-making held regular meetings to share the results and establish future plans. To improve efficiency in the allocation of human resources, the Project Management Team appointed a Mongolian staff member to be the general manager and hired a team that was mostly fluent in both Korean and Mongolian to facilitate communication. The team also included local experts in reforestation. The general manager was formerly a government official in forestry, with technical as well as administrative ability, and greatly assisted the project. We expect that the project will proceed smoothly and expanded after transfer to the Mongolian government, especially if we enhance the contents of training courses with input of insights from the group of middle-level management staff.

2.3. Effectiveness

OECD/DAC's definition of "effectiveness" is "the extent to which the development intervention's objectives were achieved, or are expected to be achieved, taking into account their relative importance" (OECD 2002: 20). In order to assess the effectiveness of the project, it is useful to consider the output and short- and long-term outcomes of the project. In our analysis, therefore, we primarily relied on the data accumulated during the annual monitoring of the plantation area (Table 4) and also used the results from interview with stakeholders and other studies during the visits to the project sites.

Table 4. Annual Plantation Area (ha)

Year	Total		Lun Soum		Dalanzagad		Saxaul	Forest Fire	NGO consignment
	Initial Target	Changed Target	Initial	Changed	Initial	Changed	Added	Added	Added
Total	3,000	3,000 (1,908)	1,500	605 (505)	1,500	645 (575)	1,470 (598)	210	70
2007	-	-	-	-	-	-	-	-	-
2008	200	200	100	100	100	100	-	-	-
2009	350	223	175	80	175	138	5	-	-
2010	350	228	175	88	175	77	3	50	10
2011	350	257	175	57	175	80	10	100	50
2012	350	300	175	80	175	80	100	60	10
2013	350	300	175	50	175	50	190	-	10
2014	350	400	175	50	175	50	290	-	10
2015	350	(+1,092)	175	(+100)	175	(+70)	(+872)	0	(-20)
2016	350		175		175				

Source: Lee et al. (2014).

To evaluate the effectiveness of the plantation, this study quantified the effect of carbon sequestration that the annual plantation area was able to generate through the implementation of the project. The quantity of reduced carbon emission was compared to the quantity of carbon emission per automobile, utilizing the 'Standard Carbon Sequestration by Major Tree Species' (Korea Forest Research Institute 2013) as reference. This method is often adopted to assess how much car-

bon emission reduction has been achieved by an activity. A 10-year-old deciduous tree sequesters 3.81kg of carbon dioxide per year on average, while a coniferous tree shows less carbon sequestration at 1.44kg annually. However, the data does not include poplar trees, which are a major tree species in the plantation. Meanwhile, it has been claimed that 17.4 pine trees are necessary to offset the carbon emitted by an automobile standardized for the measurement. Considering that the coniferous trees sequester less carbon than the deciduous trees, we can calculate the effect of minimal sequestration based on the data on pine trees. To measure the effectiveness of the plantation, the ratio of the number of trees was calculated, which survived from those that were planted to the number of trees necessary to offset the quantity of annual carbon emission per automobile (17.4 trees) (Table 4). The quantity of reduced carbon emission in 2008 was equivalent to the quantity of annual carbon emission from 1,572 cars. The effect of carbon sequestration generated by the plantation project showed a growing trend, and in 2013, the quantity of reduced carbon emission was equal to that of carbon emission from 5,661 cars (Table 5).

Table 5. Effect of Reducing Carbon Emission from Plantation

		2008	2009	2010	2011	2012	2013
Plantation area (ha)	Afforestation	200	218	165	137	130	100
	Restoration	-	-	60	120	160	200
Survival rate (%)		50	70	89	87	91	90.5
Survived trees		54,700	83,472	89,967	85,357	89,030	108,842
Quantity of reduced carbon emission* (numbers of automobiles)		1,572	3,358	4,550	4,268	4,656	5,661

* Calculation method: (planted trees * survival rate) / trees needed to offset quantity of annual carbon emission per automobile

Source: Lee et al. (2014).

Secondly, dispatching experts to the field played a crucial role in technology transfer and field training. In particular, KOICA sent several experts as mid to long-term advisors and the experts offered valuable experiences and expertise in reforestation. They transferred technology directly to the field manager and the staff members on the sites, based on the results of the joint research. The role of the expert was particularly important during the initial stage, as any local managers

have not previously participated in reforestation. The experts provided technical advice and identified areas that needed research. We thus concluded that dispatching experts as advisors to Mongolia contributed to the effectiveness of the plantation. However, in order to sustain the benefits of technical advice, it will be necessary to arrange a network for sharing information between the participants before the project comes to a close.

Thirdly, joint research was conducted to improve the outcomes of plantation and the cultivation of seedlings. The research focused on soil improvement, selection of tree species for plantation and irrigation. At first, the research was promoted to reinforce cooperation between the two countries. Due to the constraints of time and distance, the Mongolian research team is now taking the lead and the role of the Korean counterpart was scaled down from the second year. The budget set for apparatus and materials has not been enough to support the research. A support system has not been stabilized yet, and so far the Mongolian research team has had to make the most use of the apparatus and materials from their own organizations.

2.4. Impact

Evaluating impact means measuring the extent of the primary and secondary, positive and negative, long-term effects that the project for development created directly or indirectly (OECD 2002: 24). We evaluated the social, economic, technical, cultural, institutional and ecological impact of the intervention, based on the results of several activities of the project that were completed at the time of the evaluation. The plantation projects need a long period of time for their impact to become visible, and the evaluation of this project was conducted in the middle of the implementation period. Although these conditions create complexities when attempting to evaluate the impact of the plantation project and may even render the evaluation unreliable, our goal in conducting an evaluation of the impact was to prepare the basis for offering suggestions regarding the direction of the latter part of the project and follow-up projects or associated programs.

One of the positive impacts of the project was the transfer of technology through training and education. Consultation with local participants and the results of the awareness survey demonstrated that the local residents experienced changes in perception regarding plantation and forest management and were able to attain relevant knowledge. During the initial stage of the project, local residents recog-

nized forests and trees merely as an element of nature and did not perceive the need for specific management or care, but after participating in training programs, they learned information on what to plant and how to create and maintain forests, recognizing the benefits of sustaining forests. Although there have been other international cooperation agencies such as GIZ and UNDP that already implemented similar projects for combatting desertification and improving the management of natural resources in Mongolia, this project distinguishes itself from others in that it contributed to raising public awareness through campaigns for planting trees or creating forests, using the output of the project such as the plantations, tree nurseries and training centers to provide opportunities for field trips and hands-on practice in the field. According to the awareness survey, the Mongolian citizens gain awareness of how the project was combatting desertification. Furthermore, through discussions with the MEGG, we found that the project has been making a contribution to the government's policy-making process, as several examples of the project are used as reference when planning and implementing national development programs.

2.5. Sustainability

Evaluating sustainability means assessing whether the positive effects or impact remains and can be developed after the major intervention is finished. The definition of sustainability provided by OECD/DAC also includes "the probability of continued long-term benefits" and "the resilience to risk of the net benefit flows over time" (OECD 2002: 36). For the evaluation, we examined the annual monitoring data and the results of interviews with the stakeholders as well as the operational budget plans and other records from the implementation of the project to determine the sustainability of the project. Any assessment of the sustainability of the project conducted before the projects' completion will remain incomplete, since the sustainability is not yet measurable. Nonetheless, a preliminary evaluation of sustainability is an essential part of this evaluation, which extensively examines the outcomes of the project up until the point of evaluation, the network of stakeholders, local residents' participation and the government's determination and support. The results of the evaluation help us suggest directions and guidelines for sustainable management of the project and its impact, and this study also focuses on proposing directions for ensuring the sustainability of international cooperation in the forestry sector.

The evaluation results showed that the project did not include any specific plan for ex-post management. The initial implementation plan did not consider the necessity of long-term management of forest ecological system. Plantations not only require continuous irrigation but also general management through complementary planting and these costs need to be taken into consideration. It seemed insufficient to carry on the long-term project according to the existing plan unless this is integrated with a long-term plan. A proper exit strategy with a cost-effective operation plan will be crucial for Mongolia's management of the plantation.

One of the concerns regarding the sustainability is the structural instability of the related Mongolian governmental organizations. This limits the effects of the project and creates risks regarding the performance of its ex-post management. In fact, even though the Korean and Mongolian governments and experts have engaged in in-depth discussions and established the plan for the project over the course of nearly 10 years, many modification or changes to the initial arrangement were made necessary due to changes in Mongolian society, politics or economy. Unstable governance can undermine the sustainability of the project or the consistency of the initial plan. Another concern is that changes in personnel and reshuffling of organizations are too frequent, making it difficult to manage projects with consistency and ensure sustainability. We advise the Mongolian government to make considerable changes to prevent the loss of experienced and qualified personnel. Improved plans for personnel management is essential and will help sustain the project after the completion, but, at the point of the evaluation, neither the Mongolian government nor the Plantation Management Team had yet arranged to provide a self-training program for the local workforce. To make the project sustainable after transfer to the Mongolian government, it is important to establish a plan for stable personnel management and arranging educational programs for the employees, and this importance cannot be emphasized enough.

IV. Implications and Concluding Remarks

Various activities included in the Greenbelt Plantation Project, such as the survey on public awareness, interviews and workshops with international agencies, revealed that the plantation project has made a positive impact on the Mongolian government's policymaking process and encouraged the government to establish a

national forest management plan and expand the plantation area. Although the project has influenced positively on the target region in general, there have been major challenges to the project, such as unforeseen additional expenses, some of which were generated by unexpected changes such as increase in labor costs and the rising price of seedlings and other materials. There also remains a need to establish a plan to reduce management costs in preparation for the transfer of the entire project to the Mongolian government in the future, and this task must be completed during the remaining time period of implementation.

Upon evaluating the outcome compared to the initial targets, we found that the growth and survival rate of trees planted in the sites has improved every year. The experts' consultations and accumulation of technology through training programs were assessed to be the crucial factors behind this success. In addition, local community took advantage of training and education opportunities. Residents in the area are now informed of the benefits of reforestation and have a stronger willingness to take part in further initiatives to improve the environment.

The Mongolian government and people look forward to continued support for the restoration of its forests. In Dalanzadgad, we introduced the agricultural practice of planting crops on the plantation area and local residents have high expectations about the additional income that can be earned through the practice of agroforestry or the introduction of eco-tourism (Munkhgerel 2013). As such, we will need to consider demands for projects closely associated with the main plantation project, from the initial stages of designing the program. Beneficiaries or local residents are more engaged in the main projects and are more inclined to manage the project sites even after the completion of projects.

To improve the sustainability of the ODA projects in the forestry sector, therefore, it will be essential to consider plans to generate income through agroforestry practices or introduce small businesses such as plantation and sales of trees for landscaping. In order to make associated businesses successful and helpful to the main participants in the plantation projects, it is not sufficient to offer simple suggestions for types of businesses: rather, we need to provide comprehensive and detailed studies and research on markets and value chains from production to distribution and sales before the implementation. Otherwise, any agroforestry project will be less likely to succeed in helping residents and participants secure stable sources of income and will be less likely to contribute to the sustainability of the development impact.

Methods adopted for the implementation of the Greenbelt Plantation project were

designed to raise the seedlings' survival rates but the main obstacles for the planting systems were the high initial cost of constructing infrastructure and the fact that the new planting methods diverged significantly from the traditional Mongolian methods. These factors may hamper the continuous use of the new technology introduced in the ODA projects and the sustainable management of plantations. Instead, appropriate low-cost technology for sustainable management of plantation needs to be developed and transferred through projects.

The assessment revealed several issues need to be resolved to enhance the sustainability of the ODA project in the field of forestry. First, the goals of the project and the indicators for monitoring and evaluation should be defined clearly, reflecting the socioeconomic changes made over the recent years in partner countries. Particularly, the goal of the plantation needs to be revised in a more realistic manner. In the case of Mongolia, the project only succeeded in planting trees in an area of around 1,500 ha; this means that in order to meet the goal, we will need to plant 500 ha every year until 2016. Although this is not entirely impossible with the experts and the technology accumulated over time, but the excessive pressure to push forward with the plantation may result in the neglect of other essential parts of the project, such as arranging follow-up plans, educational programmes for experts, identifying and researching associated projects, and completing the transfer to the Mongolian government. Establishing a project design matrix (PDM) for the latter part of the project, based on the experiences so far, can be an effective way for implementing the project more systematically.

In addition, we need to develop a plan for the transfer to the Mongolian government and institutions, with specific details regarding human resources, financing, communications and the management of the project sites. To ensure sustainability, we need to consider engaging additional local staff in the implementation process. Moreover, after visiting the sites twice we found that the plantation project shows little probability of ensuring the continuation of benefits achieved by the project before the entire transfer to the Mongolian government, largely due to the instability of Mongolian governance and insufficient management capabilities. Therefore, we highly recommend establishing a specific transfer plan and preparing follow-up projects, including plans for expanding the plantation area or launching businesses associated with the project to raise the income of local residents.

Partnership with the government of partner countries is also a crucial factor which ensures the sustainability of the development impact achieved by projects

in the forestry sector. Enhanced partnership during the implementation of ODA projects will influence national policy priorities and increase attention to the environment and the forestry sector. It is essential to set up a specific plan for annual joint monitoring of goals and indicators. Joint monitoring should be performed to check the outcomes and effects of ODA projects and draw lessons from the outcomes for more effective and efficient implementation of future projects in this sector. Cooperation between two governments in bilateral ODA projects can be improved not only through the exchange of information but through the engagement of the local workforce and experts from partner countries, which builds capabilities for sustainable management after the entire transfer of the project to the partner country.

REFERENCES

- Choo, J.M. et al. 2007. *A Study on the Establishment of Comprehensive Masterplan for Reducing Damages by the Yellow Dust*. Korean Ministry of Environment. [In Korean]
- Heo, J. and Jeong, S.E. 2013. *A Study on the Cooperation Model and Strategy for Rural Development of Developing Countries*. Korea Rural Economic Institute. [In Korean]
- Jeong, J.S. 2010. "Supporting Desertification in Africa: Lessons for South Korea's Foreign Aid Policy." *International Development Cooperation Review* 2(2): 95-126. [In Korean]
- Jo, H.K., Park, H.M. and Kim, J.Y. 2014. "Agroforestry Strategies Reflecting Residents' Attitudes in a Semi-arid Region—Focusing on Elsentsarhai Region in Mongolia." *Korean Journal of Environment and Ecology*. 28(2): 263-269. [In Korean]
- Kang, M.K. 2008. *Study on the Performance Analysis and Developmental Direction of Korea's Tree Planting Aid Projects in Mongolia*. Master's thesis. Kookmin University. [In Korean]
- Kaupi and Pekka E. 2013. "Foreign aid and sustainable forestry." United Nations University. WIDER Working Paper No. 2013/109.
- Keum, K.Y. and Kim, M.S. 2014. A Study Approach to Raising the Revisit Rate of Foreign Inbound Tourists in Korea: An Introduction to the Concept of Basic Tourism Environment. *Tourism and Leisure Research* 26(5): pp.5-21. [In Korean]
- Kauppi, Pekka E. 2013. "Foreign aid and sustainable forestry." United Nations University. WIDER Working Paper No. 2013/109.
- Korea Forest Research Institute. 2004. Causes and Countermeasures of the Desertification in Northeast Asia. Conference for the International Development Cooperation in Agriculture and Forestry, 13 Nov. 2013, Seoul. [In Korean]
- Korea Forest Service. 2012. *Plan for the Second Half of the Greenbelt Plantation Project in Mongolia*. Korea Forest Service. [In Korean]
- Korea Forest Service and Korea Forest Research Institute. 2013. *Standard Carbon Sequestration of Major Tree Species*. [Newsletter]. Korea Forest Service and Korea Forest Research Institute. [In Korean]
- Kwak, S.S. 2013. Globalization of Creative Economy: Coexisting Models of Science and Technology Cooperation between Korea and China—Examples of Cooperation in Biotechnology to Combat against the Desertification. Seminar on the Globalization of Creative Economy, 18 June 2013, Seoul. [In Korean]
- Kwon, Y. 2013. *Korea's Multilateral Aid: Recent Development and Future Challenges*. Korea Institute for International Economic Policy. [In Korean]
- Lee, D.S., Heo, J. and Jeong, S.E. 2011. *Evaluation of International Cooperation Projects in Agriculture and Rural Development*. Korea Rural Economic Institute. [In Korean]
- Lee, D.S., Seok, H.D., Heo, J. and Jeong, S.E. 2014. *Evaluation of the ODA Project of Greenbelt Plantation in Mongolia*. Korea Rural Economic Institute. [In Korean]

- Lee, S., Min, K., Koo, J., Lee, S., Kwon, J. 2015. *A Study for Korea International Development Cooperation Strategy in the Forestry Sector*. Korea Rural Economic Institute. [In Korean].
- Munkhgerel, A. 2013. *A Study on the Marketing Strategy for the Revitalization of Mongolian Tourism*. Master's Thesis. Mokpo National University. [In Korean]
- Northeast Asian Forest Forum. 2006. *Establishment of the Masterplan for the Greenbelt Project in Mongolia*. [In Korean]
- OECD/DAC Secretariat. 2013. *Aid in Support of Environment*. [Online]. [Accessed 9 March 2016]. <<https://www.oecd.org/dac/stats/47792813.pdf>>.
- OECD/DAC. 2008. *Measuring Aid to Forestry*. [Online]. [Accessed 17 March 2016]. <<https://www.oecd.org/dac/stats/41699327.pdf>>.
- Park, S.Y. 2009. *Project Planning, Monitoring and Evaluation Handbook*. Korea International Cooperation Agency. [In Korean]
- Seki, Y. 2001. "The political ecology of the Philippine reforestation program: ODA, government, and local people." *Philippine Political Science Journal* 22(45): 79-96.
- Subak, S. 2000. "Forest protection and reforestation in Costa Rica: Evaluation of a clean development mechanism prototype." *Environmental management* 26(3): 283-297.
- Tanaka-Oda, A., Kenzo, T. and Fukuda, K. 2009. Optimal germination condition by sulfuric acid pretreatment to improve seed germination of *Sabina vulgaris* Ant. *Journal of forest research* 14(4): 251-256.
- World Bank. 2004. *Sustaining Forests: A Development Strategy*. Washington D.C.—.
2012. *Country Partnership Strategy for Mongolia for the Period FY 2013-2017*. [Online]. [Accessed 17 March 2016]. <http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2012/04/27/000333037_20120427010240/Rendered/PDF/675670CAS0P1250Official0Use0Only090.pdf>.
- OECD Creditor Reporting System <www.oecd.org>.
- ODA Korea <www.odakorea.go.kr>.

Date Submitted: Oct. 4, 2016

Period of Review: Oct. 14~Dec. 12, 2016