THE CHALLENGE OF HARDIN'S IDEA ON THE TRAGEDY OF THE COMMONS

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ABSTRAK. Menurut pandangan Hardin, padang penggembalaan dan berbagai sumberdaya milik bersama lainnya, biasanya dimanfaatkan oleh setiap orang secara bebas, tanpa ada insentif untuk mengkonservasinya. Karena itu, tidaklah heran bahwa berbagai sumberdaya milik bersama atau tidak ada pemiliknya sangat rentan mengalami "*the tragedy of the commons". Di samping* itu, menurut Hardin, berbagai sumberdaya milik bersama hanya dapat dikelola dengan baik melalui swastanisasi atau dikontrol pihak pemerintah. Namun, berdasarkan hasil-hasil studi dari berbagai kelompok masyarakat di berbagai wilayah, menunjukkan bahwa berbagai sumberdaya milik bersama, seperti maritim, padang penggembalaan, dan hutan tidak selalu mengalami degradasi. Hal ini dikarenakan berbagai sumberdaya milik bersama tersebut tidak selalu merupakan akses tanpa pemilikan, dan bebas dimanfaatkan oleh setiap orang. Selain itu, kenyataan di lapangan juga menunjukkan bahwa pengelolaan sumberdaya milik bersama tidak selalu dapat dikelola secara efektif oleh pihak swasta atau pemerintah. Karena itu, tidaklah heran bahwa pandangan Hardin tersebut banyak dikritik oleh berbagai kalangan ilmuwan pasca Hardin. Artikel ini mendeskripsikan tantangan terhadap teori Hardin mengenai "*the tragedy of the commons" bahwa berbagai sumberdaya milik bersama selalu rentan mengalami degradasi.*

Kata kunci: tragedi milik bersama, berbagai sumberdaya milik bersama, degradasi lingkungan.

ABSTRACT

ABSTRACT. According to Based on Hardin's view's model, pasture land and other resources held in common have usually been freely utilized by everyone without any incentive for conserving and are therefore susceptible to "the tragedy of the commons". In addition, the common property resources can be managed properly only by either the institution of private or government action. However, on the basis of based on case studies from different societies in many regions undertaken by a number of scholars, the commons-property resources, such as marines, rangelandsrangelands, and forests, have not always been degraded. This is because the common property resources are not always to open to all and freely utilized by anyone. Moreover, in reality, both private property and government have not always effectively managed the common property resources. As a result, the Hardin's view has been criticized by a number of scholars of post Hardinian view. there is a basic philosophical difference in the use of the term "common property" between Hardin's view and the contra Hardin view. According to Hardin, common-property resources are open to all. As a result, these common-property resources have been freely utilized by anyone and are prone to degradation. However, according to contra Hardin, the common-property resources are not always ownerless but in some cases are owned by well-defined social groups, for example, the local communities who manage the common-property resources. This paper describes the ideas that challenge the theory of f Garret Hardin, namely "the tragedy of the commons"

revealed by Garret Hardin which who assumes , particularly in relation to the view that common-property resources are always susceptible to degradation.

Key words: *the tragedy of the commons, common-property resources, environmental degradation*.

TANTANGAN ATAS GAGASAN HARDIN TENTANG "THE TRAGEDY OF THE COMMONS"

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ABSTRAK

Menurut pandangan Hardin, padang penggembalaan dan berbagai sumberdaya milik bersama lainnya, biasanya dimanfaatkan oleh setiap orang secara bebas, tanpa ada insentif untuk mengkonservasinya. Karena itu, tidaklah heran bahwa berbagai sumberdaya milik bersama atau tidak ada pemiliknya sangat rentan mengalami "*the tragedy of the commons*". Di samping itu, menurut Hardin, berbagai sumberdaya milik bersama hanya dapat dikelola dengan baik melalui swastanisasi atau dikontrol pihak pemerintah. Namun, berdasarkan hasil-hasil studi dari berbagai kelompok masyarakat di berbagai wilayah, menunjukkan bahwa berbagai sumberdaya milik bersama, seperti maritim, padang penggembalaan, dan hutan tidak selalu mengalami degradasi. Hal ini dikarenakan berbagai sumberdaya milik bersama tersebut tidak selalu merupakan akses tanpa pemilikan, dan bebas dimanfaatkan oleh setiap orang. Selain itu, kenyataan di lapangan juga menunjukkan bahwa pengelolaan sumberdaya milik bersama tidak selalu dapat dikelola secara efektif oleh pihak swasta atau pemerintah. Karena itu, tidaklah heran bahwa pandangan Hardin tersebut banyak dikritik oleh berbagai kalangan ilmuwan pasca Hardin. Artikel ini mendeskripsikan tantangan terhadap teori Hardin mengenai "*the tragedy of the commons"* bahwa berbagai sumberdaya milik bersama selalu rentan mengalami degradasi.

Kata kunci: *tragedi milik bersama, berbagai sumberdaya milik bersama, degradasi lingkungan.*

INTRODUCTION

Since the early 1970s, particularly after the 1972 UN Conference on Human Environment, environmental issues have become major global concern. Various problems of environmental degradation have been widely reported in both developed and developing countries. In developed countries various environmental problems, such as pollution, fish stock depletion, acid rain, and toxic waste have been widely known.

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Unlike the developed countries, the most serious problems concerning environmental degradation in developing countries are domestic waste pollution, forest destruction, soil erosion, and loss of wildlife.

The main issue both in the developed and developing countries related to over exploitation of the natural resources is the so-caolled "tragedy of the commons". This tragedy has been known for more than three decades since Garret Hardin first addressed it in 1968. According to Hardin's model, "the tragedy of the commons" has occurred because pasture land or other resources, such as rivers, oceans, and forests, are held in common. Serious damage results because individuals do not see it in their own interest to protect those resources. Everyone tends to utilize these resources without any incentive for conserving them. According to Hardin, the tragedy results because;

> ' … a pasture open to all. It is to be expected that each herds-man will try to keep as many cattle as possible on the commons. ….. the rational herdsman concludes that the only sensible course for him to pursue is to add another animal to his herd. And another; and another… … But this is conclusion is reached by each and every rational herdsman sharing ain commons. Therein is the tragedy (Hardin, 1968: 1244).

The Hardin is viewmodel has a number of implicationimplications for the utilising other similar natural resources, such as the ocean. Therefore, each fisherman in his utilising fish in the ocean may apply the rational thinking of every herdsman, by analogy. the rational thinking of every herdsman, by analogy may be appied by each fisherman in his utilising the ocean. For example, why should one fisherman reduce his own harvest to conserve the fish in general when they will be taken by some one else in the near future (Acheson, 1989b: 199). Hardin has the view that the oceans of the world have suffered from degradation because these oceans are open to all. Similarly, the national parks have been considered as open to all, without limit. Therefore, to avoid the tragedy of the commons, the resources should be privatised or controlled by the government. (Hardin, 1968: 1245).

The notion of the tragedy of commons has been widely discussed and criticized by many scholars, including McCay and Acheson (1987); Berkes (1989); Acheson (1989b); Berkes *et al*.(1989), and Andelson (1991). This paper describes ideas of Post Hardinian that challenge idea of the tragedy of the commons based on case studies from different societies both in the developed and developing countries.

CONCEPT OF THE COMMON PROPERTY

Natural resources play an important role for humankind in providing various functions, such as food and income. In utilising and managing natural resources many factors are involved. The most important is the type of property regimes: open-access, state, private, and common or communal property (Gibb and Bromley, 1989: 24; Berkes and Taghi Farvar, 1989; Berkes *et al*, 1985: 91). Each of these has specific characteristics. Thus: (1) open-access means the absence of well-defined property rights, whereby access is free and open to all; (2) private property refers to the situation in which

an individual or corporation has the right to exclude others from using the resource and to regulate its use; (3) under communal property, the resource is held by an identifiable community of users who can exclude the others and regulate use; (4) state property or state governed property ensures that rights to the resources are vested exclusively in government (Berkes *et al., 1985: 91).*

Based on these four categories of property regimes, there is a basic philosophical difference in the use of the term "common property" between Hardin and the post Hardinian. According to Hardin's view, common property is not owned by anyone. It is a free goods, owned by no one and belonging to every one, e.g. range land resources. In contrast, according to the post Hardinian view, common property should be restricted to communally owned resources, i.e. those resources for which there exist communal arrangements for the exclusion of non-owners and for allocation among co-owners (Berkes and Taghi Farvar, 1989:7). In other words, the common property resources are not ownerless (*res nullius*)*)* but are owned in common (*res communes*) by well-defined social groups in the local community (Berkes, 1985b: 202). For example, it has been recognised that in many countries and regions, such as Indonesia, Japan, Melanesia, Papua New Guinea, Canada, and North America, the informal territoriality of some marine environments is recognized as being owned and managed by the local community (Johannes, 1982a; Berkes, 1985b; Acheson, 1987; Carrier, 1987; Ruddle, 1989; Wahyono *et al.*, 2000).

HARDIN'S MODEL AND THE TRAGEDY OF THE COMMONS

The concept of common property in relation to resource depletion was first introduced by Garret Hardin (1968), which discussed the world population problem in an article published in *Science*. Hardin (1968: 1243), points out that a finite world can support only a finite population, which means that the per capita share of the world's goods must steadily decrease. Seemingly, there is no technical solution to solve this problem, rather a fundamental extension in morality is required. He discusses this dilemma in a simplified way by using the example of pastoral utilisation. According to Hardin (1968:1244), a pasture is open to all. Therefore, if one of the herdsmen adds more and more animals in his herds, explicitly or implicitly, more or less consciously, he depletes the communal sources. Moreover, Hardin mentions that:

> "This utility has one negative and one positive component. 1) The positive component is a function of the increment of one animal. Since the herdsman receives all the proceeds from the sale of the additional animal, the positive utility is nearly +1. 2) The negative component is a function of the additional overgrazing created by one more animal. Since, however, the effects of overgrazing are shared by all the herdsmen, the negative utility for any particular decision-making herdsman is only a fraction of –1 (1968: 1244)".

Hardin suggests that to solve this problem, either government control or privatisation is required.

Hardin's theory has been widely criticized and rejected by a number of scholars on a variety of grounds. According to pPost Hardinian view, the tragedy of the commons introduced by Hardin infers a number of basic assumptions (c.f. Stillman, 1975; Acheson, 1989b: 375-378):

(1) That common resources involve the absence of private property or are owned by no one and belong to everyone;
(2) That the user is selfish. The individual has to be able to pursue self-interest to achieve economic goals, which over exploit resources on which their livelihood depends, without considering other users;
(3) That the user has the technical capacity to exploit the common property resource, resulting in the rate of extraction exceeding the natural replenishment of the resource;
(4) That the community which depends on common property resources cannot and will not erect effective institutions to protect that resources; and
(5) Those common property resources can be well managed only by either the institution of private property or government action.

CRITICISM OF HARDIN'S MODEL

Case studies from different societies in various regions, related to marine, range land and forest ecosystems, show that the opose the oppose mentioned basic assumptions of the Hardin's model can be challenged on a number of grounds, as discussed below:

Firstly, the common resources involve the absence of private property or are owned by no one and belong to the environment. In reality, based on analysis from different regions, the common resources, such as marine resources in many regions of Asia, Oceania, Canada, and USA have not been unregulated as open access, but rather belong to local communities (Acheson, 1975, 1987; MacCay, 1980; Berkes, 1985a, 1985b; Chapman, 1985; Ruddle, 1989; Carrier, 1987; Hudson, 192; Johannes, 1982b; Spring, 1982). .

Second, the users are selfish individuals driven to achieve economic goals by over exploiting resources on which their livelihoods depend. In reality, individual rights are subordinate to community rights. For example, based on some case studies, the local fishermen of Indonesia, Japan, Turkey, and Canada have not freely exploited their marines resources because they have been traditionally controlled by informal leaders, "harbour gang", and so on (Acheson 1975; Ruddle, 1989; Wahyono *et al*., 2000; Marten, 2001). Similarly, the traditional pastoralists and swidden cultivators have not freely exploited their local resources since informal or local leaders have restrained practices (Little, 1985).

Third, individuals are using common-property resources and communities in which they live cannot and will not erect effective institutions to protect those resources. As we have seen in many instances, such as in Maluku, Sulawesi and Papua of Eastern Indonesia, local village societies have generated special institutions called *sasi* to control overexploitation of local marine resources (Wahyono *et al.*, 2000).

Forth, the common-property resources can be managed only by either the institution of private property or government action. In reality, however, both private property and government have not always effectively managed the common property resources. For

example, the forest in Indonesia has not been effectively managed by the private sector (forest concession holder or *HPH*) or by the semi-government bodies (*Inhutani*). *).*Consequently, widespread forest destruction in many areas of Indonesia, such as East Kalimantan, has not been avoided (Iskandar and Ginanjar, 2002) .

F The fifth, the user has the technical capacity to exploit the common resource. Therefore, over-exploitation has not been avoided. In reality, however, local communities have not either the ability or the motive to over exploit common-property resources. In general, local communities have built up an extensive knowledge, which they have received from earlier generations and from trial and error over a long time. This knowledge allows them to appropriately manage their local resources, to their socio-economic and ecological advantage. Various indigenous management and conservation systems have been known in Indonesia, such as:

(1). *Subak, traditional irrigation management system in Bali (Arawata, 2003);*
(2). *Lubuk latangan, river tenure management system in Tapanuli (Lubis, 1999);*
(3). *Sasi darat, land tenure management system in Maluku, and sasi laut, sea enure* management system in Maluku, Sulawesi, and Papua (Wahyono *et al, 2000).*
(4). *Tana' ulen, traditional forest management system of indigenous Dayak, East Kalimantan* (Lamis *et al. 1999);*
(5). *Leuweung lembur and leuweung titipan, traditional forest management and conservation* system of indigenous Baduy South Banten (Iskandar, 1998); and
(6). *Leuweung kolot or Leuweung Geledegan, and Leuweung Titipan, traditional forest* management and conservation system of indigenous Kasepuhan, Cisolok, Sukabumi (Adimihardja, 2004).

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(f). *Leuweung klolot* or *Leuweung Geledegan,* and *Leuweung Titipan*, traditional forest management and conservation system of indigenous Kasepuhan, Cisolok, Sukabumi (Adimihardja, 2004).

THE USE OF COMMON-PROPERTY RESOURCES

It has been discussed earlier that some basic assumptions of the tragedy of the commons have not proven to be true. The following are case studies of the use of common-property resources from different societies in various regions, described by a number of scholars.

Marine

According to Hardin's model, the marine or ocean environment is considered "common property" or "open access". As mentioned by Hardin:

> '…the oceans of the world continue to suffer from the survival of the philosophy of the commons. Maritime nations still respond automatically to the shibboleth of the "freedom of the seas". Professing to believe in the "inexhaustible resources of the ocean," they bring species after species of fish and whales closer to extinction' (1968: 1245).

The first thing to be considered about this prediction is that that it tends to emphasize the non-limitation of individual rights to utilise natural common resources. In reality, however, individual rights are usually affected by constraining social factors, such as the beliefs and norms of a community. In other words, according to Acheson (1989b: 375-376), individual rights are subordinate to community rights. In virtually all societies, there are controls on access to resources and various kinds of rules and institutional arrangements to limit exploitative activities. Individuals are not allowed to seek their short-term goals at the expense of the society. Thus, for instance, in a fishing community it is important to control the use of the natural resources which can create limited property rights over fishery resources.

Various kinds of fishery tenure systems exist in different regions (Acheson, 1989a; Berkes, 1985a: 202; Wahyono *et al*., 2000; Soselisa, 2001; Marten, 2001: 160-161), for example:

(1) property rights of cooperatives for a variety of inshore fisheries in Japan and Turkey;
(2) group territories (harbour gang) of lobster trappers in inshore Maine, USA;
(3) exclusive rights by group of villages to reefs and lagoons in Oceania;
(4) community resource use rights for gill-net and seine fishing in James Bay, Quebec;
(5) licensed community of fishing cooperative rights for shrimp weirs in Gulf of California; and
(6) exclusive rights by group of villages to sea and its resources, such as fish, shrimps, and turtle in Papua, Sulawesi and Maluku of Eastern Indonesia. This traditional regulation has been popularly known as *sasi laut*.

In Japan, for example, it has long been the case that fishing rights to marine waters are controlled by the community based on customary village tenure. Nowadays, some

traditional values and behavioural norms are still recognised. For example, in one cooperative on Lake Biwa, which has been administered for about a century for fishermen as a "small sea", *koumi*, the use of fish weirs, was allocated solely to village paupers (Ruddle, 1989: 174). More generally, each fisherman enjoys legally guaranteed equitable access to and ownership of the living aquatic resources in coastal waters.

In Turkey, many traditional fishing villages have territorial authority over fishing areas near the village. As a result, the fishermen have distinct ownership that is essential for avoiding tragedy of the commons in a coastal fishery. Moreover, the fishermen have made special traditional rules, which are easily understood by every one. For example, they are also fair despite the complexities of good sites, poor sites and fish movements during the year. Every fisherman has an opportunity to fish good sites as well as poor ones (Martin, 2001:160-161).

Similarly, in Eastern Indonesia, such as Papua, Maluku, and Sulawesi, the sea tenure system (*hak ulayat*) has been widely recognised. According to Lokollo (1988), cited by Wahyono *et al*.. (2000), the traditional rules *(sasi*) have been traditionally applied in Maluku since the sixteenth century. Based on *sasi*, the local community has traditionally managed their exclusive, distinctive fishing areas, which are normally bordered by hills, cape, cave, village borders, stakes, and shallow waters. To manage the coastal fishery, every local fisherman has been allowed to fish only certain months in each year during the open fishing season. Conversely, during the closed fishing season, all fishermen are prohibited from fishing. This traditional rule has been controlled by village informal leaders using a system which is called *Kewang* in Maluku or *Dewan Adat* in Papua. Fishermen who violate these rules are usually given penaltiesfinalty, such as by paying money.

According to Carrier (1982: 146), in many islands in Melanesia, such as Ponam Island, maritime ownership is commonly owned by groups, such as clans, lineages or other kinship groups. Only fishing equipment is owned as personal property. However, those areas of reef and sea and those species and fishing techniques that are owned are the property of patrilineal descent groups. Johannes and Spring describe similar arrangements to those mentioned by Carrier. According to Johannes (1982a: 259), although traditional fishing rights have largely disappeared from island groups, such as Hawaii, the Mariannas, Ponape, and American Samoa, in other island countries, such as Fiji, Palau Yap and much of Papua New Guinea, these rights are not only still practised but are also protected through explicit or implicit legal recognition. Thus, the right to fish in a particular area is controlled by a clan, chief or family. Moreover, in many Papua New Guinean villages, the boundaries of traditional inter village fishing areas are often marked by lining-up obvious features along the outer reef edge, such as the channel mouth or protruding rocks, with the coastline. In addition, one fishing boundary between two villages or islands is marked very obviously by clearing coral and rock along the boundary line to form a kind of underwater path readily observable from a canoe (Johannes, 1982b: 240-241). Spring (1982: 203-204) also points out that in some parts of Papua New Guinea, various animals, such as fish, turtle and shellfish belong to certain families within the village. Therefore, these animals cannot be hunted by people from other villages without obtaining permission from the owners.

These kinds of sea tenure systems are not only known from in the Eastern societies but also fromin Western societies. According to Acheson (1975: 187-191), in Maine, USA, from an official point-of-view, anyone who has a license can go lobster fishing anywhere. However, in realty far more is required. For example, to go fishing, one needs to be accepted by the men fishing out of one harbour and one has to gain admission to "the harbour gang".

In Maine there are two different types of lobster fishing territory management systems: nucleated and perimeter-defended. In general, it is relatively easy to gain acceptance to harbour gangs in nucleated areas. Particularly if a person is a resident of the community and shows a willingness to abide by local fishing norms, the person will eventually be accepted into the local gang. However, it is vastly more difficult to gain admission to harbour gangs that maintain perimeter-defended territories, which are located outside the nucleated areas.

Similarly, in the Great Lakes, Canada, fishermen are able to manage fishing areas by making borders based on mutual agreement. Such allocations operate informally, and are therefore more efficient and flexible (Berkes, 1985b; 192). In this case, it can be seen that informal regulation is more applicable than those of the formal government regulation.

To sum up, in some regions access to the marine resource is not open to all as assumed by Hardin's model, but is controlled by identifiable local communities of users. Moreover, each is restrained from acting entirely in that person's own selfish, short-term interest by various informal regulations, beliefs, taboos, and the actions of informal leaders.

Range Land

According to Hardin's model, traditional pastoralism in many regions will inevitably lead to overgrazing due to the selfishness of each herdsman. In reality, from many case studies, overgrazing is avoided by pastoralists of Africa because they have a specific social organization. For instance, grazing land can be managed through cyclic dynamic movement involving traditional institutions. The Il Chamus, Kenya, are a case in point. They have traditional means of regulating pastoral grazing systems called *olokeri* (Little, 1985: 139). Under the *olokeri* system, the swamp and certain high land areas are restricted, and can only be grazed in the good seasons. The main purpose of this is to hold in reserve certain grazing land in the good seasons due to the relative abundance of grasses at the time.

However, in the bad seasons these areas can be grazed due to lack of grasses in many other places. Thus, these areas function as "rangelands reserve stock". An appropriate time to close these areas is decided by a council leader (*lamaal*). One *lamaal* is usually composed by a coalition of two or three neighbor units. The control of this area is usually accomplished by young males between 18-30 years of age called *Ilmuaran* (Little, 1985: 139). Decisions to restrict access to an area are made according to both the conditions of livestock and the range. For example, if the livestock are in good condition and there is sufficient grazing in the wet season range, then the area will be restricted. These areas, however, can be opened when there is a lack of grazing land in many areas, and when the livestock are also in a bad condition. Decisions concerning the time and

place to graze are increasingly left up to the individual unit, although recognition is still made of the *olokeri* (Little, 1985: 139).

In order to avert either overgrazing and grazing land destruction, livestock are grazed in small herds. By splitting their livestock into several small herds, livestock more efficiently utilise resources and survive food shortage better than animals in large herds (Western and Finch, 1986: 90). By this strategy, grazing land can be maintained appropriately to achieve sustainable production on a long-term basis. In addition, to reduce the risk of over grazing, livestock are also divided into smaller herds and looked after by relatives or friends in different areas. Therefore, by this strategy the livestock can be maintained in different areas because grasses are distributed differently in different places. Moreover, social interrelationships can be maintained.

Another important aspect which needs to be discussed is the movement of herds. Hardin mentions that '… a pasture opens to all. It is to be expected that each herds-man will try to keep as many cattle as possible on the commons' (Hardin, 1968: 1244).

Regarding this, Based on Hardin's view as mentioned above, it seems that each herdsman adds animals without considering the territory of each herdsman group. In reality, however, pastoralists usually move dynamically in order to develop a strategy of survival, which has a spatial pattern, ranging from the simple, seasonal, and short distance transhumance, to long-distance movement (Windstrand, 1975: 150). But such movements are restricted by territoriality and the involvement of various social organisations. According to Dyson-Hudson and Dyson-Hudson (1969), because of the patchy and unpredictable nature of resources and the individualized pattern of herd movement, territorial ownership of fixed grazing areas is not a viable strategy for the Karimojong of Uganda. However, at a particular point in time the number of cattle grazing in an area can be regulated by social interactions. A herd-owner moving to a new grazing area must request permission of the people already herding in the area, who are organised into an ephemeral political unit termed a "clump cluster'. These social interactions allow exchange of information and can operate to regulate the number of herds in a particular area at a particular point in time in relation to the available resources. In times of severe shortage the people who are associated in a camp cluster may exclude other Karimojong from the area where they are grazing, or from sharing their water supply, and enforce the exclusion by fighting with sticks. Therefore, territoriality is important for the pastoralists in order to adapt to their environment.

Forest

According to Hardin's model, various forestland use types, including national parks are a common property resources. He mentions that, as is mentioned by him that:

> 'The National Parks present another instance of the working out of the tragedy of the commons. At present, they are open to all, without limit' (Hardin, 1968: 1245).

It is clear, however, based on case studies from different regions, theat forest is not always open to all, without limit. For example, historically, forestlands in some regions of Southeast Asia have traditionally belonged to the community. In Indonesia, it has long been recognised that according to customary law (*adat*) some local community groups have rights to forestland called *hak ulayat*. Based on the Agrarian Law of 1960 (*Undang-Undang Pokok Agraria* 1960), for example, such land rights have been recognised:

> *The implementation of the communal property of the hak ulayat (the communal rights of an adat community), and the rights similar to that of adat community, in so far as they exist, shall be adjusted such as to fit in the national and state's interest, based on the unity of the nation and shall not be in conflict with the acts and other regulation of higher level ……..* Article 3 (SKEPHI and Kiddell-Monroe, 1993: 237).

Nowadays, such rights to land are mostly recognised in Outer Indonesia, such as Sumatera, Kalimantan, Sulawesi, Maluku and Papua, where the larger forest areas are still to be found. In Inner Indonesia (Java and Bali), however*, hak ulayat* is almost disappear. Land rarely recognised any more. This is due to high population pressure on land and a rapid development programme in Java and Bali. Thus, land has been privatised and intensively used for a long time (Geertz, 1963). Only in certain , special areas, is *hak ulayat* still to be found, such as in the Baduy community, South Banten *hak ulayat* is still to be found (Iskandar, 1998).

In Indonesia, communal land is usually used for practising swidden cultivation called *ladang*. Other non timber forest products, such as rattan, resin, aloe wood (*gaharu*), iron wood (*ulin*), edible mushrooms, edible bird's nests, and wildlife have also playan an important role for swidden cultivators in order to fulfil their home consumption as well for their income. from some surpluses sold in markets.

Local communities who live in the forest areas use primary forest (*hutan primer* or *rimba*) as a collective resource. However, rights to swidden fields (*lahan ladang*) are often individual. According to Appell (1986: 120), the swidden plots are initially established by cutting the primary forest (*rimba*) and planted by rice in one or two years successively. After harvesting rice, the swidden plots (*ladang*) are normally fallowed and recultivated after fallowing more than 5 years. Moreover, by natural vegetation succession process, it has become the secondary forest (*belukar*) and affirmatively belonged to each household. As a result, rights to swidden plots and fallowed lands land in various groups in Borneo, such as the Iban, the Bidayuh Land Dayak, the Kenyah, the Ma'anyan, the Melanau, the Bisaya, the Kantu' Dayak, the Selako Dayak, the Maloh, the Punan Bah, are belonged to each independence house hold instead of belonging to collective resource. created by cutting primary forest (*rimba tua*). These swidden plots and fallowed land rights may be exercised over a period of years or permanently, and may be transferred to other jural entities.

Among the Iban and Dayak, for example, swidden fields (*ladang*) are passed equally to all descendants (Freeman, 1955; Dixon, 1974). As a result, eEach person in a village , therefore, belongs to a number of land holding descent groups and each plot is subject to

cultivation by a number of persons. According to Each family, customary law, each household of the swidden farmer thereforis normally allowed to open e, each year has independentthe primary forest to plan rice annually. The size of swidden plot for each household is normally , separate swidden plots the size of which is determined by the availability of the labour in the family (Freeman, 1955). Moreover, each individual makes their own decisions for managing their swidden fields, although constrained by some informal community regulations. Under the traditional system, the decision to select certain new swidden fields before planting upland rice each year is always discussed together in a meeting attended by all *bilek* family representatives.

Traditionally, as long as forest land is plentiful and the agricultural techniques are sensitive to the local environment, swidden cultivation systems may be productive in terms of labour and ecological sustainability (Conklin, 1957; Geertz, 1963; Dove, 1985). Therefore, the tragedy of the commons, as predicted by Hardin, need not occur in practice under a traditional swidden cultivation system. Forest is not free good, , but rather each swidden field and area of secondary forest "belongs" to a particular group. This system, however, cannot always be sustained on a long-term basis. This is due to prevailing circumstances, for example, population pressure, and external factors, such as logging, commercial plantations, transmigration programmes, and mining projects (Kartawinata *et al*., 1981; Rigg, 1991; Colchester and Lochmann, 1993).

Unlike claims to swidden fields, claims to timber forest products are not clearly fixed for each individual. Therefore, according to Hardin's model, such resources might seem doomed to overexploitation, because everyone wants to harvest such resources as much as possible before they will be taken by somebody else. In reality, however, these resources have been utilised by local communities collectively on a sustainable base. The selfish instincts of individuals in utilizing these resources have been mitigated by beliefs and norms of the societies.

In many areas of East Kalimantan, for example, swidden cultivators can harvest non timber forest products from the fallowed secondary forests, which have been claimed by each household, as well as from primary forests, which have not yet been claimed by anyone (Iskandar and Ginanjar, 2002). Various trees as well as animals which provide benefit for them are usually managed in similar ways. For example, in cutting trees for swidden fields, rattan, resin, aloe wood (*gaharu*) and iron wood (*ulin*) are never cut. Moreover, if they find trees which are habitat for nesting honeybees, such trees are usually conserved to provide some benefits for them. Therefore, these trees are usually found in the swidden as well as primary forest areas.

According to De'Ath (1982: 206) swidden agriculturalists in Papua New Guinea also carefully manage land for swiddening. Farmers are very selective in terms of slope, soil, drainage, sunlight, and do not misuse gardening plots because they know their descendants will have to return to them. In addition, there are also controls on forest resource use associated with territoriality. The hunters and gatherers stake out territories and limit incursions by outsiders. Some restrictions are also applied to hunting animals. For example, to hunt animals, some aspects must be considered first. These include limitation on the time animals can be killed, who is permitted to kill them, where they may be killed, and who eats them (De'Ath, 1982).

In short, local communities in different regions have tended to manage forests appropriately. As a result, the forests have not been considered as open to all. Thus, the tragedy of the commons has been avoided.

DISCUSSION

The tragedy of the commons was proposed by Garret Hardin in an essay, which was first published in 1968. According to Hardin:

> The tragedies of the commons develop in this way. Picture a pasture open to all. It
> is to be expected that each herds-man will try to keep as many cattle as possible on the commons. Such an arrangement may work reasonably satisfactorily for centuries because tribal wars, poaching, and disease keep the number of both man
> and beast well below the carrying capacity of the land. Finally, however, comes the day of reckoning, that is the day when the long-desired goal of social stability
> became a reality. At this point, the inherent logic of the commons remorselessly generate tragedy (1968: 1244).

Based on Hardin's opinionn's suggestion, it can be inferred that pastures or other resources, such as oceans, and forests, which are held in common, are open to all and susceptible to degradation because individuals want to maximize yields and to minimize costs. Moreover, they do not want to conserve the common-property resources. Conversely, if the resources are privately owned, individuals might try to conserve their resources because the degrading of those resources will cost them in the long run by decreasing their yields. Therefore, to minimize costs and maximize yields, private owners will find it rational to conserve their resource. Therefore, according to Hardin, the degradation of private resources can be avoided, while degradiondegradation of common resources is inevitable.

However, the Hardin assumption, in reality, is not totally applicable it can not be applied both in the developed and developing countries. Because based on many case studies from different societies in various regions, the local communities have tended to succeed in sustainablysustainable managing the common-property resources, particularly marine, forests, and range lands. For example, based on my study among the Baduy community in South Banten, Indonesia, it can be inferred that the Baduy communal forests have tended to be managed successfully.

The Baduy divide forest into two main categories: protected and non-protected (Iskandar, 1998). Protected forest constitutes those areas that have never been open for swiddening (*huma*), and which the Baduy call *leuweung kolot* (old mature forest not known to have been previously farmed), large forest (*leuweung gede*) or entrusted forest

(*leuweung titipan*). In addition, there are some small plots of protected forest located on hills (*dungus*). In general, protected forest (*leuweung kolot* or *leuweung gede*) is found in Inner Baduy. Two of the most important protected forest areas are *Arca Domas* and *Sasaka Domas,* located in Cikeusik and Cibeo, respectively. These places can be visited only once a year by informal leaders (*puun*), who are accompanied by a few people both Inner and Outer Baduy who undertake ascetic rituals (*ziarah*). This takes place during the month of *Kalima* in the Baduy calendar.

Another forest type, *reuma kolot* (mature fallowed forest), indicates forest which can be opened for swiddening If protected forest has been opened for swiddening, the term *leuweung* is usually no longer used and is replaced by *reuma*. Moreover, if *reuma* is opened to established settlement, the anthropogenic forest surrounding the hamlet is called *lindung lembur* (hamlet shelter forest) or *dukuh lembur* (hamlet fruits).

Thus, by applying the traditional management system, the Baduy communal forests have tended to be managed appropriately. In other words, the forests which are held in common, have not been seriously damaged because individuals do see it in their own interest to protect those forests.

According to the suggestion of John Reader (cited by Andelson, 1991: 37), 'the true commons' may be defined as an area of mutual benefit and responsibility, managed by those using it in a manner that acknowledges that environmental resources have limitations. Access to the common is restricted by entitlement; use is regulated to ensure that no individual can pursue their own interest to the detriment of others. Far from bringing ruin to all, the true commons functions to keep its exploitation within sustainable limits, thus providing every commoner with a dependable food supply in the short term, and maintaining the viability of available resources for generations to come.

Many factors may determine the success of local communities in managing the common-property resources. One of these factors is social capital. It mainly consists of three components, namely (1) crafting institution, ability of the community to craft institutions in managing the common-property resources; (2) equal participation, equal participation of community members in managing the common property; and (3) trust, growing of trust among community members in managing the common-property resources (c.f. Lubis 1999).

Conversely, based on some case studies show that the management of resources by the private sector has not avoided degradation. One such example is the overgrazing in the Great American Desert, where private ownership has led to degradation of the environment. Additionally, the communal grazing lands of the Borana of Ethiopia have been more productive in terms of protein per acre at a lower cost than private grazing lands in comparable climates of Australian cattle rangeland (Ember and Ember, 1996).

Actually, the misapprehension of common-property resources has been realized by Hardin, as he mentions that:

> 'the title of my 1968 paper should have been "The Tragedy of the *Unmanaged* Commons".
>
> …. The farmers on Hardin pasture do not seem to talk to one another. As

> individuals, they are alienated, rational, utility maximizing automatons and little
> else. The sum total of their social life is the grim, Hobbestian struggle of each against all and all together against the pasture in which they are trapped. This is a
> serious misapprehension of the evidence, as can be shown by abandoning the hypothetical model to examine some relevant empirical evidence.' (Hardin, 1991:
> 178-179).

According to these examples, it can be seen that Hardin's model of "the tragedy of commons" has some weaknesses. Particularly, the high variety of social systems of the local communities, including population, values, ideology, economy, technology, and social organization in interaction with the ecosystem (c.f. Rambo, 1983), has been ignored by Hardin.

Thus, development and commercialization may be more important than private versus communal ownership in leading to overgrazing or overfishing (Ember and Ember, 1996). For example, various strategies developed by indigenous pastoralists of Africa, which have failed to solve the problems in managing their common-property have not been caused by communal ownership leading to overgrazing. Rather, they have failed to manage their commons mainly due to external factors, such as governmental control, encroachment of agropastoralists, and influence by the establishment of nature reserves and national park development (Ayeni, 1983).

Some governmental programmes are introduced to control rangelands in different regions of Africa, which leads to the loss of pastoral lands or restriction on the territories of pastoral people. In many places, pastoralist land areas are now controlled by governments. Pastoralists, however, tend to refuse changes in the status of their grazing land. Therefore, their land might be replaced by other communities. For instance, the Fulani, refuse to change the status of their land, pay taxes or buy land already used by them. According to their beliefs, all land along their traditional routes belongs to them (Ayeni, 1983: 24). Therefore, they refuse to buy land in order to get strong autonomy and free movement.

In some regions of Africa, such as Somalia, Bostwana, Niger, and Mali, pastoralists are influenced by livestock investment of absentee herd ownership by outsiders, such as businessmen, civil servants, townsmen and farmers who purchase livestock The result is disturbance of traditional grazing patterns and institutions due to the activities of non-indigenous pastoralists lacking local knowledge. Moreover, outsiders tend to seek benefits on a short-term basis with less attention to pastoral conservation systems. .

In Eastern Indonesia, which had traditional conservation practices popularly know as *sasi laut*, serious overfishing apparently only became a problem. m when the local people failed to control their sea tenure. Theis failure in management of the resource was caused by outsider interventions and motorized fishing boats (c.f. Wahyono *et al*, 2000).

Similarly, forests of Outer Indonesian areas, such as East Kalimantan have been seriously damaged as a result of the introduction of development and commercialization activities, such as logging, commercial plantation, transmigration, and mining projects,

instead of the communal forest management systems undertaken by local communities (c.f. Iskandar and Ginanzar, 2002).

Thus, it is clear from this discussion of the studies of human ecologists, anthropologists, and researchers in other disciplines, that the theory of common-property resources needs to be extended and modified in several ways if it is to be applied appropriately to various local social systems and ecosystems in different regions of both developed and developing countries.

CONCLUSION

To sum up, the common-property resources, which have usually been managed by the local communities in different regions of both the developed and developing countries, have not necessarily led to environmental degradation as predicted in Hardin's model. In fact, the common-property resources have widely been managed appropriately by local communities because these local communities have strong social capital, consisting of crafting institutions, equality of participation, and trust.

Recently, however, as conditions have changed, many traditional strategies are no longer appropriate or sufficient. The common-property resources have tended to fail to be properly managed by the local communities. Apparently, various internal and external factors, including population increase, market economic penetration, and government policies have undoubtedly affected the local communities in managing the common-property resoucesresources. Therefore, new strategies involving more appropriate management concepts must be developed for sustainable management of common-property resources in the future.

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