

A Participation Income Project to Remove Marine Debris and its Possible Contribution to Creating a Marine Protected Area in Korea

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Abstract : *The creation of marine protected areas is an important aspect of marine ecosystem sustainability. However, South Korea has not achieved its Aichi Biodiversity Target to designate 10% of its sea as marine protected by 2020. Local residents have strong opposition to the designation of protected areas in South Korea; there has been little trust in the government since the 1970s, when residents felt that their property rights were being ignored in favor of creating national parks. Here, we present a case where creation of a marine protected area was led by residents of TongYeong City. The success of a participation income project to remove marine debris in the city seems to be an important factor that led to the designation of the marine protected area. The case of TongYeong City is compared with that of nearby Geoje City, where an ecologically important stream has not been designated as a wetland protection area, although a similar participation income project enrolled the city's residents. The comparison provides a tentative assessment of the conditions needed to increase trust among residents. The results suggest that, if the projects are well-designed and well-managed, participation income projects to remove marine debris can be effective in building trust among stakeholders in potential marine protected areas.*

Key Words : *Marine protected area, Marine debris, Participatory income, Trust, Social capital*

1. Introduction

The establishment of marine protected areas is an important policy instrument to achieve conservation and ensure sustainable use of marine resources (WCPA/IUCN, 2007; European Commission, 2015; IUCN, 2016). Marine protected areas can conserve biodiversity while supporting local communities through ecological tourism (OECD, 2017). In these areas, human activities such as fishing are not totally restricted (MMO, 2019); instead, human activities are regulated to achieve sustainability based on scientific findings (Taylor et al., 2021). Therefore, institutions such as the United Nations have long sought to expand marine protected areas worldwide (Humphreys and Clark, 2020).

However, South Korea has failed to meet the Aichi Biodiversity Targets, which include designating 10% of its coastal and marine areas as protected (CBD, 2010). Indeed, by 2020, only 2.12% of the sea had been designated as marine protected areas (Heo, 2020). With the exception of the Shinan Protected Area, an area of ~1,100 km² that was placed under protection in 2018, most marine protected areas in South Korea are relatively small (MOF, 2019a). Because coastal areas in South Korea are intensively used for both fishery such as mariculture and land development through reclamation (Nam et al., 2010), expansion of marine protected

areas has been difficult; there has been significant opposition from coastal users (Nam, 2006; Hong et al., 2017).

Here, we suggest the participation income project (Atkinson, 1996) as a way to create new marine protected areas because it can build trust among the residents of the candidate protected areas. In addition to examining the theoretical backgrounds of the participation income projects, we compare two such projects in South Korea. By comparing the social and ecological conditions of the two cases, we sought to set standards for participation income projects that build trust among stakeholders. We show that participation income projects can be effective in increasing participation and trust if the projects are well-designed, properly managed, and considerate of the social and ecological conditions of the project area.

2. Materials and Methods

2.1 Theoretical backgrounds

2.1.1 Economic reasons behind opposition to protected areas

Public opposition to protected areas has a long history in South Korea. In the 1970s, the authoritative government designated national parks through top-down control, ignoring the opinions and property rights of affected residents (Lee, 1993; Kang, 2004; Son,

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2016). Korean law regarding marine protected areas (MOF, 2019b) clearly states that residents' economic activities will not be restricted by the creation of new marine protected areas. But, the experience of the 1970s destroyed the public's trust that the government would protect their interests. Notably, among the seven categories of protected area listed by the International Union for Conservation of Nature (Dudley and Stolton, 2008), most of the marine protected areas in South Korea are category IV or VI (Korea Database on Protected Areas, 2022); thus, they are subject to fewer restrictions than national parks, which are category II (Kil et al., 2014; Green Korea, 2022). Moreover, marine protected areas in Korea might be even considered under "other effective area-based conservation measures" (IUCN-WCPA, 2019) because fishing is permitted for nearby residents. However, it is not easy for the public to recognize the differences in restrictions between national parks and marine protected areas, nor has the government invested lots of effort to explain these differences. Consequently, many residents display placards saying "No more protected areas that threaten our livelihoods" whenever a protected area is proposed (e.g. Park, 2002; Yook, 2013; Choi, 2005).

A possible solution to the insufficient trust that has hindered the expansion of marine protected areas is to increase the opportunities for public participation (Charles and Wilson, 2009; Cormier-Salem,

2014). Trust can be established among stakeholders when they participate in talks and discussion with the government, both before and after the creation of marine protected areas (Lee, 2017; Kang and Lee, 2020).

However, residents are mostly unwilling to participate in these discussions because of obstacles that often limit collective action (Olson, 1965). For example, if the benefits of participating in the political process are smaller than the costs of participation (e.g., lost time), individuals are unwilling to participate.

This at least partially explains the low level of public participation in the management of marine protected areas in South Korea (Park et al., 2019). Moreover, while incentives for resident participation are needed to increase the number and extent of marine protected areas, such measures are typically enacted only after a marine protected area is legally designated (MOF, 2019b).

2.1.2 Participation income as a way to build trust for protected areas: theory and practices (Table 1)

Participation income can help to encourage participation while building trust, thus enabling the creation of new marine protected areas. Participation income was originally suggested as an alternative form of basic income conditional on participation (Atkinson, 1996; Pateman, 2004; Van Parijs, 2004; Widerquist et al., 2013; Torry,

Table 1. Previous cases of theoretic studies and policy practices of participation income

Summary of the cases	References
Participation income can be a good alternative to the basic income.	Atkinson, 1996; Pateman, 2004; Van Parijs, 2004; Widerquist et al., 2013; Torry, 2016
Participation income can be implemented as a type of civic service.	Perez-Munoz, 2016
AmeriCorps and Senior Corps in the USA can be viewed as participation income projects.	Han, 2020
In Denmark, Finland, Germany, and the Netherlands, there are social welfare programs that can be viewed as offering participation income	Hiilamo and Komp, 2018
Participation income can be recognized as a means to reduce the unemployment rate while increasing social welfare.	Lee, 2021; Lee and Baek, 2021; Moon et al., 2021; Jeong, 2022a; Jeong, 2022b
South Korea's work participation allowance program is similar to participation income and its administration expenses are lower than those of basic income programs.	Eun, 2019
Participation income can support environmental protection goals and foster community trust.	Byrne et al., 2009
Participation income can incentivize participation in efforts to improve eco-social conditions.	Laruffa et al., 2022

2016). Here, participation is not limited to labor market participation; it also includes other social contributions, such as caring for the young, elderly or disabled, as well as other types of voluntary work. Participation income programs can also be implemented as a type of civic service to address unmet social needs (Perez-Munoz, 2016).

There have been examples of participation income although government programs specifically referring to “participation income” are scarce in the literature. AmeriCorps and Senior Corps in the USA can be seen as an example (Han, 2020). In Denmark, Finland, Germany, and the Netherlands, there are social welfare programs that can be viewed as offering participation income (Hiilamo and Komp, 2018). Recently, in South Korea, the value of participation income has been recognized as a means of reducing the unemployment rate while increasing social welfare, by providing job opportunities that benefit society overall (Lee, 2021; Lee and Baek, 2021; Moon et al., 2021; Jeong, 2022a; Jeong, 2022b). South Korea's work participation allowance program, which has been in place for > 10 years, is similar to participation income programs. Moreover, its administration expenses are lower than those of basic income programs (Eun, 2019).

Unlike basic income and employment policies, participation income can support environmental protection goals and foster community trust (Byrne et al., 2009; Ostrom, 2010). This support of the commons, or public goods, cannot be provided by market systems, which are vulnerable to free-riding (Li et al., 2021); rather, only people who contribute to the commons are rewarded (McNutt, 1999). While universal payment of participation income to citizens might be difficult (Wispelaere and Stirton, 2007), the allocation of small grants in relation to a specific project, such as a cleaner sea, can encourage citizens to participate. In particular, when pathways for participation are supported by citizens themselves rather than enforced by the government, participation income can be expected to incentivize participation in efforts to improve eco-social conditions (Laruffa et al., 2022).

2.1.3 Marine debris cleanup: a good opportunity for a participation income project

Because established and candidate marine protected areas can be damaged by marine debris (e.g. Renchen et al., 2021; Purba et al., 2020), participation income can consist of wages paid to residents for debris removal; this would produce the public benefit of a cleaner sea, while increasing the social capital of communication and trust. Moreover, the removal of marine debris offers a good economic opportunity for the residents of Korean coastal villages, most of whom are older adults (Jung et al., 2014).

2.2 Goals and methods of this study

The goal of this study is to find conditions for participation income projects that can lead to building trust strong enough to create a new protected area. For this goal, first, we describe a participation income project to remove marine debris in TongYeong City, South Korea (Fig. 1). The project was conducted from 2018 to 2020, and it led to the creation of a new marine protected area. The case is compared with another participation income project to remove accumulated waste upstream of a dam in Geoje City (Fig. 1) and create a protected wetland area; the effort in Geoje City was unsuccessful.

Then, we will compare the process and results of the two projects. By comparing a case that succeeded in creating a new protected area and another case that failed in creating a new protected area, we will try to find the conditions for successful project of participation income that may lead to creating a new marine protected area.

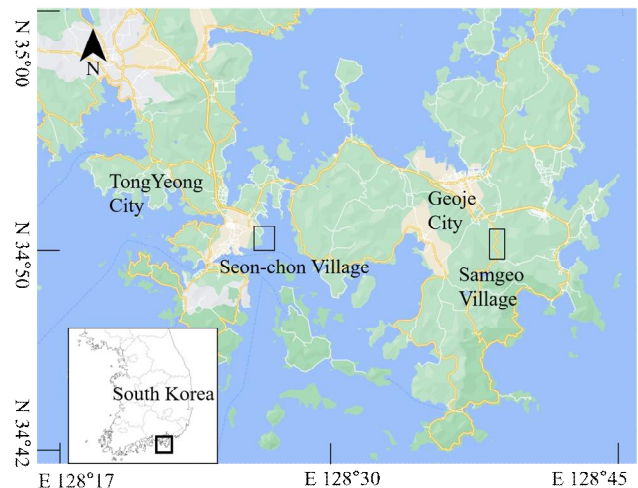


Fig. 1. Study area. The projects that comprise the case studies were conducted in Seonchon Village, TongYeong City, and in Samgeo Village, Geoje City (both in South Korea).

3. Results and discussions

3.1 Successful Case: Seonchon Village, TongYeong City

3.1.1 Conventional approach to persuade the residents to designate a marine protected area

Seonchon Village hosts a branch office of the Korean Federation for Environmental Movement (KFEM, www.kfem.or.kr). In 2014, environmentalists in the KFEM TongYeong Branch

proposed that the sea in front of Seonchon Village be designated as a marine protected area because it includes a wide seagrass bed, which is protected under South Korean law. The environmentalists began a campaign to designate the coastal area of Seonchon Village as a marine protected area, under the belief that the measure would benefit the village (Kim, 2014a). However, their efforts failed because residents of the village opposed the project, which they presumed would threaten their livelihoods (Kim, 2014b).

In 2017, the environmentalists re-introduced the campaign; it failed again because of the continuing opposition of village residents (Kim, 2017a), who insisted that “economic development and well-being would be impossible if the sea were designated as a marine protected area” (Kim, 2017b). This statement was inaccurate because the conventional economic activities of residents before the designation of a protected area cannot be restricted by the designation of the area (MOF, 2019b); however, village residents were unwilling to trust or listen to the environmentalists.

3.1.2 An idea for a new approach

Accordingly, the environmentalists developed a new approach: “If residents can make money from a project managed by the environmental group, they will believe in its broader aim.” However, if residents were to receive payment, they had to do something of value. The environmentalists thus posed the question: “What type of work can be done by residents for public purposes?” In response, the environmentalists selected the removal of marine debris, which accumulates in large amounts on the shore of Seonchon Village. Debris removal was a task that could be performed by the village’s older residents—who comprise most of its population (Purba et al., 2020)—because it does not require high-level skills or physical strength.

3.1.3 The structure of the participation income project

The structure of the participation income project in TongYeong City is described in <Fig. 2>. The environmental group received ~500,000,000 Korean Won (~500,000 USD) from the Community Chest of Korea (www.chest.or.kr) for a 3-year (2018-2020) project to remove beached marine debris (TongYeong KFEM, 2021). The residents were paid 10,000 Korean Won (~10 USD) per hour, which was slightly higher than the legal minimum wage of 7,530 Won in 2018 (MEL, 2018). Because most residents worked 4 hour per day, 2 days per week, they earned ~80,000 Korean (~80 USD) per week. In addition, TongYeong City government and Fishermen Cooperative Banks supported the project.

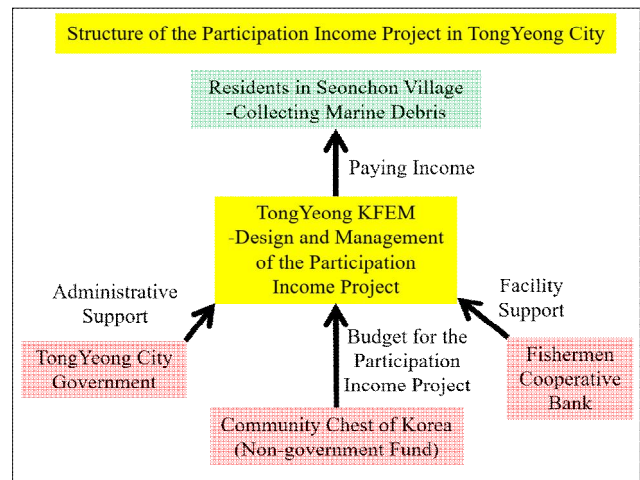


Fig. 2. Structure of the Participation Income Project in TongYeong City.

3.1.4 Educational aspects of the participation income project

While participating in the project, residents also attended educational workshops (Ha, 2019), where both the cleanup effort and the marine environment were discussed. During the workshops, participation was encouraged; this allowed residents to express their views and discuss the creation of marine protected areas with various stakeholders. Moreover, the residents engaged in conversation with each other while working. By the end of 2019, during the second year of the participation income project, the residents had begun to support the marine protected area, rather than opposing it. They held a meeting among themselves, during which they decided to petition the government to designate their coastal area as a marine protected area. Thus, in February 2020, a marine protected area was designated along the coast of Seonchon Village, TongYeong City (MOF, 2020; Lee, 2020). This was the first case of a bottom-up approach to the designation of a marine protected area in South Korea—it was initiated by the residents, rather than the government.

3.2 Unsuccessful Case: Samgeo Village, Geoje City

3.2.1 Socio-ecological backgrounds

In Samgeo Village, the Gucheon Stream is home to an endangered species of freshwater fish, *Odontobutis obscura* (Chae, 1999). In South Korea, a stream containing an endangered species of wildlife can be designated as a wetland protected area (ME and MOF, 2016). In 2015, the Geoje branch of the same environmental group as in Case 1 held a workshop concerning the endangered

fish, which they hoped would persuade village residents to designate a part of the stream as a wetland protected area (Lee, 2015). However, this appeal failed because residents were concerned about the loss of economic development opportunities.

3.2.2 The structure of the participation income project

Encouraged by the success of the Seonchon Village project, the environmentalists sought to carry out a similar participation income project in Samgeo Village, with a focus on waste removal. Across Gucheon Stream is Gucheon Dam, which was built in 1987 to provide drinking water and is now managed by a governmental agency, the Korean Water Resources Corporation (Korea Water Resources Corporation, 2002). Over the years, a large amount of waste has accumulated upstream of the dam (Geoje KFEM, 2022); it has become entangled in the vegetation and requires manual removal. The Geoje KFEM therefore proposed that residents of Samgeo Village engage in waste removal upstream of the Gucheon Dam. Funding of 200,000,000 Korean Won was provided by the Korean Water Resources Corporation in 2021 (Geoje KFEM, 2022). The project was conducted for 8 months, from August 2021 to March 2022; residents were paid 10,000 Korean Won per hour for their labor.

The project had several goals dam (Geoje KFEM, 2022): (1) to clean the area upstream of Gucheon Dam, thereby improving the dam's ecology and the quality of drinking water provided by the dam; (2) to provide participation income to village residents; and (3) to communicate with village residents and ultimately persuade them to designate the stream as a protected wetland. Although the first two goals were achieved, the stream was not designated as a protected wetland, even after project completion. Despite their participation income, residents continued to reject the stream's designation as a protected wetland.

3.2.3 Trust level of the residents unchanged after the project

Unlike in TongYeong, the level of trust among residents of Samgeo Village was assessed through interviews (Jang, 2022a). Twenty-six of the 30 participants in the cleanup project were asked the same questions (e.g., "Do you trust the government?") at the beginning (September 2021) and end (March 2022) of the project. In the first interview, residents had the highest level of trust in their own friends in the village, moderate trust in environmental groups, and the lowest level of trust in the local and central government. This ranking did not change at the end of the project,

nor did residents' opposition to designating the Gucheon Stream as a protected wetland.

3.3 Comparison of the two cases and its implications (Table 2)

3.3.1 Similar socio-ecological conditions

The social and ecological conditions of the two villages are similar; the main industries in both are farming and fishery. As in other rural areas of South Korea, young people have left the two villages, such that older adults comprise most of the residents (Choi and Yoon, 2012).

3.3.2 Similar efficiency of waste collection

The outcome and efficiency of waste collection was similar in the two villages (Table 2). Although the average cost was lower in Seonchon Village (1,321 Won/kg) than in Samgeo Village (3,809 Won/kg), the difference was related to the condition of the waste, rather than the residents' efforts. For example, in Seonchon Village, the fishing-net waste collected from the seafloor with the help of dredging machine was heavy, such that the waste collected in Seonchon Village weighed more than the waste collected in Samgeo Village (comparable waste was not collected from the bottom of the stream).

3.3.3 Difference in change of trust level

However, a major difference between the two villages is that Samgeo Village continues to experience the effects of the conflict related to dam construction across Gucheon Stream (Jang, 2022b). In 1987, when the government (Korea Water Resources Corporation) built Gucheon Dam, officials did not adequately explain the restrictions on economic activities needed to maintain water quality. According to residents, they were not allowed to build new houses after the dam was completed. The residents held a street rally in front of City Hall, in which they asked the government not to restrict their livelihood activities (Kim, 2006); the city mayor promised to remove restrictions. However, the residents said that restrictions were not completely abolished until 2022 (Jang, 2022b), more than 30 years after construction of the dam. Consequently, residents felt that they could not trust the government. Despite the residents' greater trust of the environmental group, they could not be convinced that the protected wetland area would not have negative effects on their community.

Table 2. Comparison of two participation income projects in South Korea

Items	Project in TongYeong City	Project in Geoje City
Total funds (A)	500,000,000 Korean Won (~500,000 USD)	200,000,000 Korean Won (~200,000 USD)
Total amount of waste collected (B)	378,490 kg	52,500 kg
Average cost of waste collection (C = A / B) (#1)	1,321 Won / kg	3,809 Won / kg
Total labor input (D)	3,486 man-days	1,152 man-days
Amount of waste per man-day (E = B / D) (#1)	108 kg / man-day	45 kg / man-day
Wage (#2)	10,000 Korean Won (~10 USD) / hour	10,000 Korean Won (~10 USD) / hour
Number of participants	40 residents	30 residents
Historic conflict level	None	Management of the dam has been a source of conflict.
Duration of project	3 years (2018-2020)	8 months (August 2020-March 2021)
Fund source	Chest Foundation (non-government charity)	Korea Water Resources Corporation (government)
Level of autonomy (#3)	Higher	Lower
Trust in government (#4)	Trust in government increased during the 3-year project.	Trust in government did not increase during the 8-month project.
Final result of project	Designation of a new Marine Protected Area	Designation of a new protected wetland area was needed but failed.

※ Note: Data in this table is from project reports by the TongYeong KFEM (2021) and Geoje KFEM (2022).

#1: This difference does not automatically mean that the efficiency of TongYeong City is higher than that of Geoje City. See paragraph 3.3.2 for explanation. #2. This wage ratio is a little higher than the minimum wage of South Korea.

#3. See paragraph 3.3.5 for explanation. #4. See paragraph 3.3.3 and paragraph 3.4 for explanation.

3.3.4 Difference in duration of the projects

The durations of the participation income projects also differed: 3 years in TongYeong City and 8 months in Geoje City. Considering the historic conflict and low level of trust, the Samgeo Village project should have been extended to resolve the conflict and rebuild trust. This may have been the most critical difference between the two projects; it presumably had a strong effect on the differences in their outcomes.

3.3.5 Different level of autonomy in implementing the projects

The projects also differed in the level of project design and management autonomy. For the project in TongYeong City, funds were provided by the Community Chest of Korea, a non-government

foundation; the project in Geoje City was funded by the Korean Water Resources Corporation, a government agency. Therefore, the TongYeong project had greater autonomy than the Geoje project. In the Geoje project, the environmental group could not conduct the project for a longer period because this would have violated existing regulations.

3.4 How can trust be fostered among residents?

The residents of both villages had many opportunities to communicate among themselves while working together to clear waste from the sea or the river, although the project period in Geoje was shorter than that in TongYeong. So, why did the residents of Seonchon village in TongYeong change their mind regarding the protected area, whereas the residents of Samgeo

Village in Geoje found that difficult?

The most critical difference was the level of communication between residents and the various stakeholders. The residents of Seonchon talked with government officials and experts at workshops on marine debris and marine protected areas many times. Their questions were “officially” answered by government officials. Media reports also had an impact, as many news reporters visited the village and interviewed residents, who reported feeling proud of themselves for participating in the project. During visits to Suncheon City and Gochang County, where marine protected areas have already been designated, residents from the village spoke with members of the community living near those areas, who reassured them that there were no restrictions on economic activities and that financial support would be provided by the government.

These various forms of communication dissuaded residents from their long-held belief that protecting the local marine environment would threaten their livelihood, and enhanced trust in the government. Nonetheless, for the Sameo Village project in Geoje, which began in August 2020, these various forms of communication were abbreviated, because the program was shorter and the preventive measures implemented during the COVID-19 pandemic included a ban on public gatherings.

4. Conclusions

4.1 A participation income project can increase trust for marine protected areas

The cases described here demonstrate that a participation income project provides an opportunity to create new marine protected areas by building trust among stakeholders. This is especially important in South Korea, where such efforts are often met with strong opposition because of misunderstandings about the restrictions on economic activity in marine protected areas.

4.2 How to improve the laws in order to expand participation income projects for marine protected areas?

To expand marine protected areas in South Korea and thus achieve the goals of the Aichi Targets, participation income projects should be expanded by changing the current law in Korea regarding marine protected areas (MOF, 2019b). First, participation income projects need to be implemented more widely in marine protected areas so that these areas are seen as an opportunity to increase the income of nearby residents. Second, participation

income projects should also be implemented in candidate marine protected areas as such projects can enhance communication and trust among residents of the cities and villages affected.

4.3 Marine debris removal is a good opportunity for a participation income project

Marine debris removal can provide opportunities for participation income projects in candidate marine protected areas, especially in South Korea. Marine debris can be removed by older adults, who comprise the largest segment of the population in most fishing villages in South Korea. The funding of such projects can be easily justified, because the removal of marine debris results in a cleaner sea and contributes to public goods. Moreover, the amount of marine debris collected by participants can be measured; this avoids the potential for participants to become idle.

4.4 Guidelines for a successful participation income project

From the cases examined in this study, guidelines to design a successful project of participation income can be drafted (Table 3). (1) First, each project should be long enough to build trust among participants. For example, in Seonchon Village, during the 3-year participation income project, residents changed their attitude from opposing the designation of a marine protected area to supporting it. (2) Second, the types of labor offered should match residents' capabilities. For example, in the two cases in this study, waste from the beach or riverside was collected by elderly residents. (3) Third, participation must also enhance public goods. In the two cases in this study, waste removal from the sea or river improved the environment. (4) Fourth, contributions need to be measurable. As the public goods produced by participation income projects are not traded in the market system, the value of participation is not measured by market prices, such that participation income projects might be viewed as inefficient. In the two cases in this study, the amount of waste collected by residents, and thus their contribution, could be objectively measured.

(5) Lastly, autonomy should be given to a responsible agency. In the two cases in this study, the participation income projects were designed and managed by grassroots environmental groups that had considerable experience with the communities. This enabled the design of projects that were easily implementable by the communities. In order to design a participation income project consistent with the social and ecological conditions of a potential marine protected area, the responsible agency should be given considerable autonomy in terms of project design and management.

Table 3. Guidelines to design a successful project of participation income

Principles	The case of TongYeong City
(1) A project should be long enough to build trust among participants.	The project in TongYeong city was for 3 years.
(2) The types of labor offered should match residents' capabilities.	Cleaning up marine debris from the beaches can be conducted even by elderly people.
(3) Participation must enhance public goods.	Collecting waste makes the environment cleaner.
(4) Contributions need to be measurable.	Collected waste can be easily measured.
(5) Autonomy should be given to a responsible agency.	The environmental group had autonomy in designing and implementing the project.

4.5 Further studies needed

A criticism of participation income has been its potentially high administrative cost (Wispelaere and Sturition, 2007). But addressing this issue is beyond the scope of this paper. However, our study demonstrates the feasibility of small participation income projects to increase public goods by creating new marine protected areas while building community trust. Moreover, the efficiency and effectiveness of various types of social welfare programs related to marine environments, similar to participation income, need to be analyzed with the cases in different countries. Such studies can contribute to preparing a better project of participation income in the future.

Acknowledgement

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