The Kyoto Protocol and Private Forest Policy of Local Governments in Japan

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SUMMARY

The policies of the national government for global warming prevention are increasing in importance in Japan, especially after the Kyoto Protocol went into effect in February of 2005. The national government wants to use domestic forest resources at the maximum level permitted for the calculation of CO_2 emission reduction. Forestry Agency has strongly combined the domestic forestry promotion policies to the global warming prevention policies, and has made a 10-year action plan. In this paper, the problem relating to the forest resource database and related statistics, which is one of several serious problems in the forestry management system in Japan, is clarified, as well as the problem relating to the administrative works of prefectural governments which manage the database. The database has much incorrect data, which is difficult to correct due to the lack of both budget and staff. The budget problem has seriously affected the entire administrative section since the 1990s. Regional environmental tax relating to forest has recently begun in several prefectures, however the total revenue is very small. The basic reason of the problem in relation to the database is that the National Land Survey is as yet incomplete, thus the land size, which is one of the basic data in forest resource database, is unreliable. Because of the insufficiency of the Cutting Reporting System in forest planning and the lack of the statistics regarding timber cutting, the true cutting volume shown by each municipality is unclear. Considering these situations, without change it seems to be difficult for the private forest sector to contribute greatly to the Kyoto Protocol. Though the private forestry promotion measures and the global warming prevention measures differ from each other, the problems relating to forest resource database and forestry statistics are common to both and therefore, must be addressed immediately.

INTRODUCTION

As the Kyoto Protocol became effective in February of 2005, Japan must cut 6% of the total greenhouse gas from the levels of 1990 during the first commitment period of 2008-2012. The national government made the Kyoto Protocol Target Achievement Plan in April of 2005. Under the plan, the carbon absorption by the domestic forest sector is expected to reach to 3.9% of the total greenhouse gas of 1990. This level was accepted officially by COP7 in 2001. The plan also points out the serious situation relating to the domestic forest sector. Namely, when we calculate the carbon absorption by forests under the conditions of the current forest practices, log production, and lumber utilization, it must be far below 3.9%. It becomes a national policy matter to increase the size of forest which is considered as correct forest management area under Article 3.4 of the Kyoto Protocol.

Japanese forest is divided into national forest, public forest and private forest classified by ownership. National forest is managed by the Forestry Agency of Ministry of Agriculture, Forestry and Fisheries, and public forest is managed by local governments. Recently, both national and local governments have made various action plans on global warming, including policy

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measures for national and public forests managed directly by both national and local governments, respectively. When a sufficient level of budget and correct management organization exists, both categories of forests have the possibility to realize the plan. In this sense, the forest category which has the most difficulty in achieving the proposed plan is the private forest, composed of a large number of forest owners, most of whom are small-scale and non-active owners.

In this paper, we will briefly explain the action plan relating to the global warming problem in the field of forestry. Also, the recent prefectural governments' policies on global warming relating to private forests, especially from the point of the statistics administration, will be explained. The forest resource data management system and the relating statistics system are important to grasp the true forest management situation systematically. The current systems have several serious problems which must soon be improved. Recently, prefectural governments and forest owners' associations have begun new private forest programs relating to global warming, and we will also introduce some new cases.

GLOBAL WARMING PROBLEM AND FOREST POLICY

The Ministry of Agriculture, Forestry, and Fisheries in December of 2002 decided on a 10-year Action Plan of carbon dioxide absorption by forests for the prevention of global warming. This action plan shows the basic policy direction for the global warming problems of this ministry. The targets of the action are: (1) good forest management to maintain a healthy forest (2) promotion of proper management for the conservation of the protection forests (3) promotion of the utilization of timber and wood-biomass, and (4) promotion of forestation (planting, care of the forest) through public awareness hence citizen participation.

There are approximately 10,000,000 ha of artificial forests in Japan. Many of these artificial forest areas were planted after World War II using subsidies from national and local governments. The main trees planted were Japanese cedar and Japanese cypress. There are many artificial forests in which the management was too limited and could not provide for the thinning of trees or damage repair caused by animals, diseases, and typhoons. To promote thinning for artificial forests is one of the most important forest policies. The basic forest resource policy after World War II has tried to increase the domestic forest resources and the existence of the 10,000,000 ha of artificial forest is a result. The policy change from such a quantitative policy goal to a quality one such as sustainable forest management became clear in the 1996 Basic Forest Resource Plan, which is located at the top in our top/down Japanese forest planning system. The concern for the quality aspects of forest resources has just started. Thus, the important target 1 is difficult to achieve.

Target 2 is relating to the protection forest and the similar forest area controlled under law. The protection forest specified by the Forest Law covers approximately 40% of the total forest area in March of 2004. If all the protection forests were well managed, there would not be any problems. However, the policy direction of the protection forest after World War II was also the quantitative increase of specified areas. The increase of forest area specified as protection forest had been promoted through the Protection Forest Consolidation Plan which is revised every 10 years. Under the first plan, of which the planning period was from 1954 to 1963, the specified area of protection forests mainly relating to disaster prevention increased. Under the second plan (from 1964 to 1973), the increase of the specified area of water reserve protection forest was planned for the increasing demand for water at that time. Under the third plan (from 1974 to 1983), the specified area of recreation forest increased. Through five plans, the area of forest specified as protection forest increased from 2.5 million ha in 1953 to 9.8 million ha in 2003.

The protection forest system started under the first Forest Law in 1897. The protection forest before World War II was specified to the limited forest area, most of which was not allowed to be cut or only allowed to be cut selectively. However, the characteristics of forest area specified as protection forest after World War II also changed under the policy to increase specified areas. In

many parts of protection forest such as headwater-conservation forest, clear-cutting method is permitted with some upper limitations. After the expansion of specified areas, management has grown in importance. After the fourth plan (from 1984 to 1993), a new category was added to the former protection forest, namely specific protection forest, for the forests where the expected function has been lost or weakened by various reasons such as insects or typhoons. The 10-year plan system completed its fifth cycle (from 1994 to 2003), and the law, which gives authority for national government to make the 10-year plan, ended on March 31, 2004. It is also financially difficult to maintain such a large area of protection forest. Furthermore, for artificial forests, some forest practices such as thinning will be needed.

Target 3 is related to the forest products such as timber and wood-biomass. The final policy goal of the 10-year Action Plan of carbon dioxide absorption by forests for the prevention of global warming is the reduction of the greenhouse gas. In order to reach the final goal, a sustainable social system as well as a recycling-oriented society is necessary. As to forest resources and forestry department, the effective utilization of timber production and forest biomass is necessary. The total timber demand in Japan had increased by 1973, to approximately 120 million m^3, and after that it slowly decreased to reach 87 million m^3 in 2003. Generally, the utilization of biomass resources has been delayed in Japan. Recently, the facilities using wood-biomass resources have increased throughout Japan as a result of government subsidies.

Target 4 is relating to people. Probably, this is the most important basic target. For example, government subsidies may contribute to the change or improvement of forest management (target 1, target 2) and the increase in consumption of forest products including wood-biomass (target 3), in the short-term, but people's way of thinking probably will not change. However, the action plan includes target 4. The action plan shows some examples relating to the target as follows: events such as planting trees, sustainable volunteer activities, environmental education, and various utilizations of forest areas.

These targets include wide areas of social and economic aspects, therefore the plan must be developed for both the national forest and non-national forest (public forest and private forest). The cooperation between mountainous areas and city areas, including national government, local government, companies, and the public is necessary. It is important that everyone understands the necessity of correct forest management. Furthermore, the economic efficiency of forestry and the related economic sector must be considered.

The action plan includes concrete measures which realize these four targets. As the fifth measure, the necessity of examining and reporting system of carbon dioxide absorption by forests is shown in the action plan. After the Kyoto Protocol went into effect, national government planned to utilize the carbon dioxide absorption by forests at the maximum level, therefore to reach this goal, the information system relating to the forest resources must be strengthened or reorganized by the beginning of the first commitment period of 2008-2012. The forest resource information system is mainly managed by prefectural governments, which will be explained in the next chapter.

FOREST RESOURCE DATA MANAGEMENT SYSTEM OF PREFECTURAL GOVERNMENTS

1. Forest Planning System

As private forest resource database is managed as a part of forest planning system, at first, we will briefly explain the forest planning system (see Figure 1). According to the Basic Forest and Forestry Law of 2001, national government must make the Basic Forest and Forestry Plan, which is the top of the top/down forest planning system. This basic plan is revised generally every 5 years. It requires national government to make National Forest Plan according to the Basic Forest and Forestry Plan. For non-national forest, prefectural government is required to make Regional Forest Plan, of which the planning area is determined mainly by the river systems. However, this planning area was firstly determined not only by the river systems but also by the location of local

FIGURE 1: FOREST PLANNING SYSTEM IN JAPAN.

offices of prefectural governments and the size of planning areas. For national forest, Regional Forestry Office must make Regional Forest Plan of which the planning area is the same area as that of prefectural governments. More local planning system of national forest is omitted in this paper. Under Regional Forest Plan, municipal offices must make Municipal Forest Plan of which the planning area is equal to the boundary of the municipal offices. Municipal government also has rights to accept Forest Practice Plan made by forest owner/owners, and to permit forest practices such as cutting activities.

The basic data relating to the Regional Forest Plan of non-national forest were developed and are now maintained by the Department of Forestry of prefectural governments (national government showed only the basic concept of the data management system). The national government gathered the summary tables prepared by prefectural governments, and municipal offices use data obtained from prefectural governments. Thus, the database of prefectural governments, called Shinrinbo, is very important. This database includes all non-national forests, namely private forests and public forests, however we will give information and discuss only about private forests from here.

Almost all of the data relating to forest resources management are included in the database. Thus, when the database is well-managed continuously, national and local governments can easily grasp the real situation of how well the private forests are operating. In order to get maximum contribution from forest management under the Kyoto Protocol, government must make a clear data management system. Real-time forest management data, such as cutting volume, planting area, and damaged forest area, must be clear. These data must have a consistent system. Therefore the data must be completely connected to the map.

2. Problems of Forest Resource Database

The current forest resource database managed by prefectural governments has some serious problems (Matsushita and Yoshida 1998). First, we would like to point out the incorrectness of the database. Some Japanese researchers have commented on it. The basic items which have many incorrect data are related to forest owners and the size of forestland. As prefectural governments make the database to make resource tables classified by municipalities, the data on forest owners are not always important to them. Thus, the name of the owner has often been unchanged when in fact the owner has changed. We have another map and data on forestland in Japan, namely Land Register, including all land-use. However, these data do not include the contents of forest resources such as species and volume. Generally, Land Register is widely utilized, and the

name of the owner is correct, so in the case of Protection Forest System, the basic map is based on the Land Register.

Areas within the database were generally unsurveyed ones. The size given is often far from the real situation. The basic problem is that the National Land Survey since 1951 has been incomplete and the percentage of completion is only approximately 45% as of 2002 (Samejima 2004). In the case of some prefectures, the percentages are very low, for example: Osaka Prefecture is 3%, Mie Prefecture and Kyoto Prefecture are 6%, Gifu Prefecture is 8%, and Nara Prefecture is 9%. In the forest area, approximately 120,000 km^2, almost one third of Japan's total land area, is still unsurveyed. Thus in most cases, the area included in the Forest Resource Database is an estimated size and that written in the Land Register is also data not based on actual surveys. The number of forest owners who do not live in the same village as the location of their forest has increased and reached to approximately 25% in area basis by the 2000 Census of Agriculture and Forestry. This percentage is of the total forest in Japan, as to several prefectures, the percentage is larger, for example: 53% in Hokkaido Prefecture. In such a situation, there is a concern that the National Land Survey in mountainous areas will become more difficult to conduct in the future. Moreover, the remaining forest owners are aging, and some of them as well as their successors do not know the definite boundaries of their own forestland. However there are some exceptional cases: the areas of forest land which have subsidized trees are always correctly surveyed due to the necessity of the survey in order to get subsidies. It is a serious situation that the most basic data such as the name of the forest owner and the size of the forest are unclear. Recently, the application of Geographic Information System (GIS) to forest resource management by prefectural governments or forest owners' associations has been introduced, however, the data for GIS are still generally incorrect. The importance and the role of National Land Survey for GIS must be more recognized (Yamamoto and Hagiwara 2003, Yamamoto 2004).

Secondly, we would like to point out the many errors in the contents of forest resource information such as species and age. There are several reasons why such errors occurred in the Forest Resource Database. This system started after World War II, and the annual survey relating to the database was conducted by the staff of the Department of Forestry of prefectural governments until the 1970's in most prefectures, and after that the database had been maintained mainly by computer system of prefectural governments until recently. During the period, forestry officers did not check the data on site. In our opinion, the introduction of a computer system to the work of forest planning resulted in the reduction of the number of forestry staff, and instead the data were processed by non-forestry computer workers, who knew nothing of the field, and this has influenced the current situation. The incorrectness of the contents is caused not only by the computer system of prefectural governments but also from the activities of forest owners. According to the Forest Law, forest owners must submit a Cutting Report before cutting. If all forest owners reported their cutting activities correctly, the Forest Resource Database would be well-maintained. The reason why forest owners do not file it is not limited to only one reason, however, one reason is some owners were unaware of the system of Cutting Report. The unawareness of the system is caused by both local government and forest owners. By the results of the questionnaire survey for forest owners (total responses were 184 persons) in Kagoshima Prefecture conducted in 1995, the top two reasons why forest owners did not file the Cutting Report were as follows: "as the cutting area was small, I thought the Cutting Report was not required" is 42.4% and "I did not know of the existence of Cutting Report" was 32.1% (Matsushita 1996). As this last survey was conducted about 10 years ago, the current situation may be changed. However, it is a serious situation of lack of responsibility that the forest owners do not know the important administrative system related to forestry practices, and at the same time, this is the problem for local governments from the point of publicity of forest policies.

The authority to accept the Cutting Report was transferred from prefectural governments to municipal offices in the 1998 amendment of the Forest Law. The reason of the change is that the municipal office is the closest administrative office

for forest owners. In this sense, municipal offices must strongly conduct public relation campaigns for the system. Also, forest owners' associations have been playing an important role for maintaining the Forest Resource Database instead of the forest owners and prefectural governments. The association was initially founded for the territory of the municipal offices during war time, and one of the main roles of the association was complementary works of the municipal offices. Generally in Japan, the forestry section is undeveloped in municipal offices, and one of the reasons is the existence of the forest owners' associations of which the jurisdiction area is equal to the municipal one. Recently, the forest owners' associations weakened, and the Forestry Agency tried to make an amalgamation of small associations. The weakening and the amalgamation also influenced the incorrectness of the Forest Resource Database.

Thirdly, we would like to point out the problems relating to the yield tables including in the computer system of prefectural governments. Yoshida and Matsushita (1999) pointed out that the yield tables used in prefectural governments were estimated mainly during the 1960's and 1970's, and the estimated figures were quite different from each other. As the yield tables are regional, due to the differences of geographical conditions, in this sense, it is not a problem that the yield tables are not equal. However, in our opinion, one of the main reasons of the differences is the difference of the estimation methods and the utilized data. In some cases of the yield tables, the prefectural governments do not own the original data which were used to estimate the table. The yield tables and the calculation process must be open to outside of the forestry sectors, including foreign countries involved in the Kyoto Protocol, as a persuasive form. Namely, even if the current area, species, age, and site conditions are completely grasped by prefectural governments, the standing volume and growth volume used by yield tables are not correct. Under the circumstances that forest owners are unconcerned about the Forest Resource Database or Cutting Reporting, such a difference relating to volume among the database is of no problem to almost all forest owners.

3. Problems of the forestry statistics system

The most important statistics on forestry and forest resources on a national level is the Census of Agriculture and Forestry (Designated Statistics, No.26, specified in 1949) which is conducted every 10 years, and the most recent one contains the results of the year 2000. The forest resource tables among the Census of Agriculture and Forestry were made from the summary tables prepared by prefectural governments, calculated from the Forest Resource Database. Therefore, in order to improve the precision of the national statistics, the improvement of the Forest Resource Database must be processed first. As these national statistics have a 10-year interval period, the annual change is not clear. The statistics also have problems relating to the forest owners. As we have already explained, the percentage of the forest owners who do not live in the same village as the location of their forest has increased in recent surveys. A lot of the statistic data are based on the survey from forest owners. However, as many forest owners do not live near their forest, probably such forest owners have not been to their forest for a long time and do not have enough current information on their forest. Under such conditions, the conventional survey system of the Census of Agriculture and Forestry must be changed in the future.

The annual stock change in volume is calculated by subtracting the decreasing volume through various damages and the cutting activities from the growing volume. We do not have a definite system to clarify the annual cutting volume. Another statistic relating to forestry on the national level is the Survey of Lumber Products (Designated Statistics, No.69, specified in 1953). This survey includes several annual figures on wood-based industries. The arrival volume to mills can be thought as a figure which shows the log volume moving from forest to out of forest. The reason is that almost all trees cut down domestically will be processed in the domestic wood mills. Staff of prefectural governments estimate the annual cutting volume using several data such as the Survey of Lumber Products, the Cutting Report, the information from the local log auction markets, and the information on forestry subsidies. It must be noticed that this calculation

procedure is not open to outside the department such as to forest owners, forestry companies, and researchers. Some of the data, for example: data from the Survey of Lumber Products, are available only on the prefectural level. Some data, for example: data on market situation, are available in the area which does not corresponded to administrative areas. Under such a situation, staff of the prefectural governments estimate the annual cutting volume also on the municipal level. From the point of the consistency of the regional forestry statistics, the utilization of the Survey of Lumber Statistics seems to be a feasible idea, however, this method has a serious problem in that the cutting volume does not corresponded to the actual cutting place.

These two national level statistics were specified as Designated Statistics by the Statistics Bureau, Ministry of Internal Affairs and Communications. Recently in Japan, the circumstances surrounding the national level statistics have become worse. One of the reasons is a difficulty relating to the budget and the staff who conduct the actual survey. The actual survey of these two statistics is conducted by Statistics and Information Center, Regional Agricultural Administration Offices, Ministry of Agriculture, Forestry, and Fisheries. This center was founded on the prefectural level. Now, the national government is facing financial difficulties, and the administrative reform has been planned. On December 24, 2004, Cabinet decided the Future Policy on Administrative Reform. Among the policies, in the field of the statistics on agriculture, forestry, and fisheries, a significant cut in the number of staff and structural change in regional offices was included. However, as the serious financial situation of prefectural governments is almost the same as that of the national government, future conduction of new forestry surveys on the prefectural level may not be able to begin. The other reason is on the side of survey respondents. The repetition of similar surveys must be reduced and attention must be paid for the protection of personal data. Regarding the latter problem, on April 1, 2005, the Act concerning the Protection for Personal Information (Law No. 57, 2003) was strictly enforced. Both statistics, the Census of Agriculture and Forestry and the Survey of Lumber Products, faced the problem related to the protection of personal data. The Forest Resource Database also faces the same problem (Matsushita and Yoshida 2002), because the Act concerning the Protection of Personal Information includes the personal information utilized by the local governments.

There are many damaged forests throughout Japan. For example: in 2002 and 2003, 2,634 ha and 726 ha of forest burned, respectively. As of non-national forest, in 2002 and 2003, the total area of forest which suffered some meteorological disasters were 32,264 ha and 3,242 ha, respectively. The most serious forest damage by disease and insects was damage by pine wilt disease, by which the total damage was 797,000 m^3 in fiscal 2003. The largest damage to forest due to animals was damage by deer, and reached to 4,500 ha in 2003 (these statistics on selected damages was obtained from the Forestry Agency (2005a)). Excluding the almost complete disappearance of forest, for example by fire, damage is a part of the forest in general. Therefore, how to reflect the damage within the Forest Resource Database seems to be difficult. In addition, in many cases, the same forest suffered the same damage. For example: in case of the forest damaged by deer, the damage did not occur for only one year. It is difficult to reflect the damage every year in the database. In case of damages by animals, the statistics gathered by prefectural governments did not connect to the forest location maps in general, so there are some possibilities where the damage may have been counted twice or even more.

Under the Kyoto Protocol, the location of forest which is well-managed, cut, or damaged must be clarified systematically for the whole of Japan during the specified periods. To maintain mutual consistency among forestry statistics, several basic data must be strictly connected to each other. However, many statistics are made separately by different sections of the same ministry or the same prefectural governments and do not have a mutual consistency. One of the common problems observed in forestry statistics is the lack of relationship between data and location. In this sense, the recent development of GIS in the prefectural governments must contribute also to the improvement of forestry statistics from the point of the global warming policy.

4. New movement on forest resource data management

There are several new movements relating to the Forest Resource Database managed by prefectural governments and prefectural global warming policy relating to forest resources. We will introduce some actual cases here.

In the 1998 amendment of the Forest Law, the role of municipal offices for non-national forest policy increased, and it was established that Municipal Forest Plan must be responsible for all forest practices. In this sense, staff of forestry of municipal offices must have the database, however, in most cases, the database is the Forest Resource Database distributed from the prefectural governments. Here, we would like to introduce the development of forest database on the municipal level.

Under the situation that the National Land Survey was not completed in general, the basic maps utilized in GIS forest resource management system also contain many errors. The National Land Survey has already been completed in some municipalities. For example: in case of Yusuhara Town, Kochi Prefecture, of which the total area is 23.7 km^2, the National Land Survey began in 1962, and was completed in 1983. In 1993, the forestry information system, including map data, was developed based on the results from the National Land Survey. The result of National Land Survey and the forestry information system contributed to the forest certification of Yusuhara Town by Forest Stewardship Council in 2000 (Samejima 2004). On the level of prefectures, no prefectures have completed the survey. However, on the level of municipal offices, some municipal offices have completed it. From these municipal offices, the correct forest map data are available for the GIS forestry system. Of course, the result of the National Land Survey must be maintained due to the change of land-use after the completion of the survey; municipal offices must use their budget for this. In this sense, the basic policy for land information is necessary for municipal offices to maintain the GIS forestry system.

Another example relating to the forest resource database on the municipal level can be observed in forest owners' associations. For example: in the case of Hiyoshi-cho Forest Owners' Association, Kyoto Prefecture, the promotion of thinning has recently been strongly encouraged. In the activities of the forest owners' association, a new forest information management system was introduced instead of the Forest Resource Database managed by prefectural governments which most forest owners' associations utilize. It is notable that the important role of the correct database is understood by the manager of the association.

The main target for the promotion of the private forestry sector by the Department of Forestry of prefectural governments has conventionally been forest owners' associations. Recently, some prefectural governments began to pay attention to private enterprises. Under the circumstance that the national government promotes the global warming prevention policies, enterprises must play important roles. One of the contributions to the global warming policy by private enterprises is the attendance to and the payment for the forestry activities. For example, Osaka Prefecture is planning to introduce "adopt system", where private enterprises may care for currently unmanaged forest. The first company which has agreed to this program was an electronic company. Kochi Prefecture has also planned a new co-working project between the prefectural government and the enterprises which have a deep concern for environmental issues. On the side of the enterprises, they hope to contribute to forestry activities, for example: writing their own activities in the annual environmental reports. At that time, the correct data relating to their contribution must be present. Therefore, the improvement of the Forest Resource Database will also be required for the promotion of partnership between enterprises, prefectural governments and private forest owners.

DISCUSSION

1. Budget

In Japan, in spite of the increasing tendency of the growing volume of trees, the cutting activity has stagnated. We will show some recent figures (Forestry Agency 2005a, 2005b), for example: the total forest area and volume are 25.1 million ha and 4,040 million m^3 on March 31, 2004, respectively,

and the total cutting volume was 20.4 million m^3 in 2003; thus the percentage of the cutting volume to the total volume was only 0.5%. The self-sufficiency rate of industrial round-wood was 18.5% in 2003. The stumpage price has a decreasing tendency, for example: in case of Japanese cedar, the price index of 2003 was at approximately 20, when in 1980 it was equal to 100. Under such conditions, the number of forest owners who have stopped their forest management activities has been increasing. The largest problem from the point of forestry policy is that thinning, which is necessary for some age-classes of artificial forests planted after World War II, is insufficient or it is not conducted at all. Both the national and prefectural governments have strongly encouraged forest owners to conduct thinning with subsidies. The detailed explanation is omitted here, though various subsidies have been utilized for almost all private forestry activities. The main forest policy after World War II has been the increase of domestic forest resources, and approximately 10 million ha of the current artificial forest is the result.

In our opinion, it is notable that the Forestry Agency and the Department of Forestry of prefectural governments want to use the sudden appearance of the national policies relating to the Kyoto Protocol as the important policy programs for the activation of domestic forestry sector. These two large matters originally existed separately. We find two important points as follows: firstly, the Kyoto Protocol became the reason for keeping or increasing the budget, and secondly, correct forest management is required.

The first point must be discussed from the point of budget. The common problem in various fields of administrative organizations after the 1990s is the financial problem. On a national level, the issue of government loans has been increasing from 6,700 billion yen (55.8 billion U.S. $; hereinafter parenthetic figures are the converted value when 1 U.S. dollar is equal to 120 yen) of the fiscal 1991 to 34,400 billion yen (286.7 billion U.S. $) of the fiscal 2005. The total budget of the Forestry Agency of the fiscal 2003 decreased to 490 billion yen (4.1 billion U.S. $) from 749 billion yen (6.2 billion U.S. $) in the fiscal 1998. In the case of National Forest, the total long term debt reached to 3,800 billion yen (23.3 billion U.S. $) in 1998, when the organizational reform was conducted. In the case of forestry corporations managed by prefectural governments, the financial situation became worse. The total long term debt of all corporations exceeded 1,200 billion yen (10 billion U.S. $) in 2005. Although the backgrounds of these financial difficulties were different from each other, it must be noted that now both national and prefectural governments face serious financial difficulties. Under such situations, the policy programs for the Kyoto Protocol became a strong excuse by forestry administration sectors for the increase in budget.

Regarding the budget of the Forestry Agency, the total budget has been drastically cut, however the expenditure, except for public works, is almost unchanged since 1998. Attention must be paid to the percentage of budget transferred into a special account for National Forest. In 2003, the percentage of the transfer reached over 50% of the total expenditure excluding public works. As already noted, the organization of National Forest was reformed in 1998, and the transfer increased. As a result, the expenditure for forestry production and marketing policy decreased greatly. After all, the main expenditure of the Forestry Agency was public works and the transfer to the National Forest Special Account. The budget for the promotion of the private forestry sector has become smaller. Under the circumstance that the policy actions for the global warming prevention became important, the budget for private forestry sector decreased much. The Kyoto Protocol Target Achievement Plan was made in April of 2005, however the national government made the Outline of Promotion to Prevent Global Warming already in June of 1998, and a 10-year Action Plan for forestry, relating to the prevention of global warming was submitted in December of 2002. During these periods, such policies did not largely influence the budget of the Forestry Agency.

Among the 2006 budget bill of the national government, the total expenditure which is recounted as the expenditure to be directly effective to the accomplishment of the Kyoto Protocol is 453.7 billion yen (3.8 billion U.S. $), of which 157.7 billion yen (1.3 billion U.S. $) is the expenditure for the forestry policy programs. In

order to progress the policy programs relating to the global warming prevention programs, some budget is certainly necessary, however the important thing is how to use or distribute this budget. The problems relating to forest planning system in the 1990s, have already been discussed and a drastic change can not be found in the budget. This situation is clearer in the works of prefectural governments which are closer to the forestry field. Some prefectures show the indicators relating to CO_2 in relation to the Regional Forest Plan, for example: Shiga Prefecture showed that the increase in CO_2 sinks was predicted as 85,879 t-CO_2 per year, when the Regional Forest Plan would be completely realized (Shiga Prefecture 2006). However, as to the problems relating to the forest planning system and the basic database, investigation has not yet begun. After all, as the recounted calculation does not mean the change of how to utilize the budget.

The tax system is also an important financial policy for the national government and prefectural governments. The draft of the Environmental Tax on a national level made by Ministry of the Environment in 2005, of which the taxation was 2,400 yen (20 U.S. $) per 1 t-$CO_2$, was not passed. In contrast, some environmental taxes on the prefectural level have been recently introduced. By December of 2004, 38 out of 47 prefectures investigated into, or decided to introduce the environmental tax relating to forest or water resources (Akiyama 2005). We will show four examples of the regional tax, especially relating to forest (Shiga Prefecture 2004). These new taxes are added to the prefectural inhabitant's tax on per capita basis. In the case of Kochi Prefecture, the amount of annual tax is 500 yen (4.2 U.S $) for both each individual and each company, which was introduced in 2003. In Okayama Prefecture, the annual tax is 500 yen (4.2 U.S. $) per person and from 1,000 yen (8.3 U.S. $) to 40,000 yen (333.3 U.S. $) for a company, which was introduced in 2004. In Tottori Prefecture, the annual tax is 300 yen (2.5 U.S. $) per person and from 600 (5 U.S. $) yen to 24,000 yen (200 U.S. $) for a company, which was introduced in 2005. In Kagoshima Prefecture, the amount of the tax is the same as Okayama Prefecture, which was introduced in 2005. The taxable period is 5 years for three prefectures except Tottori Prefecture (3 years).

These four prefectures planned to use the revenue from the regional tax for a specific fund. How to utilize the revenue from the tax vary with each prefecture and there are projects such as: (1) thinning (especially, thinning over 40% degree in order to make mixed-forest) (2) projects in order to promote and maintain a healthy forest (3) projects such as public information, awareness, environmental education, school forest and forest volunteer (4) projects relating to forest workers (5) promotion of the utilization of wood, and (6) projects to manage forest for the purpose of water conservation or global warming prevention. In the case of Kagoshima Prefecture, the global warming prevention is included explicitly in the utilizing fields of the revenue. And all from (1) to (6) are relating to the targets of the 10-year Action Plan. The basis for the introduction of the regional environmental tax is the global warming problem as well as the financial problems of prefectural governments. However, the total revenue from the tax is low, approximately from 86 to 450 million yen (from 0.7 to 3.8 million U.S. $) per year. Using this fund alone, the targets of the 10-year Action Plan will be unable to be carried out by prefectural governments.

After all, the usage of regional tax includes various forest practices, however most of these have already been conducted until now by the Department of Forestry of prefectural governments, and furthermore, the total revenue is very low. As a result, the aim of the introduction of such new regional taxes became unclear. It must be noted that the basic policy such as making Forest Resource Database or conducting National Land Survey were not included explicitly within the usage of the regional environmental tax. As the global environmental policies are new policy fields for prefectural governments, it is very important to raise a fund. However, without the change of the past budget and tax systems, the revenue from a new tax must be small. In other words, the new tax showed that the feasible policy projects will be limited without the change of the past policy programs and public works. In Japan, forestry problems have been publicly noticed for the first time under the necessity of the global warming prevention problem, and the administrative sector

relating to forestry has linked these two problems strongly together. However, without the concern regarding the financial aspects, the combination of the forestry problems and the global warming prevention policies will not result in the expansion of well-managed or healthy forests.

2. Statistical system

It is the national government's work to make statistics on a national level. In the case of the forestry statistics, the basic data are a part of the forest planning system. The prefectural governments must manage Forest Resource Database to make Regional Forest Plan which is specified by the Forest Law. As the national government shows only the basic items which must be included among the database, it is the work of prefectural governments to conduct the definite design of the database which is closer to the real situation and maintain it. As we have shown, there are several serious problems in the current database. In our opinion, the essential problems consist of the following three points: (1) lack of recognition of the importance of National Land Survey (2) lack of recognition of the reason as to why prefectural governments are currently managing the Forest Resource Database which includes private properties, and (3) insufficient utilization of forest resource statistics outside of the forestry sector.

As to the first point, the lack of budget is a major reason for many local governments, as to why the National Land Survey is often not completed. However another factor is the lack of recognition of its importance. The National Land Survey must be conducted mainly by municipal offices under the Act of National Land Survey of 1951. As a result, the percentage of enforcement differs with each municipal office. Considering the development of land management system utilizing GIS system and the increasing underpopulation in mountainous areas, the role of surveyed and computerized maps have become more important. Both prefectural governments and municipal offices must recognize this, and prefectural governments must lead municipal offices to conduct National Land Survey, and municipal offices must explain its role for land owners. The reform of Forest Resource Database will be possible on the basis of the success of the National Land Survey.

The second point relates to the work of prefectural governments. As private forest is basically a private property, its management problems must belong to private sectors including forest owners. As we have already discussed, Forest Resource Database which is managed by the Department of Forestry of prefectural governments has many incorrect data and due to budget cuts and computerized systems, the small staff is unable to check the data. The information which is necessary for the staff of the department is the summary tables on forest resources. For the staff, of most importance is to make statistics which have no contradictory data, which is realized by calculating all resource tables with the same database in spite of the incorrect data. On the other hand, regional forest resource tables are of no concern to forest owners. Forest owners have little incentive to report the correct information in order to contribute to the completion of forest statistics. There are no penalties nor disbenefit for forest owners by giving the incorrect data. After all, the current database with its many errors is of little concern for both the staff of the department and forest owners.

There are also Forest Planning Maps corresponding to Forest Resource Database under Regional Forest Plan. As the database has many errors, it follows that the maps too, have many problems. As we have already discussed, the National Land Survey has not been completed, the main process of how to currently make the maps are aerial photos and hearing from the persons concerned, thus the maps have also many mistakes. As a result, when forest owners want to use Forest Planning Maps and inquire for the copy, prefectural governments prepare it with a clause, which states that prefectural governments can not legally sanction the property rights, the boundary of property, and the size of forest. For the purpose of calculating the volume of forest relating to the Kyoto Protocol, this is an official work. The national government needs the correct data, and prefectural governments must investigate it systematically. These data must be credible and easy to understand. Prefectural governments must reconsider the reason of the management of the

database, and forest owners also must consider their role regarding the database. And then, at least the statistics on the cutting volume and the utilization of wood-biomass must be completely reorganized, because these data have an important role in the calculation relating to the Kyoto Protocol. To clarify the cutting activities correctly and systematically, prefectural government must have a large enough staff to take on the task of correcting data, and forest owners, forest owners' associations, and companies relating to forestry will have to co-operate and give the information required.

The third point is relating to the utilization of forest resource statistics. The weakness of the forest statistics, including Forest Resource Database, has been known to the concerned persons to a degree, but this has not come out publicly. In other words, the traditional utilization field of forest statistics has been almost limited to the forestry sector of the administration offices. In our opinion, one of the reasons why forest statistics are not fully utilized is that the staff of the department is well aware of the problem of the statistics errors, and therefore they intentionally do not distribute the statistics widely enough. Due to the increasing usage of forest with the exception of timber production, the demand for forest statistics by the sectors other than the forest sector will increase. The Department of Forestry of prefectural governments, which make the forest statistics, will have to explain the current situation of forest statistics. As already discussed, if a private company prepares some funds for forest in order to show their contribution in their annual environmental report, prefectural government will have to prepare correct maps or adequate calculation results for the company.

The poor utilization of forest statistics by the sectors, except for forestry, is a result of the contents of the statistics, including much incorrect data. Another reason is that most of contents are relating to forest practices. At the same time, as the utilization field is limited, the errors of the statistics have not improved at all. In order to improve forestry statistics, the utilization of the statistics must become wider, including international usage; this would mean the important forestry statistics must be also written in English. It is necessary to determine a more clear definition on the surveys and to conduct the surveys more accurately for the users outside of the forestry sector. The users, both national and international, relating to the Kyoto Protocol will need such explanation and accuracy. Although the problems of the domestic forestry and the global warming prevention problems are basically different from each other, in this sense, the reform of forestry statistics will greatly contribute to the improvements of both. This is the hope.

3. Role of local governments

Recently, the policies regarding the promotion of decentralization and the consolidation of municipalities have been seriously conducted. In the field of forestry, some authorities on forest planning system were transferred from prefectural governments to municipal offices in 1998. However, the organization is poorly managed and the number of staff related to forestry is very few in most municipal offices. For example, there is a department of forestry in prefectural governments, however, there is generally not a department or a section of forestry in municipal offices. And, there are many engineering officials of forestry in prefectural governments, however, very few staff in municipal offices. Under these conditions, the role of prefectural governments is still important. Also the relationship between national government and prefectural governments has been discussed in relation to the administrative decentralization for a long time. In February of 2006, the Local Government System Research Council of the national government recommended the introduction of a new regional system instead of the current prefectural system. The role of local governments in the field of forestry and forest resources will have to be discussed further in the near future. Here, we would like to briefly comment on the following two points in relation to the Kyoto Protocol and the promotion of private forestry.

Firstly, in our opinion, in the field of forestry, the importance of the role of prefectural governments must increase in the future. As the policy objectives on the Kyoto Protocol are a national target, it is necessary to strengthen the

connection between the national government which has decided the legally binding treaty on an international basis and the many municipal offices which have almost no special section on forestry. Under the current forest planning system, prefectural governments must make a Regional Forest Plan, in which the clear and feasible plans, relating to the Kyoto Protocol, must be included. It is also an effective policy measure to show the well-management action plan of the forest owned by prefectural governments.

Secondly, we would like to make a point regarding the ownership of private forests. It has been clear that some private forest owners have abandoned their forest management roles completely. Even if a more sufficient subsidy system exists, many of them would not resume forest practices. In order to progress the private forest policy relating to the Kyoto Protocol, public sectors will finally have to care for a large area of private forest in various ways. At that time, an accurate and reliable forest resource database management system will be required. The weakening of some private forest owners' forest management has also influenced the forest owners' association. In order to develop a new policy objective, which is to keep forest under a well-management situation, the role of forest owners and their associations must also be addressed. And at that time, local governments, including both prefectural and municipal governments, must consider decentralization policies which will have to be developed in all administrative fields.

CONCLUSION

Under the Kyoto Protocol, forests which have had additional activities, such as forest management and thinning since 1990, can be included for the calculation of the reduction of CO_2 emissions. Recently in Japan, timber production has been decreasing, and forest practices such as thinning are omitted, and some forests damaged by typhoon are simply left. National government began promoting forest management throughout the country in order to include as much forest as possible, for the Protocol calculation. However the institutional basis necessary, in order to grasp the actual condition on forest management and timber production, is greatly lacking. It is a fact that the actual condition of forest management is unable to be evaluated systematically as 1) renewable and reliable forest resource database is greatly lacking 2) forest maps which are based on National Land Survey do not exist, and 3) national statistics on tree cutting are also lacking. It is an arduous task for local governments to improve this basic statistic data for the forest sector. And a long-term perspective based on both national and regional actual situations is needed, but at last we find the major block is political – lack of will to change. If these serious problems will be improved through the policies relating to the Kyoto Protocol, then it will enable the domestic forestry sector to recover.

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