

**Private Financing of Public Goods by Means of “Eco-Goods” Schemes:
Social Entrepreneur and Not-for-Profit Enterprise**

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Abstract

With a view to applying to the problem of collective action for the global commons, we analyze a three-stage game model where public goods are provided by the costly leadership of a social entrepreneur for undertaking “eco-goods” scheme. We derive (i) the conclusion that the social entrepreneur can finance more for the collective action under not-for-profit constraint than without the constraint, and (ii) the conditions under which he prefers the not-for-profit constraint on a rational basis. The main results are applied to some social experiments on the natural common-pools of a public-goods nature in the river-basins communities of Japan.

Key Words: Commons, Collective Action, Social Entrepreneur, NPO

JEL Codes: H41, L31, L21

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1. Introduction

In order to provide public goods by means of private financing, some entrepreneurship is indispensable for undertaking it, or some leadership is indispensable for organizing the collective action. However, the costly aspects of the entrepreneurship or leadership have been overlooked so long in the traditional literature on the voluntary provision of public goods as well as on the logic of collective action. Furthermore, though the financing is usually undertaken under not-for-profit constraints, the rational reasons why those constraints are preferred by risk-taking undertakers have not been given.¹ Even if people are ready to share the direct or production cost of public goods, they may not want to take on the leadership for private-provision schemes. The incentives for taking it on may become much weaker under the not-for-profit constraints. In this paper, we take up *social entrepreneur* as the key player who takes the initiative for an “eco-goods” enterprise with a view to financing for the provision of public goods such as the global commons. We examine how the social entrepreneur can solve incentive problems with his costly entrepreneurship or leadership, and derive the conditions for not-for-profit constraint to be preferred by him.

The entrepreneurship or leadership (hereafter, both terms are interchangeable) is mainly comprised of the “organizing work” at some preliminary stage and the “managing work” at provision stage² after the preliminary stage. The process of providing public goods must be finalized by the managing work of the social entrepreneur. The beneficiaries of the public goods decide on sharing in the cost to provide the public goods in

¹ Bilodeau and Slivinski (1998) recognize the not-for-profit constraints on as a rational response to the agent problem, following the logic of Hansman (1980, 1986) and Fama and Jensen (1983). But they did not take into consideration the costly aspects of the leadership problem.

² As to the details of those works for collective action, see Ueda (2003) and Ueda (2005).

anticipation of the effects of their decision on the managing work. Thus, the managing work is faced with agent problem. On the other hand, the organizing work suffers from hold-up problem because it must be done under the condition of incomplete contracts. Thus, problems with incentives for the entrepreneurship are characterized (i) by the agent problem with the managing work and (ii) the hold-up problem with the organizing work. The social entrepreneur has to solve these two problems.

When we reconsider public goods such as the global commons from the view points of both the generalized logic of collective action³ and the property-rights approach, it can be argued that the tragedy of the commons is caused by the incentives of free-riding on someone's costly leadership for collective action indispensable for establishing valid property rights to the global commons. The "selective-incentives schemes" argued by Olson (1965) are a solution to the problem of those free-riding incentives. The eco-goods scheme, the net proceeds of which are earmarked for financing for public goods, is one of those schemes, and it is well known to be more efficacious than voluntary contributions⁴ in terms of the amount of finance. However, the literatures on those schemes have been overlooking the key player who has to take on the leadership for those schemes.

In order to address the leadership problem with the eco-good scheme, in this paper we come up with a three-stage game model played by a social entrepreneur and n homogeneous consumers. In the beginning of the first stage, the social entrepreneur decides on whether to launch onto the eco-goods enterprise. After he does, he makes decision of whether to choose a not-for-profit or for-profit organization under which he undertakes the eco-goods scheme, and then he does the work of organizing n consumers into joining in the eco-goods scheme. After they know whether or not the enterprise is carried out under the not-for-profit constraint, in the second stage those consumers decide on how many of the eco-goods to be purchased, under the condition that the net-proceeds of their expenditure are earmarked for financing the public goods, the output level of which is

³ The adjective "generalized" means the refinement of the Olsonian logic of collective action by taking into consideration the indispensability of costly leadership.

⁴ For example, refer to Morgan (2000).

determined not only by the net proceeds but also by the managing work done by the social entrepreneur in the next stage. In the third stage, the social entrepreneur does the managing work to transform the net proceeds to the public goods.

From the analysis of the above game model, we derive the results as follows: (i) that the public goods are provided on a higher level under the not-for-profit constraint than under for-profit enterprises, (ii) that the more efficient at the leadership and the more conscious of collective interests he is, the more plausible is it for the social entrepreneur to prefer the not-for-profit constraint. From the view point of this paper, the “tragedy of the commons” and the property rights approach are reexamined. Those results are applied to the problem of natural common-pools in the river-basins societies of Japan, and some policy implications are mentioned.

This paper is organized as follows: In the second section the basic concepts are defined or reexamined. In the third section, the base model is presented. In the fourth section, several analytical results are derived and summarized as three lemmas. In the fifth section, the logic of this paper is applied to the above social experiments in Japan. In the sixth section the traditional logic of the tragedy of the commons and that of the property-right approach are reexamined from the point of view of this paper. In the last section, the main conclusions are summarized and we derive some policy implications on social entrepreneurs.

2. Basic Concepts

In this section, the basic concepts and their relations are defined and explained, because they are not necessarily the same as the conventional ones, or the conventional usage is not clear.

Myopia is defined as such a short time-span over which to calculate player’s self-interests as to neglect the repercussion of his present behavior on his future wellbeing. On the other hand, *foresight* is defined as such a long time-span over which to calculate player’s self-interests as to take into allowance the repercussion of his present behavior on his future wellbeing. These definitions of the myopia and foresight can be applied not only to

selfish individuals but also to altruistic individualists.

Collective action means that the beneficiaries of public goods, such as those users or exploiters of natural common-pools, are organized so as to curb their non-cooperative behaviors and coordinate their behavior aimed at achieving their collective interests. Here, someone has to take the leadership for that collective action. That person is, in general, called *social entrepreneur* in this paper. The social entrepreneur has to do the work of organizing the members of a society at an *ex ante* stage, as well as to do the work of managing the enterprise at later stage. The former type of work is called *the organizing work*, and the latter *the managing work*. To put it concretely, the organizing work is comprised of the tasks of creating new ideas and strategies, persuading other members, and setting up a network or organization. It represents the essential factors of the *entrepreneurship* defined by the Austrian School.⁵ On the other hand, the managing work is essentially the same as the traditional concept describing the work to manage established organizations. It should be noted that both the organizing work and managing work are risky or costly in the sense that nobody is willing to take on those works without sufficient reward or compensation.

The social entrepreneur is defined as the organizer of an entrepreneur type, who can be rewarded not only with pecuniary incomes but also with collective goods he is providing. In this paper the pecuniary incomes are represented by his receipt of *a part* of the net proceeds of an eco-goods enterprise. He has to choose an organizational form in which the eco-good enterprise is carried out. They are divided into (i) *not-for-profit organizations or enterprises* (NPO, for short), and (ii) *for-profit organizations or enterprises* (FPO, for short).

Business entrepreneur is distinguished from the social entrepreneur by the requirement for the former to be rewarded mostly with pecuniary incomes for his risky or costly entrepreneurship. Political entrepreneur is also distinguished from the social entrepreneur by the requirement to be rewarded mostly with private benefits on a par with pecuniary incomes for his risky or costly leadership. *Volunteer* is such a type of organizers as to be

⁵ As to the recent survey of the concept, refer to Kirzner (1973).

able to be rewarded only with the benefits of collective goods he is providing.⁶

The relation between the social entrepreneur and NPO is a ubiquitous observation. When the social entrepreneur offers an eco-goods scheme with a view to organizing collective action for public goods, he usually chooses NPO but not FPO as the organizational form in which this scheme is undertaken. He does so, although he is subjected to the non-distribution constraint. Why? It is because he has to overcome or solve the *principal-agent problem* arising in the process of financing for provision of the public goods. That is, even if he can make promise of financing the net proceeds for the public goods, there is no guarantee of the promise being kept under for-profit organization, since he is legally allowed to exploit the net proceeds and it is too costly for each consumer to monitor that process. For fear of being exploited, the consumers lose incentives for purchasing the eco-goods. If, on the other hand, the social entrepreneur offers the same scheme under the non distribution constraint, the principal-agent problem can be, if not perfectly, alleviated. Thus, those consumers are less likely to hesitate purchasing more of the eco-goods under the NPO constraint. If so, we can say that NPO is chosen by the rational calculus of the social entrepreneur but not by his altruistic motives.⁷

On the other hand, the social entrepreneur need not be subject to *no-salary* constraint, because he is not a volunteer. By choosing NPO, the social entrepreneur can lawfully set aside his salary from the proceeds of the eco-goods enterprise, and is rewarded with that salary.

3. The Basic Model and Assumptions

In this section, the base model is presented, and the basic assumptions are explained. Let us begin with an exposition of the outline of the base model.

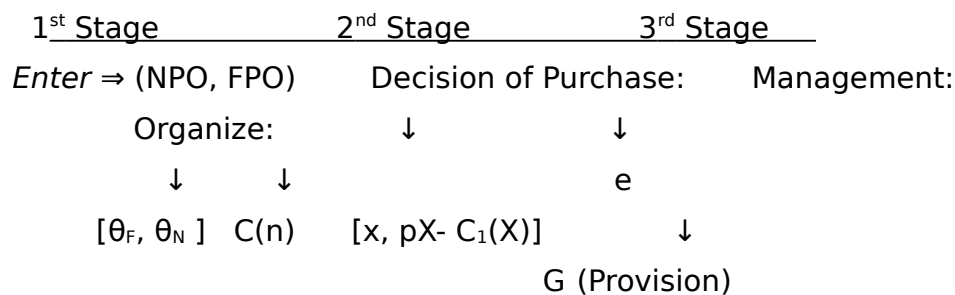
3.1. Three-Stage Game

⁶ The entrepreneur assumed by Bilodeau and Slivinski (1998) is such a volunteer.

⁷ As to the rational logic of NPO, refer to Hansman (1980, 1996), Fama and Jensen (1983), Bilodeau and Slivinski(1998), and Ueda (2005).

The entire process of providing public goods is divided into three stages consisting of “enter,” “organize,” and “manage” stage, in turn. Perfect information is assumed. It is modeled as a three-stage game played by one social organizer and n homogeneous consumers. The outline of the game is described in the *Figure 1* below.

Figure 1: The Time Line of the Game



At the beginning of the first stage, a social organizer decides on whether to launch into the eco-goods enterprise. If his net payoff is expected to be positive or to be zero, he chooses “Enter.” Otherwise, he chooses “Not Enter.” Then, he has to choose an organizational form from between NPO and FPO. When he chooses NPO, he must be subjected to the non-distribution constraint. This paper assumes that the non-distribution constraint is represented by a lower share of the net proceeds for NPO, denoted by θ_N , than that for FPO, denoted by θ_F , where $0 < \theta_N < \theta_F \leq 1$.

By the end of the first stage, the social entrepreneur has to organize n consumers in order to motivate them to go along with the eco-goods scheme. In the organizing process, he forms a socio-economic network consisting of n consumers who have not been consciously ready to purchase the eco-goods. Without his organizing work, those consumers remain unconscious of the benefits of the public goods, in particular, such as the global commons. At the next stage, they make decision of their purchasing the eco-goods in the expectation that a part of the net proceeds are earmarked for financing public goods provides at the third stage. The organizing work is valued in terms of the numeraire good and is denoted by $C(n)$, which is assumed to be given in this paper. The offer of the eco-goods

scheme which the social organizer makes in this organizing process is comprised of the selling price of the eco-good, p , and an *ex ante* promise of allotting a portion, $1-\theta_i$, for $i = N$ or F , of the net proceeds to the provision of the public good. The portion, $1-\theta_i$, is dependent on his organizational choice at the first stage.

At the second stage, each consumer makes decision of the volume of the eco- goods, x , so as to maximize her payoff including the benefit obtainable from the public goods as well as the selective benefits of the eco-good itself. Those consumers know that the actual output level of the public goods is determined not only by the amount of the net-proceeds but also by the managing work done by the social entrepreneur at the last stage. At the end of this stage, the total net proceeds of the enterprise come out, as $pX - C_1(X)$, $X = nx$ for a symmetric case, where $C_1(X)$ is the cost function of the eco-good.

At the third stage, the social entrepreneur makes decision of how much effort, e , he should put into the management work in order to transform the net proceeds earmarked for the public goods into the public goods. The entire game ends with provision of the public goods, G .

In the next subsection, the basic assumptions of the base model are detailed.

3.2. The Basic Assumptions and Notations

Players and Payoff Functions: There are assumed to be n homogeneous consumers and a social entrepreneur. The payoff of the representative consumer is a function of three variables; numeraire goods (leisure time), eco-goods and public goods. The payoff of the social entrepreneur is a function of numeraire goods (leisure time), public goods, and salary income.

The utility function of the representative consumer, U , is defined by (1).

$$(1) U(L, x, G) = L + \varphi(x) + v(G),$$

where $\varphi(0) = 0$, $\varphi' > 0$, $\varphi'' < 0$, $v(0) = 0$, $v' > 0$, and $v'' \leq 0$, as usual. L , x , and G stand for, in turn, her leisure time, eco-goods, and public goods. The consumer is subject to the resource constraint defined by (2).

$$(2) I = L + px,$$

In the Eq.(2), I stands for her initial endowment and p is the price of the eco-good which is given in a competitive market.

The payoff function of the social organizer, Π , is defined by (3).

$$(3) \Pi (L_E, y, G) = L_E + y + v_E(G),$$

where L_E , y and v_E are, in turn, his leisure time, salary income, and the benefit to him of the public goods he is arranging to provide. It is assumed, as usual, that $v_E(0) = 0$, $v_E' > 0$, and $v_E'' \leq 0$. He is subject to the resource constraint defined by Eq. (4).

$$(4) I_E = L_E + C(n) + e,$$

where I_E , $C(n)$, and e are, in turn, his initial endowment, the effort cost of organizing n consumers, and the effort cost to manage the process of providing the public goods.

Strategies: At the second stage, the consumer decides on how much to purchase the eco-goods, x , subject to her resource constraint, in the expectation (i) that she can gain some benefit indirectly obtainable from the public goods as well as the benefits directly obtainable from consuming the eco-goods, and (ii) that the output level of the public goods is determined not only by the net proceeds of the eco-goods enterprise but also by the management work done by the social entrepreneur at the next stage. The social entrepreneur decides on (i) how much management work, $e = e(x)$, to do at the third stage, (ii) binary choice between "NPO" (θ_N) or "FPO" (θ_F) just after he enters the game at the first stage, (iii) binary choice between "To Do" or "Not to Do" the organizing work, $C(n)$, in the first stage, and (iv) binary choice between "Enter" or "Not Enter" at the beginning of the first stage. In this paper it is assumed for simplicity that the payoffs are not discounted.

The Price and Cost of Eco-Goods: The price of eco-goods is assumed to

be given by the competitive market of a private good chosen as the eco-good, and it is set at p , constant. This reflects the condition that candidates for the eco-good are selected from necessity goods, the market demand for which is of a regular nature. The production cost of the eco-good is defined by $C_1(X)$, where X is the total production of the eco-good, i.e., $X = nx$. It is assumed that $C_1(0) = 0$, $C_1' > 0$, and $C_1'' > 0$.

The Production Function of the Public Good: The public good is provided by the social organizer's management work to transform the net proceeds of the eco-goods into the public goods. Thus, the output level of the public good is dependent on how much management work he puts on the net proceeds earmarked for the public goods. The transformation function is defined by $\psi(e)$. It is assumed that $\psi(0) = 0$, $\psi(0)' > 1$, $\psi' > 0$, and $\psi'' < 0$. Thus, the actual level of output, G , is assumed to be defined by (5).

$$(5) G = \psi(e) (1 - \theta_i) (pX - C_1(X)), \quad i = F \text{ or } N,$$

where $(1-\theta_i)$ denotes a portion of the net proceeds of the eco-goods enterprise under i organizational form.

Here, it should be noted that the cost of organizing work, $C(n)$, can not be subtracted from the net proceeds, because the organizing work is of an unverifiable nature, and thus it is faced with the hold-up problem.

Threshold Conditions: In order to provide the public good, n consumers are required to join in the scheme of eco-goods, and furthermore the portion of the net proceeds which are earmarked for the public goods must exceed a threshold level, denoted by G_0 . The threshold conditions meet both (6) and (7) below.

$$(6) (1-\theta_i)[n(px_0) - C_1(nx_0)] \geq G_0$$

$$(7) x_0 = \arg \max_x \{ -px + \varphi(x) \}$$

The equation (6) and (7) should be interpreted as follows: Suppose each consumer is purchasing private goods without the eco-goods scheme. Then, her optimal consumption level, x_0 , is derived from (7). Here, the social

entrepreneur has to be able to expect that at least the threshold volume of funds can be collected as a precondition for the eco-goods scheme. This threshold condition is described by (6). The quantity of the private good purchased by each consumer under the eco-goods scheme must be expected to be larger than x_0 .

In what follows, we assume that the threshold conditions are met, and that the quantity of the goods the consumer purchases under the eco-goods scheme, say x^* , is larger than x^0 . That is, $p = \varphi'(x^0) > \varphi'(x^*)$.

The Incentives of the Social Entrepreneur: The social entrepreneur has to organize n consumers in order to motivate them to go along with the eco-goods scheme, because he has to enlighten those myopic self-interested consumers to be conscious of the benefits of the public goods, and to persuade them to join in that scheme, more or less, in a face-to-face way. This organizing work is costly, and the cost is given by $C = C(n)$. In general, it should be assumed that $C' > 0$. In this paper $C(n)$ is assumed to be constant because n is fixed.⁸ It should be noted that because the organizing work is of an *unverifiable* nature, $C(n)$ cannot be counted in when calculating the net proceeds. The unequal relations (8) given below mean that no social organizer of an entrepreneur type has an incentive for the organizing work without some selective incentive, y , as well as the benefit obtainable from the public goods he is providing.

$$(8) \quad I_E - C(n) - e + v_E(G) < I_E$$

$$I_E - C(n) - e + y + v_E(G) \geq I_E$$

If, on the contrary, a *volunteer* takes on the works of the social entrepreneur, the conditions (8) are changed to (8)' below:

$$(8)' \quad I_E - C(n) - e + v_E(G) \geq I_E$$

This is because the volunteer is rewarded enough with the benefits

⁸ If the organizer chooses n so as to maximize his payoff, it is determined by the first necessary condition as follows: $C'(n) = \{\theta + v_E' \psi(e)(1-\theta)\} \{p - C_1'\} x$.

obtainable from the public goods he is providing.

“Non-Distribution Constraints”: Not-for-profit organizations are subject to the “non-distribution constraints” by law (Hansmann, 1980, 1996). Actually, the managers of NPO can appropriate more or less the net proceeds of their enterprises under various disguises such as perquisites and perks. Of course, cash revenues should be preferable to those perquisites and perks. This circumstance can be subsumed in the assumption that $\theta_N < \theta_F$, in accordance with the hypothesis of Glaeser and Shleifer (2001). This paper assumes that the social entrepreneur honestly complies with his offered share in the net proceeds, θ_N , in order to derive the conditions for him to honestly comply with his promise.

Salary: Suppose that at first, n consumers are buying private goods without the eco-goods scheme. After enlightened or organized, they become conscious of the benefits of public goods, which have not been provided owing to no leadership for provision. An entrepreneur offers those consumers an *ex ante* contracts which say that a portion of the net proceeds from their purchase of the private good is earmarked for financing the public good. When those n consumers are organized, the social entrepreneur carries out this scheme. Thus, the reward obtainable from his undertaking the enterprise, y , is defined by Eq. (9).

$$(9) \quad y_i = \theta_i \{pX - C_1(X)\}, \quad i = N, F$$

In Eq.(9), X stands for the total quantity of the eco-good purchased by those n consumers.

4. The Analysis of the Basic Model

In this section, I analyze the third-stage game constructed in the previous section. The participation constraints and incentive compatibilities are used as its optimization concept. In what follows, we assume for simplicity that both v and v_E are positive constants, and $\psi''(e)$ is a negative constant.

4.1. The Third Stage: Decision on the Managing Work

After substitution (2) and (5) into (1), the payoff function of the representative consumer is rewritten as (10).

$$(10) U(x; \theta_i, e) = I - px + \varphi(x) + v[\psi(e) (1 - \theta_i) (pX - C_1(X))], \quad i = N, F.$$

On the other hand, the payoff function of the social entrepreneur is rewritten as (11) after substitution of (4), (5) and (9) into (3).

$$(11) \Pi_i(\theta_i, e; x) = I_E - C(n) - e + \theta_i \{pX - C_1(X)\} \\ + v_E[\psi(e) (1 - \theta_i) \{pX - C_1(X)\}], \quad i = N \text{ or } F$$

Maximizing Π_i with respect to e , given θ_i and X , and rearranging it, we obtain the maximizing condition shown by (12). (It should be noted that Π_i is concave with respect to e , and thus (12) is also the sufficient condition.)

$$(12) \psi'(e) [pX - C_1(X)] = 1 / (1 - \theta_i) v_E, \quad i = N \text{ or } F,$$

from which we can derive the best response of e to X , given θ_i , as follows:

$$(12)^* e^* = e^*(X; \theta_i), \quad i = N \text{ or } F.$$

From the comparative statics of (12), we can derive the relation between e and x given θ_i and that between e and θ_i given x , as follows:

$$(12)^{**} \partial e^* / \partial X \Big|_{\theta_i} = \psi'(e^*) [p - C_1'(X)] / [-\psi''] [pX - C_1(X)],$$

$$e^*(\theta_N; X) > e^*(\theta_F; X) \text{ for } \theta_F > \theta_N.$$

From the second result of (12), $\partial e^* / \partial \theta_i < 0$, we can derive the result that *the larger portion of the net proceeds he can appropriate in his income, the less effort he makes to transform the net proceeds into collective goods, given the net proceeds*. This inference, however, is not general yet, because

(12)** neglects the indirect effects of θ_i on X still. As proved later, however, this conclusion on the effect of θ_i on e remains unaffected, even if we take into consideration those indirect effects. As a special case, suppose the case of θ_f being unity. Then, $\partial\Pi/\partial e < 0$, and therefore, $e^f = 0$. That is, if all of the net proceeds are distributed to the entrepreneur as his cash revenues, then he has no incentive for making effort of providing the collective good.

Next, from the first equation of (12)** we can derive an identical relation (***) as follows:

$$(***) \quad \partial e^* / \partial X \Big|_{\theta_i} > 0 \Leftrightarrow p - C_1'(X) > 0$$

which is because $\varphi'' < 0$, and $pX - C_1(X) > 0$.

In the equilibrium, the identical relation (***) is assured both by the threshold assumption that $p = \varphi'(x^0) > \varphi'(x^*)$, and by the identical relation that $p > \varphi'(x^*) \Leftrightarrow p - C_1'(X) > 0$ for $X = X^* = nx^*$, which is proved in the next subsection.

4.2. The Second Stage: decision on the purchase of eco-goods

As a precondition for the eco-goods scheme, the participation constraint on each consumer, $l - px + \varphi(x) \geq l$, for $x \geq 0$, must be met. It is assured by the threshold conditions, i.e., (6) and (7). When each consumer accepts the eco-goods scheme after organized at the first stage, she makes a decision on how many eco-goods to purchase, under the condition that $e^* = e^*(X; \theta_i)$. Maximizing (10) with respect to x , subject to (12), we obtain the first necessary condition (13).

$$(13) \quad p = \varphi'(x) + v(1-\theta_i) n \left[\psi'(e^*) \{pX - C_1(X)\} \partial e / \partial X + \psi(e^*) \{p - C_1'(X)\} \right]$$

$$s.t. \quad e^* = e^*(X; \theta_i), \text{ and } \theta_i = \text{given},$$

from which the optimal values for x and $X (=nx)$ are derived, denoted below as follows:

$$(13)^* \quad x^* = x^*(\theta_i), \quad X^* = X^*(\theta_i)$$

The Eq.(13) is rewritten as (13)' by substituting (12)** into (13) and rearranging the result.

$$(13)' \quad p = \phi'(x^*) + v(1-\theta_i) n \{ p - C_1'(X^*) \} [\psi(e^*) + \{ \psi'(e^*) \}^2 / \{-\psi''\}],$$

$$s.t. \quad e^* = e^*(X^*; \theta_i), \text{ and } \theta_i = \text{given.}$$

From the above equation, we can derive an identity relation as follows; $p - C_1'(X^*) > 0 \Leftrightarrow p > \phi'(x^*)$. This relation is proved to be assured in what follows: From the threshold conditions (6) and (7), it is assured that $x^* > x_0$, that is, $p > \phi'(x^*)$. Thus, the second term of the right hand of (13)' must be positive, and therefore, $p - C_1'(X^*) > 0$, because $\psi(e^*) + \{ \psi'(e^*) \}^2 / \{-\psi''\} > 0$.

The Eq.(13)' means that the consumer is induced to purchase more of the eco-goods under the eco-goods scheme than under no such scheme not only because of the threshold condition, $x^* > x_0$, but also because an increase in the purchase of the eco-good is sure to stimulate the social entrepreneur to do the harder managing work at the third stage as shown by the identity (**). Here, the social entrepreneur is stimulated to make the harder effort of providing the private goods by an increase in his income revenues brought about by an increase in sales of the private eco-good, which is described by the condition of $p - C_1'(X^*)$ being positive.

4.3. The First Stage: Decision on the Organizing Work and NPO

By the end of the first stage, the social entrepreneur has to organize n consumers, more or less, in a face-to-face manner in order to enlighten them to be conscious of the benefit of the public good, and then to persuade them into going along the eco-goods scheme. The organizing process is required because those consumers are a myopic type of selfish individualists, so that they do not yet have a preference for the public good without being enlightened. When such a network is formed, it takes the form of a star type of network, and once formed, it is stable in the sense that it is a strong Nash equilibrium (For the mathematical proof, see Ueda and Svendsen (2002)). So, only one network is formed and each member of the

network has no incentive to leave it, once formed.

In this paper, it was assumed that it costs $C(n)$ to organize n consumers. Thus, participation constraint on the social entrepreneur has to include $C(n)$. It is given by (14) below.

$$(14) \quad \Pi[\theta_i, X^*(\theta_i), e^*\{X^*(\theta_i); \theta_i\}] = I_E - C(n) - e + \theta_i \{pX - C_1(X)\} \\ + v_E[\psi(e) (1-\theta_i) \{pX - C_1(X)\}] \geq I_E, \quad \text{for } i = N, \text{ or } F.$$

On the other hand, the incentive compatibilities of the social entrepreneur let him reject becoming a volunteer. This is described by (15).

$$(15) \quad \Pi[0; X^*(0), e^*\{X^*(0), 0\}] = I_E - C(n) - e + v_E[\psi(e^*)\{pX^* - C_1(X^*)\}] < I_E$$

When both (14) and (15) are met, the organizer is willing to take on the leadership for collective action as an entrepreneur, but rejects to do it as a volunteer.

At the beginning of the first stage, subject to the conditions of both (14) and (15), the social organizer makes an organizational choice from between NPO and FPO. Before deriving the conditions for NPO to be chosen, two lemmas are proved. In what follows, the suffix of e , x , and θ_i are omitted except when required.

Lemma 1. The less is entrepreneur's salary, the more of the eco-goods are purchased by those consumers. That is, $dx / d\theta < 0$.

Proof: By taking the total differential of both sides of (13)' and rearranging the result, we obtain (16) as follows.

$$(16) \quad \left[-\phi''(x) + v(1-\theta) n^2 \left[\psi(e) + \frac{\{\psi'(e)\}^2}{(-\psi'')} \right] C_1''(X) \right] \partial x / \partial \theta \\ = -v n \left[\psi(e) + \frac{\{\psi'(e)\}^2}{(-\psi'')} \right] \{p - C_1'(X)\} \\ + v(1-\theta) n \{p - C_1'(X)\} \left[\psi'(e) + \frac{\partial \{\psi'(e)\}^2}{(-\psi'')} / \partial e \right] \partial e / \partial \theta$$

It is obvious that the right side of (16) is negative because the first term is negative and the second term is zero. On the other hand, the coefficient of ∂

$x / \partial \theta$ on the left side is positive because $\phi''(x) < 0$, $\psi'' < 0$, and $C_1''(X) > 0$. Thus, $dx / d\theta < 0$, as claimed. *Q.E.D.*

This lemma verifies our intuition that the organized consumers, expecting a higher share in the net proceeds to be earmarked for the public goods, would like to purchase more of the eco-goods, due to not only the direct effect of higher $(1-\theta)$ but also the indirect effect that an increase in their purchases promotes the entrepreneur to make harder effort of transforming it into the public goods. These two effects are summarized by (12)** and the identity relation(**).

The second lemma, given below, makes clear the direct and indirect effects of salary on the managing work, as follows.

Lemma 2: The less is entrepreneur's salary, the harder work of management he does. That is, $de / d\theta < 0$.

Proof: By taking the total differential of both sides of (12) subject to (16), and rearranging the result, we obtain Eq.(17).

$$(17) \quad (1-\theta) (\psi'') \{pX - C_1(X)\} \cdot de / d\theta \\ = \psi'(e) \{pX - C_1(X)\} - n (1-\theta) \psi'(e) \{p - C_1'(X)\} \cdot dx / d\theta$$

By *Lemma 1*, $dx / d\theta < 0$, and therefore the right side of (17) is positive. On the other hand, the coefficient of $de / d\theta$ on the right side is negative. Thus, $de / d\theta < 0$. *Q.E.D.*

We know already from the second of (12)** that the direct effect of a decrease in θ on e is negative. *Lemma 2* assures that that effect is strengthened by the indirect positive effect of x on e . This is because the decrease in θ brings about an increase in x . *Lemma 2* insists that the social entrepreneur is motivated to make harder effort of providing the public goods under NPO than under FPO. This result together with that of *Lemma 1* leads to the conclusion that more of the public goods are provided by the social entrepreneur under NPO than FPO.

At last, we can derive $d\pi[\theta ; X^*(\theta), e^*\{X^*(\theta), \theta\}] / d\theta$ by making the total

differentiation of (14) with respect to θ . It is derived as follows:

$$(18) \quad \frac{d\pi[\theta; X(\theta), e\{X(\theta), \theta\}]}{d\theta} \\ = [-1 + v_E \psi'(e) (1-\theta) \{pX - C_1(X)\}] \frac{de}{d\theta} \\ + [\theta + v_E \psi(e) (1-\theta)] \{p - C_1'(X)\} \frac{dX}{d\theta} + \{pX - C_1(X)\} \{1 - v_E \psi(e)\}$$

The coefficient of the first term on the right hand of (18) is zero because of (12), and the second term of the right hand is negative due to *Lemma 1*. Therefore, in order for FPO to be chosen, it is necessary that $1 - v_E \psi(e) > 0$ because $\frac{d\pi[\theta; X(\theta), e\{X(\theta), \theta\}]}{d\theta}$ must be positive. This inference is summarized by *Lemma 3*.

Lemma 3: The social entrepreneur prefers FPO only when his evaluation on the public good, v_E , is sufficiently low, and /or his efficiency at the managing work, ψ , is low. On the contrary, if v_E is high enough, and / or ψ is sufficiently highly-advanced, he chooses NPO.

The above Lemma 3 should be interpreted as the rational foundations of NPO. It derives the necessary conditions for the social entrepreneur to prefer NPO to FPO, as follows: (i) that the social entrepreneur has to be sufficiently efficient at his managing work, and (ii) that he must be sufficiently conscious of the benefits of common interests, which are often referred as “social missions.” Only social entrepreneurs meeting these conditions choose NPO rather than FPO, based on a rational basis.

Of course, the organizing work, denoted by $C(n)$, should be also a crucial factor influencing the efficiency of the social entrepreneur. In this paper, however, the organizing work was assumed to be given for simplicity, and the crucial nature of the organizing work was reflected in the participation constraint.⁹

4.4. Social Entrepreneur and NPO

According to the results of the previous subsections, even a self-interests

⁹ As to the general case of the organizing work being taken into consideration, see Ueda (2005).

seeker is willing to take on the leadership for collective action for collective interests in spite of our society having no volunteer, to the extent (i) that he is such a type of individualist as to evaluate those collective interests high enough, (ii) and / or that he is sufficiently efficient at the organizing work and the managing work.

However, the conditions for social entrepreneur to come into being are not necessarily taken for granted. We may have to set up appropriate academic institutions where candidates for the social entrepreneur can be trained as a qualified entrepreneur. Those candidates have to be trained for the social entrepreneur, (i) who can create and undertake appropriate “selective-incentives” schemes on a commercial basis (the organizing work), (ii) who can be equipped with technological skills on how to carry out those schemes (the managing work), and (iii) who can be sufficiently enlightened to be conscious of the benefit of collective interests (social missions). How should the existing business schools or public policy schools meet the requirements for the academic institutions to train for the social entrepreneurs?

5. An Application: The Social Network in the Yahagi-River Basins

Recently in Japan, voluntary social experiments aimed at preserving ecological systems in river-basins are attracting attention. Voluntary activities to clean rivers

or to reforest devastated mountains in headwaters are some of the popular examples. On the other hand, the establishment of funds to preserve mountain forests in headwater, or local taxes under an disguise of those funds are now under experiment or planning by many local governments. In Ueda and Svendsen (2002), we already proved that contributions-schemes are less effective than selective-incentives schemes such as an eco-lottery scheme, other types of selective-incentives schemes should be worthy of notice in examining how to finance the preservation of natural resources in river- basins. In this section, we take up as an example voluntary social networks called *the Yahagi-River Social Network* aimed at preserving ecological systems in the Yahagi-River basins.

More than 1,400,000 beneficiaries of the river-water resources have been networked in the communities of the Yahagi River basins since 1970s. It is comprised of the whole local communities in the river-basins, ranging from mountain communities in the headwater area, via urban communities such as Toyota and Okazaki City, to fishermen communities in the coast area. They were networked by social organizers called the *Council for Preserving Water Resources of the Yahagi-River*. It is financed mainly by the contributions of the beneficiary-groups, *de facto* club membership fees, which amount to about 15 millions Yen per year. It is managed by two full-time secretarial staffs, appointed by the five board members elected by the Council annual meeting.

The main activities of the Council were to monitor the users of water resources in the Yahagi-River basins. It organized the Council members to regularly join in monitoring activities on a voluntary basis. Any business projects such as industrial and house developments in the basins must be checked by the Council before obtaining a permission of local governments in charge. It is now launching into new activities such as those of afforesting and reforesting the headwaters areas.

This social network in the Yahagi-River basins could achieve their main goal, i.e., *public good*, of monitoring the users of water resources in the basins. However, it must not be confused with the communal self-management proposed by Elinor Ostrom, because the former was not organized through a town-meeting type of organizing processes with a negligible transaction cost, which are implicitly assumed by the latter type of self-management schemes. The Council was organized as a federation, but the main forces of the federation were two types of interest-groups, such as farmers' union and fishermen' union. Each of these unions had been set up with the aim of furthering each member's selective incentives, before the federation was organized, in accordance with the Olson's logic of collective action. Thanks to these group-formations in advance, those union leaders could organize their union members into monitoring units. In the end, they could involve other beneficiary groups such as industrial sectors and urban citizens, represented by local governments, in those monitoring activities. Such a federating process means that without the selective

incentives of some main-forces the collective goods for the whole communities, i.e., monitoring services, could not be provided. A recent questionnaire research¹⁰ also shows that unless those main-force unions could take the leadership, the majority of the union members are not willing to join in the monitoring activities on a voluntary basis.

How about other collective goods such as afforesting and reforesting the mountains in headwaters areas? Stating the conclusion first, these activities have been on an unsatisfactory level up till now, even though the Council leaders have been making effort to take the leadership. Why? It is mainly because the benefits to the members of joining in afforesting and reforesting activity are still less than the cost of those activities in spite of their being well conscious of the various benefits brought about by mountain forests in the headwaters areas. A means to overcome this problem of insufficient demand for collective goods may be to privately own those mountain forests, by which the external effects of the mountain forests are expected to be internalized. Actually, a tiny part of those mountain forests were purchased by a farmers-union, but it remains symbolic. Now, they have to do something more meaningful in a practical sense to achieve this new type of collective interests.

The above questionnaire shows that the beneficiaries of the river-water resources are well conscious of the benefits of the mountain forests in the headwaters areas, and that they are willing to participate in the schemes of private goods-cum-collective goods, such as eco-lotteries and eco-goods schemes. According to the results of the analysis of the base model, we can suggest that social organizers qualified for the social entrepreneur running NPO had better take on those eco-goods enterprises.

6. The Logic of the “Tragedy of the Commons”: Reconsidered

According to the conventional logic of the “tragedy of the commons,” natural common-pool resources exposed to “open access” cannot escape from being overexploited, leading to negative externalities on the exploiters themselves, and to being ruined in the end. This conventional logic should

¹⁰ Research (Ueda), financed by 2003 Grant-in-Aid for Scientific Research of JSPS

be reexamined and can be reformulated on the logic of collective action, which can explain why appropriate property rights to the natural common-pools cannot be established to put an end to the open access. From the view point of the Olsonian logic of collective action, the tendency toward overexploitation is inevitable in any case, if the exploiters are a *myopic selfish-individualist* without regard to serious repercussion effect on their future wellbeing, let alone other persons' wellbeing. Or, even if a society is consisted of a foresighted type of individualists with the positive total net benefit of their present coordinated actions, those coordinated actions are not organized, because every one is willing to free-ride on someone's leadership for coordinating their behaviors. The global commons are not, *inter alia*, escaped from overexploitation. It is because the participation constraint on the social entrepreneur is not met owing to the prohibitively high cost of organizing global communities on a voluntary basis.

When the tragedy of the global commons is reformulated from the point of view of the logic of collective action as in the above, we can seek solutions to it in alternative ways by which the collective action problem is overcome. According to the results of this paper, the collective action for financing the preservation of global commons can be organized on a voluntary basis, if two conditions are met as follows: (i) that if the exploiters are enlightened to be a foresighted long-run self-interests seeker, and (ii) that if the organizer can undertake the incentive schemes which can motivate not only those exploiters but also himself to participate in coordinated actions. A "selective-incentives scheme" can stop the global commons from being degraded, if it can finance the cost of preserving the global commons by the net profits obtainable from undertaking the selective-incentives scheme. The eco-good scheme is one of the schemes

According to the logic of collective action, the ozone layers are a common interest of the "privileged group," but the global temperature is a common interest of the "latent group," even if both of them appear to be a common-pool on a global scale. The headwater function of forests is a common interest of a privileged group, but the CO₂-sink function of the same forests is a common interest of a latent group, even if the forests appear to be a

common-pool resource on a local scale.¹¹ The common interests of the latent groups must be achieved by some appropriate selective-incentives schemes. Based on the logic of collective action organized by social entrepreneurs, we examined whether or not he can finance collective action for the “global commons” by means of the eco-good, and whether or not he can finance on a higher level under NPO.

According to the logic of Demsetz (1964,1967), the “tragedy of the commons” should be recognized as a property-right problem in the sense that common-pool resources tend to be degraded under the institutional condition of “open or free access.” Here, the free or open access is defined as the imperfect validation of formal ownership, which is due to prohibitively a high cost to establish and/or enforce it. Not only “no formal property-right”, but also “common property-right” are subsumed under the open-access unless community users of the common properties are regulated so as to suit for the purpose of sustainable use. Up till now, three categories of property rights have been claimed as the means of putting an end to free-access, as follows: (i) Centralist Ownership (Ophuls, 1973; Hardin, 1978), (ii) Privatization (Demsetz, 1964, 1967; Dales, 1968, Smith,1981), and (iii) Communal Self-Management (Ostrom, 1990, Wade, 1987). According to the property-right approach, each of these regimes should have been established as a result of maximizing the benefit minus cost brought about by it. In the light of such reasoning, this approach may seem to contribute to giving each property-right regime a rational foundation.

However, it should be noted here that any shift from an open-access to enforceable property-right regime can be achieved as the result of an institutional change from anarchy to constitutional contract (Buchanan, 1975), and that such an institutional change must be achieved by some collective action. Accordingly, without explaining both the whole process of the collective action for establishing a property-right regime and the total costs including those of the collective action, the property-right approach can not claim that it founds property-rights on the rational logical basis.

¹¹ For example, see many social networks in river-basins aimed at preserving mountain forests in the headwaters. They are organized by the leadership of NPO. By contrast, it is difficult to take ubiquitous examples of the collective action the direct objective of which is “curbing global warming.”

However, the problem of how the collective action is organized remained to be solved, and so the logical foundation of the property-right approach turns out to be unsound.

On the other hand, according to Ueda (2005;2003a; 2003b), the missing link of the traditional logic of collective action is the “organizing work” and “managing work” done by the organizer of collective action. In particular, the former work is not only indispensable but also must be done prior to the managing work. It is, therefore, more subjected to incomplete-contract problems due to its unverifiable nature. In order to organize the collective action even for a small group, accordingly, the organizer has to design and carry out appropriate “selective incentives” schemes which can motivate him to take on the organizing and managing work. The costlier the organizer’s works are, the more attractive selective-incentives scheme is required in order to induce the organizer himself to do those works.

Furthermore, our ubiquitous observations are that when the social entrepreneur undertakes selective-incentives schemes, he appeals for not-for-profit enterprises as an organizational form under which those schemes are carried out. Bilodeau and Slivinski(1998) gave a rational basis to the relation between volunteers and NPO, but they did not take into consideration the incentive problems with the costly leadership of the social entrepreneur. Rational explanations have not been given to the relation between the social entrepreneur and NPO.¹²

7. The Main Conclusions

Any collective action must be examined not only from the angle of the organized players but also from that of the organizer players. Furthermore, the organized must be classified into a myopic type and non-myopic type of selfish individualists, because the former type is not interested in any future repercussion effects of their present behavior on their own payoffs, if any. Only after being enlightened to be conscious of the future effects, they can be evolved into a non-myopic type. Even if , however, they are of a long run

¹² See Ueda (2005) as to the rational explanation of the relation between social entrepreneur and NPO.

type, the benefits to the organizer, obtainable from organizing the collective action, may not exceed the cost to him of organizing it to achieve collective interests, in particular, for common-pool resources such as those of a global nature, resulting in no incentives for anyone to take on the leadership. It is here that an entrepreneur type of social organizer can play a crucial role. He has to create and undertake appropriate selective-incentives schemes in order to overcome the incentives problems with the leadership for collective action. The Olsonian logic of collective action has been viewed mainly from the myopic organized players' angle, and therefore it could not describe the whole process of achieving collective interests.

In this paper, by taking into consideration not only the fact that leadership is indispensable for any collective action but also the fact that it is costly, we come up with a three-stage game model to examine the process of financing collective action, with a view to applying to a sustainable use of global commons. The main results are summarized as follows: (i) that under appropriate selective-incentives schemes such as eco-goods, the social entrepreneur can achieve common interests on a more satisfactory level under not-for-profit enterprise than under for-profit one, (ii) that organizational form of a not-for-profit type is a result of the rational calculus of the social entrepreneur but not the result of an altruistic motive, (iii) that, in order for him to choose not-for-profit enterprises rather than for-profit ones, the social organizer must not only be able to be sufficiently efficient at his organizing and managing work but also have sympathy for collective interests (social missions).

In this paper, we omitted describing the process of how a candidate for the social entrepreneur comes into existence at the beginning of the game. In order to examine that process, the readers should refer to Ueda (2005). Practically, however, we can not take it for granted that candidates for the social entrepreneur are ready to enter the game of collective action. In advance of the game, they are required to be trained to be qualified. The existing business schools and public policy schools are required to train those candidates to further our common interests on a voluntary basis.

References

- Bilodeau, Marc and Slivinski, Al (1998). "Rational Nonprofit Entrepreneurship," *Journal of Economics and Management Strategy*, 74(4), pp.551-571.
- Buchanan, James (1975). *The Limits of Liberty*,
- Dales, J.H.(1968). "Land, Water and Ownership," *Canadian Journal of Economics*, 1(4), pp.791-804.
- Demsetz, Harold (1967). "Toward a Theory of Property Rights," *American Economic Review* 57 (2), pp.347-59.
- _____ (1964). "The Exchange and Enforcement of Property Rights," *Journal of Law and Economics* 7, pp.11-26.
- Fama, Eugene F. and Michael C. Jensen (1983). "Agency Problem and Residual Claims," *Journal of Law and Economics* 26, pp.327-349.
- Glaeser, Edward L. and Shleifer, Andrei(2001). "Not-for Profit Entrepreneurs," *Journal of Public Economics*, 81(1). Pp.99-115.
- Hansman, Henry B. (1996). *The Ownership of Enterprise*, Cambridge, M.A: Harvard University Press.
- _____ (1980). "The Role of Nonprofit Enterprise," *The Yale Law Journal* 89(5), pp.835-901.
- Hardin, Garrett (1968). "Tragedy of the Commons," *Science* 162, pp.1234-48.
- _____ (1978)."Political Requirements for Preserving Our Common Heritage," in *Wildlife and America*, ed. by H.P. Bokaw, Washinton,D.C.: Council on Environmental Quality, pp.310-17.
- Kirzner, Israel M.(1973). *Competition and Entrepreneurship*, Chicago: The University of Chicago Press.
- Morgan, John (2000)."Financing Public Goods By Means of Lotteries," *Review of Economic Studies*, 67 (4), pp.761-84.
- Nishizaki, Ichiro, Ueda, Yoshifumi, and Sasaki, Tomoaki (2004). "Financing for preservation of the global commons and simulation analysis on an artificial society model," *Journal of System Control and Information*, 17 (8), forthcoming.
- Ophuls, W.(1973). "Leviathan or Oblivion," in *Toward a Steady State Economy*, ed. by H.E. Daly, San Francisco: Freeman, pp.215-30.

- Ostrom, Elinor (1990). *Governing the Commons*, New York: Cambridge Univ. Press.
- Olson, Mancur (1965). *The Logic of Collective Action*, Cambridge, M.A: Harvard Univ. Press.
- Smith, Robert J.(1981). "Resolving the Tragedy of the Commons by Creating Private Property Rights in Wildlife," *Cato Journal*, 1 (2), pp.439-468.
- Sandler, Todd (1998)."Global and Regional Public Goods: A Prognosis for Collective Action," *Fiscal Studies* 19 (3), pp.221-247.
- _____ (1995). "Management of Transnational Commons; Coordination, Publicness and Treaty Formation," *Land Economics* 71(2), pp.145-62.
- _____ (1992)."After the Cold War, Secure the Global Commons," *Challenge* 35, pp.123.
- Ueda, Yoshifumi (2005). "The Rational Foundations of Leadership: Who stands up first for a change?", *Mimeo, Paper for the 2005 PCS Meeting*.
- _____ (2003a). "Who Takes on Entrepreneurship for Collective Action," *Mimeo*.
- _____ (2003b). "The Hold-up Problem with Political Entrepreneurship for Collective Action," *Hiroshima Economic Review*, 27(1), pp.71-88.
- Ueda, Yoshifumi and Svendsen, Gert Tinggaard (2002). "How to Solve the Commons," *The Aarhus School of Business Working Paper* No.02-13.
- Wade, Robert (1987). "The Management of Common Property Resources: Collective Action as An Alternative to Private or State Regulation," *Cambridge Journal of Economics*, 11 (2), PP.95-106.