

Republic of South Sudan

FY2021 Ex-Post Evaluation Report of Technical Cooperation Project  
“Project for Capacity Development in Solid Waste Management in Juba”

External Evaluator: Yoshiko Ogawa, IC Net Limited

## 0. Summary

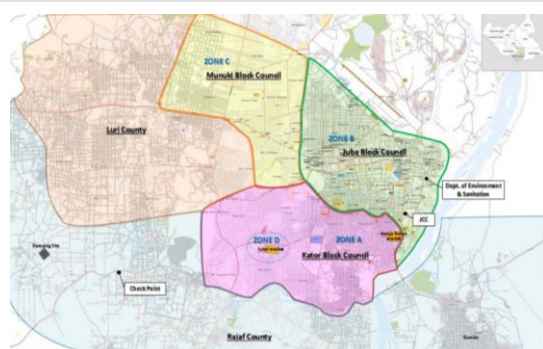
The Project for Capacity Development in Solid Waste Management in Juba (hereinafter referred to as the “project”) was implemented to realize the Project Purpose to establish the basic structure of solid waste management in Juba City, with the Overall Goal that Juba City Council becomes able to conduct solid waste management based on a plan. At the time of planning, there was no structure to manage solid waste in Juba City and solid waste in the city was an environmental and health problem. The importance of solid waste management was recognized in legal documents, as stipulated in the *Local Government Act* and the *Environmental Protection Bill* that the local governments were responsible for solid waste management. Thus, the project was consistent with the development policies and needs of South Sudan. The project was also consistent with the Japan’s ODA policy, which indicated “support to the improvement of basic living” as one of its major areas of assisting South Sudan. Moreover, that the project aimed to improve people’s lives just after the internal conflicts, and that the project carefully proceeded with pilot activity target areas selection so as not to let people feel unfairness between different tribes and communities was an appropriate approach for a project implemented in a conflict-affected country. Although on a small scale, the project conducted collaborative activities with other JICA and non-JICA projects, and played a mutually complementary role to other donors. Therefore, the project’s relevance and coherence are high. The project facilitated the implementation of pilot activities to collect garbage from markets and residential areas and improve the final disposal site and its management, through which the government officials, the counterparts (C/Ps) of the project, gained the basic capacity for regular garbage collection, transport and treatment, and solid waste management. Furthermore, the Department of Environment and Sanitation (DES) of Juba City Council in charge of solid waste management was established; thus, the Project Purpose to formulate the basic structure of solid waste management was achieved. However, owing to the major conflicts in December 2013 and July 2016,<sup>1</sup> which was an external factor to the project, after the completion of the project, regular waste management activities introduced by the pilot activities were interrupted and garbage

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<sup>1</sup> In December 2013, clashes between the presidential guards occurred and conflicts spread and continued across the country. In August 2015, the Agreement on the Resolution of the Conflict in the Republic of South Sudan (ARCSS) was signed and the Transitional Government of National Unity was formed in April 2016. However, another clash between those on the president side and the vice-president side flared in Juba in July 2016, which caused continuing conflicts nationwide. In August 2018, the Revitalized Agreement on the Resolution of the Conflict in the Republic of South Sudan was signed and the Revitalized Transitional Government of National Unity was formed in February 2020. Meanwhile, a presidential decree increased the number of states from 10 to 28 in 2015, and in 2017, it further increased to 32. In February 2020, it was decided to return to the 10-state structure and these changes affected management of local governments and their human resources allocation.

collection became irregular. Although the solid waste management plan developed by the project was partially undertaken, the achievement level of the plan, which aimed to continue and expand the regular garbage collection system, was low because of the breakdown of equipment such as garbage collection vehicles and the interruption of a project plan to replace equipment. Although the establishment of the basic structure leading to sustainable solid waste management can be taken as an impact of the project, the Overall Goal was achieved partially and effectiveness and impact are moderately low. The project cost exceeded the plan to some extent, but it is justifiable as the increase in the cost was mainly for the additional supply of a bulldozer indispensable to the final disposal site. The project period was as planned and the efficiency of the project is high. Concerning sustainability, after the completion of the project, the solid waste management system introduced by the project has not been implemented; thus, there is concern on the sustainability of technical capacity. Regarding equipment such as garbage collection vehicles, only a few vehicles are operational because of malfunction. This indicates that there are issues in operation and maintenance (O&M). Financially, there is certain revenue but it is not sufficient to cover all solid waste management needs, and there are issues in the fund management system and revenue increase. Because of such ineffective solid waste management, the population faces environmental problems such as garbage burning and bad smells in the city as well as the final disposal site. Future improvement can be expected in the aspect of policy and system, and regarding the institutional and organizational aspect, the foundation of continuing operation has been formed. However, in the technical, O&M, financial, and environmental and social aspects, some issues are observed and the sustainability of the project effects is moderately low. In light of the above, the project is evaluated as partially satisfactory.

## 1. Project Description



Project Location<sup>2</sup>



Garbage collection in Juba City  
(June 13, 2022)

<sup>2</sup> JICA and Yachiyo Engineering Co., Ltd. (2018) Data collection survey on solid waste management in Juba Republic of South Sudan: final report, p.9.

## 1.1 Background

In Juba City, which became the capital in 2011 after the independence of South Sudan, its sanitation and living environment were worsening because of the population increase resulting from rapid urbanization and economic development, and an increase in solid waste from households and commercial establishments. However, Juba City Council had neither a solid waste management system nor a solid waste management plan. Illegal dumping was a serious problem and heaps of garbage in the city negatively affected the health and environment of people in such aspects as bad smell, insect pests, and the risk of contracting infectious diseases. The local government occasionally sent garbage collection vehicles but disposed of the collected waste in a hole at the disposal site without treatment such as soil cover and compaction. Collected waste was also dumped along the access road leading to the disposal site. This hindered the use of the site. Moreover, Juba City was just established in March 2011 and became the capital city in July 2011 following the independence of South Sudan. Therefore, for Juba City Council to be able to provide a public service, which was solid waste management in this case, it was necessary to establish a basic structure and build the capacity of relevant staff members.

## 1.2 Project Outline

Overall Goal	Juba City Council will conduct solid waste management based on the “Solid Waste Management Plan in Juba.”	
Project Purpose	Basic structure of solid waste management in Juba is formulated.	
Output(s)	Output 1	Solid waste management in model markets in Juba is improved.
	Output 2	Solid waste collection in model areas in Juba is improved.
	Output 3	Fundamental landfill operation and management system is established in Juba.
	Output 4	“Solid Waste Management Plan in Juba” is drafted by “Juba Solid Waste Management Group.”
Total cost (Japanese Side)	384 million yen	
Period of Cooperation	October 2011–October 2014	
Target Area	Juba City (3 Payams, <sup>3</sup> that is, Juba town, Kator, and Munuki Payam), and the final disposal site in Rejaf Payam, Juba County	
Implementing	Ministry of Environment (Republic of South Sudan: RSS),	

<sup>3</sup> Payam was the name of the administrative sub-division under a city or county. Juba City had Juba Town, Munuki, and Kator Payam. These payams are now called “Block.” Blocks are further divided into Quarters and Quarter Councils (QCs) are the smallest administrative unit. Men and women QC members work on not only solid waste management but also health and other development activities and liaise between each Block and residents, on a volunteer basis.

Agency	Juba City Council, Juba County
Other Relevant Agencies/ Organizations	Ministry of Health, Ministry of Housing and Physical Planning, Ministry of Finance and Economic Planning, Ministry of Environment (Central Equatoria State: CES)
Consultant in Japan	Yachiyo Engineering Co., Ltd.
Related Projects	<p>&lt;Technical Cooperation&gt;</p> <p>Data collection survey on solid waste management in Juba (2017–2018)</p> <p>Preparatory survey for the project for improvement of solid waste management in Juba (2020–2021)</p> <p>Preparatory survey for the Juba clean city project (2021)</p> <p>&lt;Grant Aid&gt;</p> <p>Project for improvement of solid waste management in Juba (E/N October 6, 2021)</p>

### 1.3 Outline of the Terminal Evaluation

No terminal evaluation was conducted. The following are relevant parts from the project completion report.

#### 1.3.1 Achievement Status of the Project Purpose at the Terminal Evaluation

The project completion report has a section on achievement of outputs, but it does not give a clear description of evaluation for the Project Purpose and the level of achievement of each output. Nonetheless, the overall description of the report seems to have concluded that the indicators of each output had been fulfilled.<sup>4</sup>

#### 1.3.2 Achievement Status of the Overall Goal at the Terminal Evaluation (including other impacts)

There is no description of the prospects for achievement of the Overall Goal in the project completion report.

#### 1.3.3 Recommendations from the Terminal Evaluation

The following are excerpts from the “recommendations to achieve the Overall Goal” in the project completion report.<sup>5</sup> Among the recommendations, “(2) collection of disposal fees at the final disposal site and part of garbage collection fees” has been continued until the time of the ex-post evaluation. Other recommendations were not realized, although some efforts were made to

<sup>4</sup> A presentation material prepared by a consultant dated July 11, 2013, describes the situation at that time as exceeding the expected level of Project Purpose achievement based on outputs. The level of the project’s achievement was placed between the Project Purpose and Overall Goal.

<sup>5</sup> Others are not included here because they are more of lessons learned from the project than recommendations.

implement them during the project period, affected by the conflicts in 2013 and 2016 to some extent.

- (1) Institutional and organizational strengthening: it is desirable to establish a practical and unified organization<sup>6</sup> after gaining solid waste management experience. Laws on solid waste management need to be enacted as soon as possible.
- (2) Securing funds: a collection of disposal fees and garbage collection fees should be established. The budget must be secured based on an activity plan. Expenses for solid waste management should be shared in the tax system.
- (3) Collection of data on solid waste collection, transport, and treatment: C/Ps should collect and update these data.
- (4) Improving the collection system to cater to large volume dischargers:<sup>7</sup> C/Ps who gained how to do it should expand the collection activities.
- (5) Improvement and appropriate management of the final disposal site: it is necessary to find a way to reduce the cost of rental of heavy equipment for soil cover because this cost occupies a major part of the O&M expenses. It should be discussed how to secure a construction budget for the disposal site with the support of the Ministry of Environment in receiving subsidized funds from the national government. It is needed to employ staff who can design a disposal site and make a disposal plan. Let the site manager participate in a training course in Japan so that he/she can share the training contents with other staff members.

## **2. Outline of the Evaluation Study**

### 2.1 External Evaluator

Yoshiko Ogawa (IC Net Limited)

### 2.2 Duration of Evaluation Study

This ex-post evaluation study was conducted with the following schedule.

Duration of the Study:                      October 2021–October 2022

Duration of the Field Study:              January 23–February 11, 2022

June 1–15, 2022

### 2.3 Constraints during the Evaluation Study

That the ex-post evaluation was conducted seven years after the project completion brought difficulties in obtaining some records from the sites, materials on the project costs, etc. Many staff members involved in the project have been transferred within the city for multiple times; a few

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<sup>6</sup> There was a plan to establish an SWM company (Solid waste management company) and the project formed a preparatory committee and held committee meetings. After the conflict in 2013, the plan was abandoned.

<sup>7</sup> Hotels, restaurants, offices of NGOs and international organizations. DES signs individual contracts with them.

of them transferred outside the city. Some pilot activity areas have new staff members and it was difficult to obtain a record of the history of the solid waste management activities in each pilot area. These constraints made only a few quantitative data available and the ex-post evaluation largely relied on qualitative data such as those from reports and interviews of stakeholders. During the field study, the evaluator was not able to visit Rejaf Payam, a suburb of Juba City, where the final disposal site was situated, because of a security concern. Thus, staff members of the disposal site were invited to Juba City for interviews.

There was another constraint regarding the Project Purpose and its indicators: they do not indicate what level of capacity for solid waste management the project aimed at. Thus, evaluating achievement of the Project Purpose required, in addition to looking at the achievement of indicators, inference of the level aimed by the project based on the situation before the project implementation and project activities so that achievement is evaluated against such inferred level.

### 3. Results of the Evaluation (Overall Rating: C<sup>8</sup>)

#### 3.1 Relevance/Coherence (Rating: ③<sup>9</sup>)

##### 3.1.1 Relevance (Rating: ③)

##### 3.1.1.1 Consistency with the Development Plan of South Sudan

Table 1 presents development policies relevant to solid waste management at the time of planning and the end of the project. Just like the second chapter of the *Environmental Protection Bill of the Southern Sudan Government* (2010) clearly stating the right of the citizen to a clean and healthy environment, all policies recognize the importance of solid waste management. The *Local Government Act* (2009) and *National Environmental Bill* (2015) stipulate that the local governments should take charge of the responsibility for solid waste management. The *National Environmental Bill* (2015) clarifies the responsibility of businesses and individuals for no illegal dumping and cost bearing.

Table 1: Solid waste management-related policies at the planning and the end of the project

Phase	Names of policies and laws	Main points
Planning	<i>National Plan for Environmental Management</i> (2009)	Solid waste management strategic plan for Northern and Southern Sudan. 19 programs specifically prepared for Southern Sudan (improvement of the solid waste management law system, pollution prevention, etc.) were included.
	<i>Local Government Act</i> (2009)	This stipulates that solid waste management is part of the public services by local governments (Part IV, Appendix III).

<sup>8</sup> A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

<sup>9</sup> ④: Very High ③: High, ②: Moderately Low, ①: Low

	<i>Environmental Protection Bill</i> (2010) (Government of Southern Sudan)	Chapter 10, ‘Solid Waste’ stipulates the responsibility of all citizens for solid waste management though the chapter mainly takes up hazardous waste.
End of the project	<i>National Environment Bill</i> (2015)  <i>National Environment Policy</i> (2015-2025)	Section 32, Chapter 5, ‘Waste management and sanitation’ stipulates the responsibilities and actions to be taken by the ministry, local government, private enterprises, and individuals.  Section 1, Chapter 4, ‘Waste management and sanitation’ states that solid waste management is a major public health and environmental challenge.

(Prepared by the External Evaluator based on policy and law documents and JICA internal materials)

### 3.1.1.2 Consistency with the Development Needs of South Sudan

There was no organization in Juba City responsible for solid waste management and garbage was thrown around roadside, markets, and waterways. Only when heaps of garbage grew too big, the government rented a car to collect garbage. Because of this inappropriate and insufficient waste management, scattered garbage in Juba City became an eyesore as well as a sanitary problem. A survey result showed that 95% of the residents in Juba City had never received waste collection services.<sup>10</sup> Garbage was not only a problem in good appearance and sanitation but also affected economic activities when piling up in markets and along the roadside, and the establishment of a waste management system was needed.

During the project implementation, the waste collection was improved through its pilot activities. However, the area covered by the pilot activities was only a limited area in the city<sup>11</sup> and much of the solid waste management needs of Juba City were left unmet.<sup>12</sup> Further increase in the population of Juba City and the resulting increase in solid waste management needs were anticipated. Thus, the need for solid waste management had been high throughout the planning to the end of the project.

### 3.1.1.3 Appropriateness of the Project Plan and Approach

#### (1) Meaning of the project implemented during the reconstruction from the conflicts

The project started with a focus on the improvement of citizens’ lives among various development needs. It was recognized that, when people saw their homes, surrounding areas, and the city becoming clean with their own eyes, this may make them feel peace and nurture their

<sup>10</sup> AWEPA International (2010) No Time to Waste: Sustainable Environmental Management in a Changing Southern Sudan. p.11.

<sup>11</sup> The target areas of the pilot activities were two out of about 20 markets and four out of 58 QCs.

<sup>12</sup> The garbage collection rate of Juba City in 2015 was estimated at less than 20% (project outline of the project for improvement of solid waste management in Juba, 2016).

trust in solid waste management as a public service.<sup>13</sup> This was in line with the notion of a peace dividend that people feel after a conflict and the legitimacy of a government. Thus, it can be said that the project was appropriately selected as a project for the reconstruction period after a conflict.

(2) Prompt action taken for improvement of the project implementation structure and restructuring in the time of emergency

The project took flexible and prompt action to avoid confusion in its chain of command to set up a structure to ensure smooth implementation of the project. At the beginning of the project, a long-term expert was dispatched as a chief advisor and, in parallel, three short-term experts (consultant team) were to make business trips to perform their tasks. This arrangement was made to provide C/Ps with continuous capacity development support because, if experts would shuttle and visit to stay for a limited period only, the project would not be able to sufficiently build the capacity for waste management, starting from a zero level. However, while the long-term expert was young as chief advisor, the leader of the short-term experts had specialized knowledge and long experiences in solid waste management, which led to C/Ps' confusion about the chain of command. Both C/Ps and Japanese experts raised this issue and the implementation structure was modified; afterward, the long-term expert worked as part of the consultant team and the leader of the consultant team became chief advisor. This prompt change in the implementation structure, just six months after the start of the work of the consultant team, helped to set up a structure for smooth implementation at an early stage.

After the conflict in December 2013, the long-term expert was evacuated and the short-term experts stopped traveling to South Sudan. Even then, the Juba Solid Waste Management Group (JSWVG)<sup>14</sup> weekly meetings were held to discuss issues, and when it was difficult to solve an issue among themselves, the discussion was continued together with Japanese experts. Two local staff members arranged meetings and took minutes, liaising with the Japanese experts and contributing to the remote follow-up activities of the Japanese experts. Activities outside the country were also implemented such as the finalization of the solid waste management plan in Uganda to present at the Joint Coordinating Committee meeting held in Uganda. It is plausible that the project took such timely actions to set up a supporting structure while respecting implementing agencies' initiative and minimizing the influence of the conflict, according to the emergency situation.

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<sup>13</sup> During the field work of the evaluation, the Evaluator tried to find evidence for strengthened trust of the people to public services; however, perhaps because of its abstract nature, she was unable to obtain clear answers. However, the fact that the relationship between residents and shop owners in residential and market areas, QCs, and government officials who were in direct contact with them improved, and that the people who had not known public service itself started demanding provision of solid waste management service (see (1) in 5.1.1) may be an indication of a small but important step toward building trust in public services.

<sup>14</sup> The group consisted of the Ministry of Environment/RSS, Juba City Council, Payams, the final disposal site, staff members of the state governments. They gained understanding on solid waste management and activities through discussion on solid waste management.



### (3) Modification of the PDM

Formulation of the Project Design Matrix was done without setting detailed indicators and activities. Instead, it took an approach to add details of the PDM such as indicators, as the project implementation proceeded and the situation became clearer. It was an appropriate approach when the PDM needed to be formulated without clear data on basic statistics such as the population in Juba City, and information on C/Ps' capacity and implementation structure. Nonetheless, the last version of the PDM, version 3 in June 2013, has a few ambiguous indicators. For example, the indicator for the Overall Goal, which is "At least 10% of the projects on the 'Solid Waste Management Plan in Juba' will be implemented," did not specify on what basis the contents of "10%" could be identified (see 3.2.2). The Project Purpose, which is "Basic structure of solid waste management in Juba is formulated," had two indicators: ① improvement of capacity assessment scores, and ② implementation and continuation of regular garbage collection service. These specified neither improvement to what extent was expected, nor the coverage of the collection service. Thus, the PDM does not help clarify what level of capacity development the project aimed at. It is certainly not easy to set goals such as an Overall Goal while foreseeing the future; however, it would have been necessary to consider modification of the indicators during the project.

### (4) Selection of the target areas of the pilot activities

In South Sudan where relationships between diverse ethnic groups are complex, the project needed to avoid any risk of causing a sense of unfairness among such groups. Thus, when selecting the target area for the pilot activities, the project gathered information on ethnic groups in the short-listed areas but found no ethnic problems.

After confirming that there was no ethnic problem, the project selected the target areas based on the criteria that could facilitate the implementation of the pilot activities, such as good access to the main road and the existence of supportive leaders in the communities and markets. These criteria were set with an emphasis on finding the areas that were likely to bring successful experiences because it was envisaged to expand solid waste management activities outside the pilot activity target areas based on such success. Thus, the selection process was consistent with the purpose of the pilot activities and appropriate to the project. For the areas not selected for the pilot activities, the project team carefully explained that the pilot activities would be expanded in the future, to avoid the risk that people in non-target areas would feel shortchanged during the project.

### (5) Risk analysis

At the time of planning of the project, it was concluded that a large investment would be too risky because the security situation there was still precarious. Therefore, to avoid risks, the plan

was made to start with small-scale pilot activities, and gradually expand undertakings.

### 3.1.2 Coherence (Rating: ②)

#### 3.1.2.1 Consistency with Japan's ODA Policy

The Ministry of Foreign Affairs of Japan's rolling plan for the Republic of South Sudan in October 2011, around the time of planning of the project, referred to "support to the improvement of basic living" as one of its major assistance areas. The plan showed the policy to address development issues on water and sanitation by administrative capacity development for waste management in the Capital City, Juba. The project aimed to improve the sanitation and environment of Juba City through administrative capacity development and was consistent with Japan's ODA policy.

#### 3.1.2.2 Internal Coherence

Although cooperation with other JICA projects in South Sudan was not contemplated at the time of planning, information exchange with other JICA projects during the project brought cooperation between projects. The Ministry of Physical Infrastructure (MoPI)/CES that was in charge of the construction and repair of roads in Juba City, JICA's "Technical Cooperation Project for Capacity Development on Sustainable Road Maintenance and Management in Juba" (2011–2014) supporting MoPI, and Juba City Council together conducted a clean-up activity along the riverbed under the bridge constructed with the support of JICA's Grant Aid. Regular garbage collection from the area near the bridge was also started. These resulted in reduced illegal dumping into the river. As shown above, it was confirmed that there was a cooperative relationship and collaboration between the projects, but such cooperation did not lead to the realization of synergistic effects.

#### 3.1.2.3 External Coherence

At the time of planning of the project, other organizations such as the United Nations Environment Programme (UNEP) and CESVI,<sup>15</sup> an NGO, provided support in the area of solid waste management. UNEP supported clean-up campaigns, awareness raising activities targeting residents, and the development of an environmental law, while CESVI conducted environmental education and awareness raising activities targeting residents.

During the project implementation, the project convened stakeholder meetings<sup>16</sup> once a month to regularly exchange information, inviting stakeholders including UNEP and NGOs. There were

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<sup>15</sup> An Italian NGO named *cooperazione e sviluppo*.

<sup>16</sup> The meetings were held once a month, chaired by a Juba City Council staff member in charge of solid waste management, as part of the project activities. Project progress was reported to the meeting and information was exchanged among the organizations. The members included government organizations such as ministries related to solid waste management, JICA experts, international organizations, NGOs, private businesses, and chambers of commerce.

no overlapping activities among stakeholders and they worked supplementarily. While JICA supported the construction, operation, and management of the final disposal site, UNEP compiled a guideline for waste pickers in the disposal site; both supported the disposal site from different aspects. The project also worked with the Japan Self-Defense Forces (JSDF) seconded to the United Nations Mission in the Republic of South Sudan in improving the access road to the final disposal site, expanding construction of the disposal site, and clean-up activities in the city. During disposal site expansion work, a JSDF bulldozer was used to construct embankments. A media tour was conducted at that time, which contributed to presenting the All-Japan approach to the people of South Sudan although it was a one-off event. As seen above, the project was in loosely cooperative relationships with other donors and implemented concrete cooperation with the JSDF to improve the final disposal site. However, no synergistic effects that could strengthen the achievement of the outputs, Project Purpose, and Overall Goal of the project were found.

The project was consistent with the development policies and needs of South Sudan, and Japan’s ODA policy. The planning and approaches of the project were appropriate although some ambiguity remaining in the PDM made unclear what the project aimed at. The relationship with other JICA projects and donors was complimentary and there were some cooperative activities. Therefore, the project’s relevance and coherence are high.

### 3.2 Effectiveness and Impact<sup>17</sup> (Rating: ②)

#### 3.2.1 Effectiveness

##### 3.2.1.1 Achievement of Project Purpose

The Project Purpose was “Basic structure of solid waste management in Juba is formulated”<sup>18</sup> (see Table 2). Based on the two indicators and project implementation status, it is concluded that the Project Purpose was achieved. The reasons for this conclusion are as follows.

Table 2: Achievement of Project Purpose

Project Purpose	Indicator	Actual
Basic structure of solid waste management in Juba is formulated.	① Result of capacity assessment for C/P staff is improved.	The second year’s average score was 2.4, which improved from that of the first year, 2.0.
	② Periodic cleaning service is continuously implemented.	Although affected by collection vehicle breakdown and the conflicts, pilot activities continued regular garbage collection.

<sup>17</sup> When providing the sub-rating, Effectiveness and Impacts are to be considered together.

<sup>18</sup> The Project Purpose does not give details to clarify what it aimed at was a structure that could cover whole city or fixed-time fixed-point collection. However, considering the situation prior to the project, that is, there was no organization to take charge of solid waste management, and C/Ps’ skills and capacity to manage fix-time fixed-point system were developed for the first time through the pilot activities, it can be inferred that the Project Purpose, that is “basic structure of solid waste management,” meant establishment of a system to implement solid waste management activities, and acquisition of basic understanding and skills based on practice to expand application of the solid waste management model in Jube City in the future. The evaluation was conducted based on the understanding above.

(1) Indicator ①: Capacity assessment

The capacity assessment mentioned in Indicator ① is a self-assessment done by 15 C/Ps from the Ministry of Environment of the Republic of South Sudan, Juba City Council, 3 Payams in the City, and Rejaf Payam in the first and second year of the project. The assessment had six categories: A) management capacity, B) sense of responsibility and will to perform their tasks, C) technical knowledge and skills necessary for the planning of solid waste management, D) technical knowledge and skills about solid waste management system, E) technical knowledge and skills for disposal site management, F) technical knowledge and skills on environmental education and awareness raising activities. The result showed a higher average score in the second year than in the first year. Examined by affiliated organizations of the respondents, the assessment result in the second year showed that the respondents tended to achieve relatively higher scores in the categories relevant to the tasks for which their affiliated organizations are responsible. For example, the staff members from Rejaf Payam where the final disposal site was located scored higher in category E) compared to others. This may indicate the reliability of the assessment to some extent and it can be said that Indicator ① was achieved.

(2) Indicator ②: continuous regular cleaning services

Indicator ② was to assess the management capacity more objectively, examining if C/Ps became able to continue periodic cleaning services. Cleaning service is a series of activities including garbage collection, transport, and treatment. The ex-post evaluation examined if such a service was continuously implemented. As pilot activities, the project collected and transported garbage from markets (Output 1) and residential areas (Output 2) and improved the final disposal site (Output 3) where collected garbage was processed and disposed of. Fixed-time fixed-point collection and transport of garbage from markets (Output 1) and residential areas (Output 2) were conducted following the schedule shown in Table 3 with the support of the Japanese expert team.

Table 3: Garbage collection by the time of the end of the project

(Market)

Market	Payam	Pilot activity starting date	Collection day	JICA collection day
Jebel	Kator	July 2012	Monday through Saturday	Monday
Juba	Juba town	July 2013	Monday through Saturday	Tuesday, Thursday, Saturday

(Residential areas)

Area	Payam	Pilot activity starting date	Collection day	JICA collection day
Atlabara B	Kator	July 2012	Tuesday, Saturday	Tuesday
Atlabara C	Kator	July 2012	Wednesday, Saturday	Wednesday
Hai Thoura	Juba town	October 2012	Tuesday, Thursday	Thursday
Gudele	Munuki	October 2012	Thursday, Friday	Friday

(Source: Project completion report and field interviews)

However, for collecting garbage from the markets and residential areas, the collection was consistent when the project team sent vehicles, but vehicles from Payams, organized by C/Ps, were not always sent as scheduled. The major reason for that was that the second-hand compactors purchased by Juba City Council in 2012 started frequent breakdowns in May 2013. Furthermore, the Japanese long-term expert left the country because of security concerns after the conflict in December 2013, and visits by other experts were suspended. Since then, garbage collection vehicle operation by the project stopped and the Payams were also unable to send vehicles and had difficulty in garbage collection. Nonetheless, around June 2014, Payams started renting vehicles, and garbage collection improved. In May 2014, Kator Payam took the initiative to start garbage collection in the Konyokonyo market outside of the pilot activity scheme. It can be said that, during the pilot activity implementation, overall, regular garbage collection was conducted though some room for improvement remained. According to the stakeholders such as the residents and market union leaders in the pilot activity target areas, their areas became cleaner during the pilot activities than before.

Improvement of the final disposal site (Output 3) was also achieved and contributed to regular garbage collection. The pilot activities set up a controlled dumping system<sup>19</sup> by improving the site, compacting garbage and putting soil cover, conducting water quality and gas tests, collecting disposal fees, and recording incoming vehicles. Open garbage burning at the site was stopped. This achievement went beyond the indicator for Output 3, that is “Operation and management condition of the landfill is recorded constantly.”

As shown above, it is concluded that Indicator ② was also achieved. Incidentally, the categories C), D), and E) of Indicator ① above are about knowledge and skills required to provide regular cleaning service; the achievement of Indicator ② also leads to the conclusion that C/Ps’ knowledge and skills improved.

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<sup>19</sup> It means to fill up a disposal site properly and put soil cover in consideration of environmental influence, not simply dump garbage brought into the site (see *Mundi*, May 2018 issue, special feature article “Challenge to garbage,” footnote).

(3) Additional points to examine on the Project Purpose (management, sense of responsibility as a government officer, basic capacity for environmental education and awareness raising)

As described above, Indicators ① and ② were achieved; however, further examination is needed to conclude that the Project Purpose, that is “basic structure of solid waste management in Juba is formulated,” was fully achieved. Given that the basics of solid waste management of the Project Purpose must mean the basics of the government’s public service, the Project Purpose must include basic capacity not only in practical aspects such as those in Indicator ②, but also in those regarding the institutional organization, finance, and sense of responsibility as a government officer. Because of the expansion of the pilot activities envisaged, the building of organizational and managerial capacity to apply the solid waste management model widely was also indispensable (see footnote 14). The categories A) management capacity, and B) sense of responsibility and will of Indicator ① seem to correspond with such capacity; however, these are eventually self-assessment and insufficient as evidence for actual improvement of capacity for solid waste management. Therefore, A) management capacity and B) C/P’s awareness was examined based on obtained materials and field interviews. In addition, given that it was not possible to implement fixed-time fixed-point collection without the cooperation of the residents and shop owners in the markets, F) environmental education and awareness raising was examined.

Management capacity was examined from both organizational and financial aspects. As an organization to implement solid waste management, the JSWGM was organized and had weekly meetings; through such activities, its members gained an understanding of solid waste management, and communication among the member organizations was facilitated. The group was the main actor in making a roadmap for the continuation and expansion of the solid waste management activities after the project completion, the solid waste management plan (Output 4 in the PDM). This plan was meant to be used, after the project, as a supporting document for an annual budget plan to be submitted to Juba City Council to secure funds. Furthermore, DES was established as a section in charge of solid waste management. The division of work between DES and Payams was clarified. A system to manage solid waste was set up and DES opened its bank account to manage collected fees and expenses. A management system of the final disposal site was also improved; it was expected to cover operational expenses of the site with disposal fees collected from incoming vehicles and the funds were managed in an own bank account. Although the issue of garbage fee collection in the residential areas remained, it can be said that the basic organizational structure for solid waste management was established.

Through these practices, changes in the awareness of C/Ps were observed. They explained solid waste management activities to the residents. They received a complaint from the residents when their work was not on time, and they were thanked when the sanitary condition improved. One C/P himself found that, through such interaction, C/Ps understood the role of public services, and

their sense of responsibility was nurtured.<sup>20</sup>

Environmental education and awareness raising activities were conducted in a variety of ways because their importance was well understood as indispensable work to solicit the cooperation of the residents. As one of the awareness raising activities targeting the residents and markets, meetings were held in the communities and markets to explain the project. In addition, bus tours were planned and conducted targeting government staff, students of primary and secondary schools, and residents to show them garbage collection, transport and treatment operation and facilitate their understanding on solid waste management. Much other awareness raising was conducted such as clean-up campaigns, a drawing design contest for secondary school students, and the production of leaflets about the project activities. C/Ps explained the operation at the disposal site and their work during the community meetings and bus tours.<sup>21</sup> Through implementing these concrete activities, C/Ps seem to have gained an understanding of various methods of awareness raising.

As seen above, it is confirmed that, through the project activities, the indicators and other additional points were mostly achieved and C/Ps improved their understanding and skills regarding solid waste management. In light of the above, including the establishment of an organizational structure for waste management, the basic structure of solid waste management was formulated and the Project Purpose was mostly achieved.

### 3.2.2 Impacts

#### 3.2.2.1 Achievement of the Overall Goal

The Overall Goal of the project is that “Juba City Council will conduct solid waste management based on the ‘Solid Waste Management Plan in Juba.’” An indicator of the Overall Goal is “At least 10% of the projects on the ‘Solid Waste Management Plan in Juba’ will be implemented,” but no document clarifies what “10% of the projects on the plan” meant. Project members interviewed said that there had been no discussion on this point and what was meant is not clear. Thus, while the ex-post evaluation looked at the implementation situation of the activities in the solid waste management plan, it examined if the capacity to implement solid waste management according to the plan, as stated in the Overall Goal, would be identified at the time of the ex-post evaluation, assessing the realization of long-term effects. As a result, it is concluded that the project has achieved its Overall Goal to a limited extent.

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<sup>20</sup> Source: interview with a C/P of Munuki Payam.

<sup>21</sup> Source: a report by the expert in charge of the final disposal site (JICA internal document).

Table 4: Achievement of Overall Goal

Overall Goal	Indicator	Actual
Juba City Council will conduct solid waste management based on the “Solid Waste Management Plan in Juba.”	At least 10% of the projects on the “Solid Waste Management Plan in Juba” will be implemented.	Among 17 items of the short-term activity plan in the plan document, three items related to organizational structure and communication between organizations were started.

First, the indicator of the Overall Goal was examined. In the solid waste management plan, there are short-term activity plans that were supposed to be implemented within about five years after the finalization of the plan and long-term activity plans aiming at completion in 2023. Because the conflict in 2016 made solid waste management activities significantly regress, it is not realistic to assess the current situation against the plans targeting the year 2023. Therefore, the implementation status of the short-term activity plan is used for assessment. Among the 17 items of the short-term activity plan,<sup>22</sup> the following three (about 17% of the 17 items) can be said to have been partially implemented because there are frequent communication and continuing cooperation between Juba City Council and Payams: “to establish communication lines between Juba City Council and each Payam;” “to have regular discussion and supervision between Juba City Council and each Payam;” and “to understand the importance of communication and network.” However, many other items such as those on securing equipment and budget and continuing and expanding regular garbage collection have not been started. Although these activity plans were made on the premise that regular garbage collection would be continued and expanded, as explained above, fixed-time fixed-point collection and waste processing at the final disposal site introduced by the project were not continued and regressed. Thus, it is difficult to say that the indicator was achieved and it is concluded that the indicator of the Overall Goal was only partially achieved.

Next, the ex-post evaluation examined the realization of the long-term effects based on the situation at the time of the ex-post evaluation. At the time of the ex-post evaluation, DES took charge of solid waste management as a responsible organization. Table 5 shows the division of the target areas in the city and those in charge of each area. DES was in charge of markets and large volume dischargers though part of large volume dischargers’ waste was collected by private companies with permission of DES. However, DES was not able to keep the system to collect, transport, and treat garbage implemented during the project time, and after the completion of the project, the fixed-time fixed-point collection and treatment at the final disposal site had not been implemented. The major reason for the discontinuation of the fixed-time fixed-point collection was the breakdown of collection vehicles and disruption of the plan to renew vehicles and

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<sup>22</sup> There are six items for Juba City Council to implement, seven for the Payams, and five for the final disposal site. All these made the total number 18. However, two of them are about communication between Juba City Council and the Payams and their contents are essentially similar. Thus, the total number is regarded as 17 in the evaluation.



equipment including repair tools.<sup>23</sup> After Juba City Council purchased compactors, during the project, the compactors were distributed to each Payam. However, as of November 2013, seven compactors out of 13 were already unfunctional (see Table 6).<sup>24</sup> The garbage collection rate in 2020, putting together Juba City Council and private companies, was only 13%,<sup>25</sup> and both the number of collection points and the frequency were largely insufficient. The following describes to what extent the outputs and project effects after the project completion were maintained, in the order of the organizational structure for solid waste management activities, garbage collection in market areas, garbage collection in residential areas, the final disposal site, and awareness raising.

Table 5: Division of labor in solid waste management activities

Target area	Organization in charge	Fee collection	Management of the collected fees
Along the main roads	DES	None	None
Market	DES	Zone <sup>26</sup>	DES
Large volume discharger	DES	Zone	DES
Residential areas	Block	(Block) <sup>27</sup>	(Block)

(Source: Field interviews)

Table 6: Status of garbage collection vehicles

Type	Number*	Operational vehicles			Frequency of use at the time of the ex-post evaluation
		November 2013	2018	At the time of the ex-post evaluation	
Compactors purchased by Juba City Council	10	6	0	2	Once a day
Compactors donated by UNICEF	3	—	2	1	Once a day
Trucks	2	No information	2	1	Once a day
Tractors	3	No information	1	1	Twice a day

\*The number of vehicles in possession of DES as of 2018.

(Source: JICA report,<sup>28</sup> internal documents, and field interviews)

<sup>23</sup> After the project completion, it was planned to provide equipment such as waste collection vehicles, excavators, trucks and bulldozers with spare parts and repair tools in 2016 under a Grant Aid scheme. But this was disrupted by the conflict in July 2016. Afterward, in October 2021, E/N for a Grant Aid project was signed and finally provision of the equipment and heavy machines for garbage collection, transport and treatment has been decided. This clearly shows that the conflicts brought significant negative influence on the impact of the project.

<sup>24</sup> That the compactors were second-hand seems to have been the main cause of breakdown, but bad road condition and the climate (under high temperature, the body of a vehicle easily gets hot because of waste compaction) were mentioned as factors leading to breakdown. DES had a workshop but spare parts were hard to come by because they needed to be imported. Mechanics' lack of skills added difficulty in repair work.

<sup>25</sup> The Ministry of Environment and Forestry, Central Equatoria State, Juba City Council, Rejaf Payam, JICA project team (2020) Preparatory survey for the project for improvement of solid waste management in Juba in South Sudan, Revised solid waste management plan.

<sup>26</sup> Separate from the administrative sub-division system, DES has divided the city into 5 zones and those in charge of zones are responsible for garbage and fee collection from markets and large volume dischargers. Garbage collection in residential areas is taken care by public health section of the Blocks.

<sup>27</sup> In theory, fees were to be collected and managed by Blocks. However, actually fees were not collected and the expenses for garbage collection are covered by Block budget.

<sup>28</sup> JICA, Yachiyo Engineering Co., Ltd. (2018) Data collection survey on solid waste management in Juba, Appendix,

**Organizational structure for solid waste management activities:** DES established in 2013 was functioning as a department responsible for solid waste management at the time of the ex-post evaluation. In the beginning, it was a small department with only two staff members. Later, the organizational structure of the city was changed and those who worked for waste management were put under DES. At the time of the ex-post evaluation, the number of DES staff members exceeds 300 and its total budget amount for the closing account was comparable with that of the three Payams in Juba City.<sup>29</sup> The JSWMG established by the project has grown into Juba Rejaf Solid Waste Management Group (JRSWMG<sup>30</sup>) in 2017 and the JRSWMG was preparing for a new project at the time of the ex-post evaluation.

**Garbage collection in market areas:** After the conflict in 2013, many shop owners left the country because of the worsening security situation in the markets. Before the number of shops got back to normal, another conflict occurred in 2016 and the number of shops further decreased. For example, most shops in the Jebel market left for other places in and out of the country and the number of shops went down even to 20 at the lowest. In 2018, shops gradually came back to the Jebel market. Because the fee collection from markets was the largest part of DES’s revenue, the decrease in the number of shops was a major blow for DES. Although at the time of the ex-post evaluation, markets pay collection fees, garbage collection in market areas was inconsistent and there was a huge pile of garbage behind the Jebel market. Along the main roads, vehicles dispatched by DES collected garbage thrown by residents and shops nearby.<sup>31</sup>

**Garbage collection in residential areas:** From the time of project completion to the ex-post evaluation, regular garbage collection had not been conducted and Blocks and QCs irregularly collected garbage. Collection fees were not collected and expenses were requested from the Blocks. Sometimes QCs collected funds to rent a collection vehicle. When a Block lacked funds, DES may supplement it, and vice versa. In residential areas, there were piles of garbage everywhere with traces of burning it.



A heap of garbage behind the Jebel market (February 3, 2022)



There is always smoke under the bridge. Atlabara C, Kator Block (February 10, 2022)

**Final disposal site:** The final disposal site improved by the project had been used continuously; however, no soil cover had been conducted since the conflict in 2016.<sup>32</sup> The final disposal site

presentation material ‘Data Collection Survey’ in ‘minutes of kick-off meeting.’

<sup>29</sup> JICA, Yachiyo Engineering Co., Ltd. (2021) Preparatory survey for the project for improvement of solid waste management in Juba in South Sudan final report, Chapter 2, p.5.

<sup>30</sup> In July 2022, the name was changed to Juba Council/County Solid Waste Management Group (JC/CSWMG).

<sup>31</sup> Dumping on the roadside is principally prohibited by ordinance of Juba City Council and subject to fines.

<sup>32</sup> Soil cover was continued and equipment was checked until 2016. The leachate tests were conducted in 2011 and

was especially hard hit by the conflict in 2016; the fence, testing facility, and office building constructed by the project were damaged. The bulldozer provided by the project had its blade broken and became unfunctional. The security situation around the disposal site also got worse; armed groups stayed in the area and demanded tolls from incoming vehicles. While the final disposal site was not used, a new illegal dumping site<sup>33</sup> on the other side of the river Nile in the east of Juba City became in use, and garbage was dumped there. The staff of Rejaf Payam collected fees at this illegal site as well. Around 2018, the use of the final disposal site was resumed. Afterward, the final disposal site or the illegal site was used depending on the distance for transport and access to the final disposal site.<sup>34</sup>

At the time of the ex-post evaluation, garbage was dumped at the final disposal site without being treated. Waste pickers burned dumped garbage and there was a bad smell. The access road to the site was sometimes blocked because of illegal dumping on the road. Fee collection from incoming vehicles was continued and managed by Juba County at the time of the ex-post evaluation.



Left: Access road to the final disposal site which was recently cleaned.  
 Middle: Dumping site of the final disposal site.  
 Right: Current situation of the office building constructed by the project  
 (Photographs by the site manager, June 10, 2022)

**Awareness raising activities:** Through the awareness raising activities of the project, the residents who participated in the pilot activities understood the importance to keep the area clean and how to dispose of garbage, trying not to dump garbage around their homes. They still have such understanding. After the project completion, awareness raising activities such as bus tours and drawing contests organized by the project were not conducted but clean-up campaigns, community meetings, and radio talk shows have been conducted in the Blocks. Nonetheless, because of the influx of new residents, these activities are not sufficient.

As can be seen above, DES established during the project still took charge of solid waste management and the successor group of the JSWGMG worked on coordination of solid waste management activities at the time of the ex-post evaluation. It is plausible that the basic structure for solid waste management built by the project has continued after the project completion and

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2013 by the project, and the government and JICA conducted them in 2014, 2015, and 2016.

<sup>33</sup> Although government staff collected fees, the site was classified as illegal because it was not recognized as a disposal site in the government land use plan.

<sup>34</sup> When garbage dumped along the access road accumulated, vehicles cannot enter the final disposal site.

contributed to the activities that were getting resumed as the political situation became stable. The residents and people in the markets who participated in each pilot activity gained an understanding of garbage disposal and sanitation through the pilot activities and kept their understanding. Awareness raising activities have been continued after the project completion. Nonetheless, that did not suffice. Solid waste management activities have been continued but irregular, and the effects brought by the awareness raising activities in the markets and communities by the pilot activities were largely reduced. In light of the above, only partial achievement of the Overall Goal was identified against the plan.

### 3.2.2.2 Other Positive and Negative Impacts

#### (1) Impact on the natural environment

At the time of planning, the project was classified as category C, with minimum negative environmental impact, based on the JICA Guidelines for Environmental and Social Considerations (April 2004). During the project, no negative impact on the environment was identified and the sanitary environment in the pilot activity target areas improved. After the project completion, as a result of insufficient garbage collection and improper disposal, everywhere in the city, including the pilot activity target areas, many piles of garbage and burning were found. Much garbage is dumped in the waterways, blocks culverts under roads, and damages the roads, resulting in a negative impact on the environment and infrastructure. At the final disposal site, there are bad smells and burning. There has reportedly been no complaint about leachate water quality or gas; however, the disposal site manager said that there was an issue on gas, which is an environmental concern.

#### (2) Other indirect impacts

Before the project started, waste pickers in the final disposal site burned waste to pick up valuables such as metals. Although burning had to be banned to improve disposal site management, the prohibition of burning and the introduction of soil cover could have made it difficult for waste pickers to pick up valuables, leading to their income loss. Therefore, after dumping, waste was not compacted immediately, letting waste pickers take time to pick up valuables so that they could secure income. In this way, the co-existence of the project and waste pickers was managed. This method to collect valuables might not be as effective as burning, but at least they could pick up valuables to secure income.<sup>35</sup>

Many workers who collect garbage are women including many war widows. For example, at the time of the ex-post evaluation, Kator Block had 44 workers of which only 3 were men. While some said that cleaning is a suitable job for women as an extension of housework, others said that

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<sup>35</sup> At the time of the ex-post evaluation, waste was simply dumped in the disposal site and waste pickers burned waste to pick up valuables.

it was because many women needed money. This shows that the need for women’s employment opportunities was recognized. To supplement the meager salary prescribed by the government and secure workers, Juba City Council decided to pay 1,000 South Sudanese pounds<sup>36</sup> per day as an incentive. The payment was made daily so that they could have money at hand to pay for daily needs. In this way, waste management activities have been conducted with consideration for the socially vulnerable, such as waste pickers and widows.

Since this project’s effects were identified only partially against the plan, the effectiveness and impact of the project are moderately low. For the Project Purpose, through the practice of collection, transport, and treatment, C/Ps gained basic knowledge and skills necessary for solid waste management and developed the solid waste management plan for expansion of the work. The Project Purpose was mostly achieved. However, after the project completion, garbage collection became irregular and garbage was dumped untreated; waste management went back to the way practiced before the project. The Overall Goal has been partially achieved; part of the short-term activity plan of the solid waste management plan, such as those to improve organizational structure and communication between organizations, were initiated, while regular garbage collection, recruitment of full-time staff, and purchase of vehicles and heavy machines had not seen progress.

### 3.3 Efficiency (Rating: ③)

#### 3.3.1 Inputs

Planned and actual inputs from Japan and South Sudan for the project are as follows.

<b>Inputs</b>	<b>Plan</b>	<b>Actual</b>
(1) Experts	About 3 Experts (62 MM*) <sup>37</sup>	1 Long-Term (about 26 MM) 7 Short-Term (36.88 MM)
(2) Trainees received	Training in Japan: 5 persons	Training in Japan: 4 persons Third-country training (Bangladesh): 7 persons
(3) Equipment	Vehicles for garbage collection and transport, Truck scale	Bulldozer (320,000 US dollars)
(4) Other overseas operation expenses/local operation cost	Overseas operation expenses: 100 million yen	Local operation cost: 32 million yen
Japanese Side Total Project Cost	310 million yen	384 million yen

<sup>36</sup> This is about 330 yen (based on the JICA exchange rate in January 2022; 1 South Sudanese pound was 0.329600 yen).

<sup>37</sup> The ex-ante evaluation report states “Dispatch of expert (62 MM): Chief Advisor/solid waste management, waste collection, final disposal site management,” without specifying the number of experts.

Republic of South Sudan Side Total Project Cost	<ol style="list-style-type: none"> <li>1. C/Ps</li> <li>2. Land and facilities: facilities necessary for project implementation, meeting rooms, office space for the project experts, the cost for utilities (water, electricity, and gas)</li> <li>3. Tax exemption, and domestic transport and storage cost for equipment</li> <li>4. Salary and allowances for C/Ps</li> </ol>	<ol style="list-style-type: none"> <li>1. C/P 15 persons</li> <li>2. Land for the final disposal site, meeting rooms, office space in Kator Payam office, cost for electricity for the office (April to December 2012), compactors (10), tipper trucks (5), tractors (6)</li> <li>3. Tax exemption</li> <li>4. Salary and allowances for C/Ps (April 2012 to October 2014)</li> </ol>
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\* MM stands for man month.

### 3.3.1.1 Elements of Inputs

#### (1) Dispatch of experts

Although the dispatch of the long-term expert was planned for 36 MM, the duration was shortened owing to evacuation after the conflict in 2013. The team of short-term experts (consultants) had four people at the beginning of the project but three experts (organizational system/finance, final disposal site designing, and geological and groundwater survey) were added to the team in the second year. This addition was to cater to the needs for institutional strengthening of the government for solid waste management and understanding of the impacts of disposal site expansion work and leachate. Thus, it was appropriate addition based on the needs that had emerged as the project progressed.

#### (2) Trainees received

The training in Japan was conducted in January 2013, and the third-country training was in Dhaka, Bangladesh in early December 2013. During the third-country training, practical learning was gained from the successful case in Bangladesh. During the field interviews, those who were trained through the project, training, and workshops said that they gained knowledge and became able to think analytically, showing their confidence in their learning. Their learning was appreciated by other staff members who said that those who joined training understood solid waste management well. Those who did not join training also said that they learned from trained colleagues. Although the current situation does not allow them to fully employ what they had learned, C/Ps highly appreciate the training.

#### (3) Equipment provision

At the beginning of the pilot activities in the final disposal site, the site rented a bulldozer for compaction and soil cover but the rental cost was high and put pressure on management. This caused concern for sustainability. Therefore, after making a long-term cost estimation, the provision of a bulldozer for the project was discussed and decided. The provision of a bulldozer

removed the rental cost and, before the conflict in 2013, the site became able to manage to cover the cost for the disposal site operation with collected disposal fees.

#### 3.3.1.2 Project Cost

The planned project cost of the Japanese side was 310 million yen and the actual project cost was 384 million yen (124% of the planned amount). The actual amount was higher than planned. Information on details of this cost increase was not obtained; however, given that more than 40% of the increase was spent on the purchase of the bulldozer, and that this increase includes additional costs for the final disposal site construction, the third-country training, and project office space rental, this increase seems to be an appropriate one coming from the needs of the project.

#### 3.3.1.3 Project Period

The planned project period was from October 2011 to September 2014, for 36 months. The actual period was from October 31, 2011, to October 31, 2014, for about 36 months (100% of the planned period) within the plan. Completion of the project within the planned period, despite the experience of a serious conflict, was made possible partly by the prompt setup of the remote supporting structure as described in 3.1.1.3 (1) Relevance.

Therefore, the efficiency of the project is high.

### 3.4 Sustainability (Rating: ②)

#### 3.4.1 Policy and System

As policies and laws relevant to solid waste management at the national level, the *Environmental Protection Bill of the Southern Sudan Government* (2010) was enacted, followed by the *National Environment Bill* (2015) and *National Environment Policy* (2015–2025). These stipulate that state and local governments should establish a solid waste management system and the local governments take responsibility for waste collection and treatment, that the Ministry of Environment and state and local governments should conduct environmental education and awareness raising activities, and that businesses and households should pay for solid waste management service. The *National Environment Bill* (2015) and *National Environment Policy* (2015–2025) have not been approved by the national assembly yet, but this is not a problem in the solid waste management area. This delay comes from the political process since 2016 and it is expected to be solved in due course. Thus, the national-level policy and system forming the basis for solid waste management are expected to be improved.

Along with the national policies, Juba City Council issued an ordinance related to solid waste management in 2013 to prescribe maintenance of a sanitary environment in commercial areas,

roads, and public spaces, and to prohibit illegal dumping. The ordinance also clarifies the responsibility of private organizations including households and private enterprises for cleaning up and also prohibits dumping of garbage on the roadside and open spaces. At the time of the ex-post evaluation, the city was in the process of revising penalty regulations to make them stricter, reflecting on new environmental standards and economic situation. Rejaf Payam, which has the final disposal site, also issued a similar ordinance in 2016. Thus, there is a legal structure to support the sustainability of solid waste management activity at both the national and local government levels.

#### 3.4.2 Institutional/Organizational Aspect

Solid waste management of Juba City is taken care of by DES. DES has divided the city into five zones for solid waste management and assigned a zonal coordinator who supervises zone-level work, public health officers, environmental officers, supervisors, rate collectors, guards, the police, and workers<sup>38</sup> for solid waste management work in each zone and collects waste except for that from residential areas. Each zone collects fees and conducts waste collection, and has to report to the Director of DES. Operational budget requests are made to DES which manages funds. The division of labor and chain of command within DES is clear and it is expected that DES should continue to fulfill its function. Waste collection in residential areas is under the responsibility of the Blocks. Although there is still a need for an increase in staff and budget to expand the solid waste management activities to the whole city, it can be said that the basic organizational structure is established.

The final disposal site and illegal dumping site on the east side of the river Nile are under the management of Rejaf Payam. The site manager is to report to the Rejaf Payam Director, and the director reports to Juba County. The line of reporting for supervision is clear and reporting is made regularly.

It is the Ministry of Environment/CES that should supervise the solid waste management activities of these local governments. The JRSWMG, consisting of the Ministry of Environment/RSS, the Ministry of Environment/CES, DES, three Blocks in Juba City, and Juba County, continues its activities. Afterward, although there must be more need for further coordination to manage a new project and supervise private companies, the JRSWMG is expected to take such a role.

As seen above, while many organizations are involved in solid waste management activities, there is an organizational structure, in which coordination and decision-making are under the JRSWMG and operation is managed by DES. This basic foundation can contribute to

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<sup>38</sup> Although the number of the staff members is different from zone to zone, in total, there are 10 public health officers, 13 environmental officers, 29 supervisors, 47 rate collectors, 22 guards, 18 police officers, and 354 workers under DES. One zone coordinator is assigned to each zone except for E zone directly managed by DES, and the total number of zonal coordinators is 4 (Source: interviews with DES officials).



sustainability of the activities.

### 3.4.3 Technical Aspect

Waste collection following the solid waste management system introduced by the project and waste treatment at the final disposal site have not been implemented since 2016 and this made it difficult to assess the technical capacity and its sustainability at the time of the ex-post evaluation. “If we can secure a sufficient number of collecting vehicles and bulldozers, we can resume the waste management activities in the same way as when the project was implemented because we have the capacity necessary for that” was an assessment of the environment and sanitation advisor to Juba City Council. However, although C/Ps gained a basic understanding of solid waste management by the end of the project, they learned it through the pilot activities conducted only in limited areas. Thus, it may not be easy to cope with an increasing need for solid waste management in the future.

About the final disposal site, the site manager who had fled the country temporarily after the conflict returned in the end of 2021. At the time of the ex-post evaluation, the site manager had started preparatory work for personnel arrangement and repair and maintenance of the bulldozer for the final disposal site. He managed to solicit support from the United Nations to clean the access road; he was proceeding with the preparation, using external resources. He seems to have a basic understanding and technical capacity necessary for disposal site management.

As for all C/Ps, many of those who worked for the project still work in the area relevant to solid waste management even though they experienced transfer, and showed their willingness to contribute to solid waste management even after transfer.<sup>39</sup> On the other hand, in some cases, an administrative staff member without solid waste management experience was appointed as a zonal coordinator of DES but did not have sufficient support and time for handing-over of documents and records. There is room for improvement in the succession of work and knowledge.

Thus, in the technical capacity aspect, it would be possible to continue the current level of solid waste management work with irregular waste collection; however, to meet the unfulfilled needs for garbage collection at the time of the ex-post evaluation and future needs to cope with an increasing amount of garbage, recruitment and training of new staff and re-training of the current staff are required so that they can manage more collection vehicles and more complex vehicle allocation arrangement.

### 3.4.4 Financial Aspect

The major income source of DES is garbage collection fees from large volume dischargers such

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<sup>39</sup> For example, a C/P who worked in Kator Payam during the project and later got transferred to Rejaf Payam, was working for Juba Block at the beginning of the ex-post evaluation. He has been further assigned to the Department of Revenue of Juba City Council as Director and said that he would like to contribute to solid waste management through revenue management.

as hotels and markets, permits for private companies collecting garbage, and fines. At the time of the ex-post evaluation, DES decided on the allocation of personnel and collection vehicles based on the resources at hand coming from such revenue. During the project, a bank account of DES focused on solid waste management was opened to improve financial management. However, this account was not used at the time of the ex-post evaluation, because the former mayor instructed to unite the bank accounts of Juba City Council. Given that some people from hotels and shops complain that they pay fees but do not receive garbage collection service, it would be better to have a separate bank account to ensure independence and transparency of revenue and expense management of DES.

The Blocks do not systematically and regularly collect fees from their residents. It is because that some residents do not have much trust in garbage collection services, and that many residents, including government staff, are poor. Some Blocks tried to collect fees in the past, but it often did not go well. For garbage collection in the Blocks, the public health department of a Block requests a budget for the Block and uses that fund for garbage collection. Further, sometimes DES and Blocks mutually supplement funds to collect garbage, which could be an issue that affects the budget planning of each organization.

As shown above, efforts to secure revenue have been continued. However, the collection and management methods have been changed frequently and are not stable. Furthermore, when private companies enter the solid waste management work, company staff and government staff work together to collect garbage collection fees. This may complicate the flow and management of collected fees.

In light of the above, a certain level of revenue can be secured, but the funds are not enough to meet the solid waste management needs and there are some issues in an increase in revenue and improvement in transparency and planning of the financial management system.

#### 3.4.5 Environmental and Social Aspect

At the time of the ex-post evaluation, there were environmental problems in Juba City due to insufficient solid waste management. There were many piles of garbage in the city, which seriously affected the environment with bad smells and smoke from garbage burning. The garbage piled up and blocked waterways and dirty water stagnated. Garbage in waterways will be washed away downstream during the rainy season, which will cause water pollution problems in a wide area in the lower section of the waterways. This situation will likely deteriorate if solid waste management remains the same. At the time of the ex-post evaluation, there had reportedly been no complaints about the final disposal site and illegal dumping site from the residents in the neighboring areas, but it was reported that there were burning and bad smell. Environmental issues exist as there are also concerns about leachate and gas.

#### 3.4.6 Preventative Measures to Risks

The highest concern in South Sudan is political instability; however, at the time of the ex-post evaluation, the political situation was stable; the National Assembly had been formed and it had started a discussion on the approval of important laws. The laws related to solid waste management were also expected to be approved in due course. No concerns about political or conflict-related risks were expressed by C/Ps.

#### 3.4.7 Status of Operation and Maintenance (O&M)

The project provided the final disposal site with a fence surrounding the disposal site, one office building, 14 degassing holes, and one bulldozer. The provided bulldozer had been unfunctional since the conflict in 2016, but at the time of the ex-post evaluation, it was under repair and maintenance and expected to get functional again. The fence, office building, and degassing holes damaged in 2016 have not been repaired since then. The site manager trained by the project was actively working to proceed with maintenance and management of the site. Thus, the disposal site may be improved if the budget is secured.

The compactors used for the collection and transport of garbage were not provided by the project; however, this section takes up the compactors because their use has a strong influence on the expansion of solid waste management activities of Juba City Council. The second-hand compactors purchased by Juba City Council started frequent breaking down around May 2013. At the time of the ex-post evaluation, the O&M situation was bad; out of 13 compactors owned by Juba City Council, 3 compactors, 1 out of 2 trucks, and 1 out of 3 tractors were functional. At the time of the ex-post evaluation as well, it was difficult to secure spare parts. The lack of skills of the technician of the DES garage was also an issue. Thus, the O&M of collection vehicles is not satisfactory.

In light of the above, regarding the policy/systems and institutional/organizational aspects, although not fully satisfactory, there has been an organizational structure to support continuing solid waste management work. On the other hand, regarding the technical, financial, and environmental and social aspects, the preventative measures to risks, and the O&M status, there are some issues and prospects for improvement are low, which make it difficult to sustain the effects brought by the project. Thus, the sustainability of the project effects is moderately low. Nonetheless, the new Grant Aid and Technical Cooperation projects related to solid waste management have started. These projects plan to provide equipment and heavy machines, establish a management system, and improve the systems of waste collection, transport, and treatment. Prior to that, Juba City Council had also planned to recruit engineers and secure spare parts. Improvement after the start of the new projects can be expected.

## 4. Conclusion, Lessons Learned, and Recommendations

### 4.1 Conclusion

The project was implemented to realize the Project Purpose to establish the basic structure of solid waste management in Juba City, with the Overall Goal that Juba City Council becomes able to conduct solid waste management based on a plan. At the time of planning, there was no structure to manage solid waste in Juba City and solid waste in the city was an environmental and health problem. The importance of solid waste management was recognized in legal documents, as stipulated in the *Local Government Act* and the *Environmental Protection Bill* that the local governments were responsible for solid waste management. Thus, the project was consistent with the development policies and needs of South Sudan. The project was also consistent with the Japan's ODA policy, which indicated "support to the improvement of basic living" as one of its major areas of assisting South Sudan. Moreover, that the project aimed to improve people's lives just after the internal conflicts, and that the project carefully proceeded with pilot activity target areas selection so as not to let people feel unfairness between different tribes and communities was an appropriate approach for a project implemented in a conflict-affected country. Although on a small scale, the project conducted collaborative activities with other JICA and non-JICA projects, and played a mutually complementary role to other donors. Therefore, the project's relevance and coherence are high. The project facilitated the implementation of pilot activities to collect garbage from markets and residential areas and improve the final disposal site and its management, through which the government officials, the C/Ps of the project, gained the basic capacity for regular garbage collection, transport and treatment, and solid waste management. Furthermore, DES of Juba City Council in charge of solid waste management was established; thus, the Project Purpose to formulate the basic structure of solid waste management was achieved. However, owing to the major conflicts in December 2013 and July 2016, which was an external factor to the project, after the completion of the project, regular waste management activities introduced by the pilot activities were interrupted and garbage collection became irregular. Although the solid waste management plan developed by the project was partially undertaken, the achievement level of the plan, which aimed to continue and expand the regular garbage collection system, was low because of the breakdown of equipment such as garbage collection vehicles and the interruption of a project plan to replace equipment. Although the establishment of the basic structure leading to sustainable solid waste management can be taken as an impact of the project, the Overall Goal was achieved partially and effectiveness and impact are moderately low. The project cost exceeded the plan to some extent, but it is justifiable as the increase in the cost was mainly for the additional supply of a bulldozer indispensable to the final disposal site. The project period was as planned and the efficiency of the project is high. Concerning sustainability, after the completion of the project, the solid waste management system introduced by the project has not been implemented; thus, there is concern on the sustainability of technical

capacity. Regarding equipment such as garbage collection vehicles, only a few vehicles are operational because of malfunction. This indicates that there are issues in O&M. Financially, there is certain revenue but it is not sufficient to cover all solid waste management needs, and there are issues in the fund management system and revenue increase. Because of such ineffective solid waste management, the population faces environmental problems such as garbage burning and bad smells in the city as well as the final disposal site. Future improvement can be expected in the aspect of policy and system, and regarding the institutional and organizational aspect, the foundation of continuing operation has been formed. However, in the technical, O&M, financial, and environmental and social aspects, some issues are observed and the sustainability of the project effects is moderately low. In light of the above, the project is evaluated as partially satisfactory.

## 4.2 Recommendations

### 4.2.1 Recommendations to the Implementing Agency

#### **Establishment of a stable solid waste management system (clarity of financial and operational responsibility and allocated tasks in solid waste management activities, and dissemination of information to the residents)**

At the time of the ex-post evaluation, DES and the Blocks shared solid waste management activities, according to the categories of the sources such as large volume dischargers, markets, and residential areas. Moreover, new private companies had just entered in the solid waste management operation and started garbage collection in the assigned areas including residential areas. Although DES is a responsible organization for solid waste management, many other actors, such as the Ministry of Environment of RSS and CES, Juba County, the Blocks of Juba City, and private companies, were involved and formed a complicated structure. There is a concern that it may seem to the residents of Juba City that it is unclear who does what, who collects fees, and who takes responsibility. Fee collection requires people's trust in solid waste management services. To gain their trust, stable implementation of waste management activities and transparent financial management are indispensable. To establish a stable solid waste management system, with the support of JICA's new projects, the following will be needed: to streamline the stakeholders who are involved in solid waste management, in finance and activities to collect, transport, and dispose of garbage, and to clarify responsibility and workflow; to implement stable and regular waste collection; and to continue awareness raising and information dissemination activities for the residents.

### 4.2.2 Recommendations to JICA

None

#### 4.3 Lessons Learned

##### (1) Solid waste management work can contribute to building the trust of people toward public services in a conflict-affected country

At the beginning of the project, C/Ps did not have enough experience in providing public service, and the residents were not used to receiving public service. The government side obtained an understanding of the role of public service through doing solid waste management together with the Japanese project team and seeing what solid waste management does and what outputs are brought. The residents saw the solid waste management activities and resulting cleanliness in the neighborhood and understood that there was a service provided by the government to improve their lives. From this understanding, the residents started demanding service if service is not provided as expected (for example, a garbage collection vehicle did not come as scheduled). The government further understood its role by receiving such demand. Moreover, if public service is provided regularly, trust in the service will be built and this can motivate people to pay collection fees. Government officers will be motivated by feeling that they are trusted and acknowledged. Such a virtuous cycle emerging as a result of mutual interaction has a positive influence on trust building between the government officers and residents in general as well as solid waste management work.

Trust between the government and people in a conflict-affected country tends to be low. Trust in the entire government cannot be built easily or in a short time, but efforts to continue steady and direct interaction and trust building between government officers and residents is important, especially in a conflict-affected country.

##### (2) Continuing awareness raising activities can help residents gain understanding and facilitate solid waste management activities

The residents who were affected by conflicts till recent times and did not know public services tend not to be aware of their right to public services and obligations on their side. Cooperation of the residents is indispensable for effective and efficient solid waste management, but it is not easy to have them take appropriate action (to put garbage in a plastic bag and discharge it properly at fixed time at fixed point, clean the surroundings and pay attention to sanitation). When starting the waste management activities of the project, the Japanese experts and C/Ps gave the residents detailed explanations to facilitate an understanding of the importance of solid waste management. In addition to community meetings, they actively sent messages and conducted awareness raising activities, organizing bus tours for residents to see the activities and clean-up campaigns. The residents who participated in the pilot activities understood how to discharge garbage, sanitation, and what they should do as residents. One C/P regards the promotion for the residents to participate in the activities as an achievement of the project.

However, the pilot activities covered only some of the residents of Juba City. Many new

residents continue to come. The residents as a whole do not have sufficient understanding and some just think that they can do away with garbage by discharging it in waterways and letting garbage washed away during the rainy season. This negatively affects the environment and road maintenance. Against this situation, the government recognizes the need for awareness raising activities. In implementing solid waste management work, it is necessary to solicit residents' participation until their understanding is built. Awareness raising needs to be continuously done along with solid waste management activities so that the contents and effects of the solid waste management work and individuals' responsibility are understood.

### (3) PDM formulation for Technical Cooperation projects in a conflict-affected country

At the time of planning of the project, because there was a serious lack of the information necessary for planning, a flexible PDM was formulated with basic outlines without prescribing all details to make it easy for the project team to make proposals. For example, activities, such as "to conduct a survey and identify issues" and "to design pilot activities," were set so that details of the activities could be proposed and decided as the project proceeded. This was an appropriate approach when there is a lack of basic data and the situation and potential of the implementing agencies were not clearly understood. Actually, an indicator and an implementing agency were added as the project progressed, to adjust the plan according to the actual circumstances. The Project Purpose also matched the actual situation. When formulating PDMs for projects in conflict-affected countries, it would be realistic to set outlines first, as this project did, and make a flexible PDM to which detailed activities and adjustments are added as needed.

On the other hand, it is understandable that work in conflict-affected countries is hectic facing daily happenings, and that it may not be easy to frequently discuss details of the PDM because discussion and process for revision take considerable time and energy. However, especially in conflict-affected countries in a complex and fluid environment, it is important to build a clear consensus on what the project goal is, and how to reach such a goal, among all stakeholders. From the viewpoint of external accountability, it is desirable to formulate a clear PDM matching to an actual situation. For that purpose, review and revision of PDM can be included in the activity plan from the beginning.

## 5. Non-Score Criteria

### 5.1. Performance

#### 5.1.1 Subjective Perspectives (retrospective)

##### (1) Solid waste management as part of nation building (Japanese experts)

At the beginning of the project, there was no full-time person in charge of solid waste management with knowledge and technical capacity for solid waste management. In some cases, those who were recognized for their distinguished service during the civil war were appointed to government posts and they, including C/Ps in the implementing agencies, often do not have experience as government officers. On the other hand, residents were not accustomed to receiving public services and did not have trust in public services.

In this situation, the project expert team implemented the project with the recognition that this is a solid waste management project and, at the same time, an administrative institution-building and nation-building project to build trust in public services by the government through the provision of public service to the people. The expert team emphasized that C/Ps should understand their responsibility to provide service as government officers. At the beginning of the project, the project led garbage collection activities, and through its practice, C/Ps gained knowledge and technical capacity and understood solid waste management activities. The residents also saw garbage collection and understood what public service is, and started demanding the provision of public service, that is, garbage collection in this case. Furthermore, they started to understand that they should pay collection fees to receive the service.

The project also held many community meetings and raised awareness on the importance of garbage collection and a sanitary environment. Through the community meeting process in which C/Ps interacted with the residents to understand and respond to their needs, the project let the residents “train” the C/Ps. During the bus tours conducted as part of awareness raising activities targeting residents, C/Ps showed the residents the activities of garbage collection, transport, and final disposal. This activity also aimed that C/Ps should fully understand and be proud of their work by explaining what they were doing.

As the pilot activities progressed, the residents were happy with the cleaner neighborhood. C/Ps started to be aware of their responsibility and take pride while being thanked by the residents. At the beginning of the project, it was not clear to what extent the project could proceed and what outputs the project could achieve. But in the end, within three years, in such a short time, both C/Ps and the residents could understand public service well.

##### (2) Cooperative relation building between the JICA team and implementation agencies (Japanese experts, JICA staff in charge of the project)

Juba City itself had been just established and the solid waste management activities started with no policies, equipment, staff, and project office space. While many government organizations



were involved in solid waste management, their work and jurisdiction were vertically divided and there was no department in charge of solid waste management.

Therefore, the JSWVG, consisting of the Ministry of Environment/RSS, Juba City Council, the Blocks, the final disposal site, and state government staff, was established and held weekly meetings to develop its capacity as an organization. A group with strengthened organizational capacity can cope with the transfer of its members. The group issued newsletters, which were used by the members to make their reporting to their supervisors easier. The project reported to the Executive Director of Juba County every week. The JICA South Sudan Office also helped keep communication with the old and new mayors, with emphasis on cooperative relationships with the Juba City Council. The project strived to strengthen communication with relevant organizations to deepen their understanding of solid waste management.

Despite such efforts by the project, some stakeholders did not pay much attention to solid waste management activities and the project had difficulty in gaining their support as desired. However, as the pilot activities proceeded, their understanding also deepened. When the project became able to present visible results, for example by organizing an opening ceremony of the improved final disposal site, the leadership and staff members began taking a strong interest. The Minister of Environment, who planned to request the African Development Bank or World Bank to improve the disposal site at the beginning of the project, was very happy with the result of the improvement.

As a result, it became easier to receive cooperation in the implementation of the project.<sup>40</sup> The leaders of the South Sudan side became active in meetings.

### (3) Flexible actions taken under the conflict in 2016 (then Rejaf Payam Director)

With the support of the project, the fence and office building were constructed and recording of incoming vehicles became routine work at the final disposal site. Waste was disposed of properly with compaction and soil cover, and burning stopped. As a result, the site became more hygienic.

However, owing to the conflict in 2016, the office, fence, and all facilities were damaged. The blade of the bulldozer stationed at the disposal site was also damaged. Because there was a risk of further damage to the bulldozer if it had been kept at the disposal site, the Director immediately rent a vehicle that could carry the bulldozer to transport to Rejaf Payam's office. Afterward, the security in the neighboring area of the disposal site deteriorated; the Director contacted commanders of armed groups to get an agreement with continuing waste collection activities to ensure uninterrupted solid waste management.

However, because there were still problems such as the one in which the armed groups illegally

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<sup>40</sup> One C/P attributes provision of the office space in 2013 to this improvement in the relationship.

collect tolls on the way to the disposal site from the drivers of incoming vehicles, the drivers started going to the temporary dumping site on the east side of the river Nile. The Director proposed to use this site as a legal disposal site, but because that area was not recognized as a dumping site according to the Land Use Act, it was kept illegal. An agreement about its use with the residents in the neighboring area of the illegal site was made.

Just after the conflict was a time of many changes and uncertainty and it was difficult to make any predictions. Flexible actions made it possible to continue solid waste management activities even to a limited extent.

End