

POST-WTO FORESTRY POLICY AND ITS NEW APPROACHES

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I. Introduction

The social surroundings around our forestry, for example, technology, communication and information system, are significantly changing day by day. Uncompetitive industries are expected to shut down with the advent of WTO system. Korea imports 94% of domestic wood demands, because Korean forest of which 70% to 80% consists of 20-30 year old trees has a poor level of production. Since forest resources are not mature yet, it is hard to expect the Korean forestry to be competitive.

After Korea opened timber markets in the middle of the 1980s, forestland owners have been reluctant to invest because of no gain. The trade structure of timber and wood products in Korea has been changed. The import of processed wood products which were the main exporting merchandise once has been increased, while the export has significantly declined. Therefore, log imports have been decreased for the same period. Owing to the shrink of the wood products industry, Korea should import more wood products in order to meet the domestic demand.

Nowadays, China and South-East Asian countries such as Indonesia and Malaysia produce inexpensive merchandises utilizing their cheap labor and plenty of timber resources. Since the wood processing costs in Korea are very high, the investments in the foreign countries, which have rather favorable conditions in producing wood

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products, will be increased in the near future. The Forestry Cooperatives and other wood processing companies are already planting, producing and processing wood products abroad for their import and export. The amount of overseas-planting already exceeds that of domestic planting.

Wood processing industry which was once the third largest in the world wood processing market is now losing its competitive power. Losing competitiveness of the industry will threaten the future of forestry, because forestry grows with wood processing industry. With the advent of the WTO system which opens up the domestic market, cheap wood products from foreign countries will be flooded into the domestic market. This means that the foundation of forestry may totally collapse and 20 billion dollars which have been invested in the forestry could be wasted.

In order to acquire competitiveness in forestry, the wood processing industry should produce inexpensive and high quality products utilizing domestic timbers. Our forestry should compete and survive in the world forestry market as well as the domestic market with other industries. The structure of forestry needs to be improved for adapting to the socio-economic changes of the world for competing with other countries.

Therefore, this study introduces the changes in world situation concerning forestry owing to the advent of the WTO system and investigates ways of adjusting and overcoming them.

II. Changes in Situation Concerning Forestry and Society's Requirements

1. The Changes in the Situation Concerning Forestry and Problems of the Production Structure of Forestry

Korean forestry is facing three major problems which can be classified as internal, external, and structural problems by the changes in international situations. These are explained as follows:

First, the internal problem of forestry is the problems of production inputs such as labor and production structure. These problems come from the forestry itself. The forestry needs not only

forest itself, but also skillful labors, well trained managers and advanced technique for managing forest.

Producing high quality products with a low price is an extremely important factor to survive under the WTO system even for forestry. High technology can make it possible to produce inexpensive woods of high quality by reducing production costs and achieving high labor productivity. Therefore, developing high technology is required for the forestry area to be competitive in the world market.

Since the forest resources are not mature yet, massive labors will not be needed for a certain period. When the forest becomes 20-30 years old, however, careful treatments and managements are required for producing high quality timbers. Therefore, even for these ages, skillful labors and managers should be trained because shortages of forest labors and trained managers are major causes of the low levels of productivities of the forestry. Korean forestry even suffers the shortage of unskillful forest labors which is mainly due to the migration of labors to the big cities and other industries as a result of the changes in the economy and society. To be productive and to restore competitiveness, the labor problem should be resolved either by supplying sufficient simple forest labors or by changing production structures to require less labor input.

Second, the external problem of forestry which is a result of altered society should be considered. As the economy grows and the society become diversified, the demand for the products from the forest resources is also diversified. Supplying timber was the major purpose of managing forest before. However, it is only a part of the multiple management purposes of the forest nowadays. People are looking for recreation activities, wildlife, natural environments, and leisures from the forest. Recently, utilizing forestlands for other usages such as an industrial usage and a recreational usage is expanding. Furthermore, the demand for those usages is expected to grow significantly in the near future.

Since a large number of companies invest abroad in order to avoid expensive land costs in Korea, the supply of inexpensive land becomes an important issue for reviving a weakened economy. After agreement of GATT negotiation, securing new income sources is an important key for the development of the rural areas. To increase the income sources of the farming region, the government has enhanced

the agricultural production structure, established the area of agricultural industry, and developed recreation areas in the farming and fishery regions. However, poor capital and lack of technologies ended in an insufficient development in these areas. Therefore, a new approach is required for the development of these areas. The forest can be used to increase income and create new jobs. A way of utilizing forestland is shifting from simply producing woods to using for other purposes such as industrial, municipal, and recreational uses.

TABLE 1 Changes of the Social Demands for and the Surroundings of the Forests

Past	Present
<ul style="list-style-type: none"> · greening, land conservation · indefinite use of labor, low wage · simple labor · low price of land · short of timber resources · unified demand of society · economic development plan by the centralized government 	<ul style="list-style-type: none"> · increasing income, ensuring forestry productivity · deficient labor, high wage · high technology and experts · high price of land · environment protection · various demands from society · local autonomy, internationalization

Third, international situations surrounding forestry are changing significantly. Many countries had utilized forest resources for the economic developments. However, as the pollution problem spread worldwide, the conservation of forest becomes an important issue in the world nowadays. People became interested in clean environment and landscape conservation. Therefore they want to secure a good quality of environment from the forest.

The problem is that these changes surfaced suddenly in 10 years and ways to cope with these changes have to be found. The new structure of forestry should be created to meet the change of social conditions and the demand of society. Another problem is that creating a new structure cannot be realized in a short period.

2. Society's Requirements on Forestry

The forestry is facing the question as to what the strategy for surviving is in the midst of socio-economic changes and free trade condition under the WTO system. The twenty-first century will be a period of technological evolution in which no one knows when and what kind of technology is coming out because the advancement of technology will be so fast that the technology developed yesterday is no more new today. Therefore, if the forestry has poor production conditions with the lack of advanced technology, it will hardly survive in the twenty-first century. Trees are harvested at 80-100 years after planting. Thus, it may be better to develop a new material which has the same color, quality and feel as wood or even better than wood because human beings are willing to find alternatives to wood for their conveniences and in preparation of shortage of wood.

Forestry can be compared with agricultural industry which is a land using industry like forestry. Therefore, we can see how the forestry should be changed through examining agriculture. Nowadays, most crops are grown by technologically advanced facilities. The production method of the past is not competitive any more for both agriculture and forestry. The forestry has to compete and survive not only internationally but also interindustrially. Our forestry needs to adopt the change of technology, industrial structure, and social situation in order to survive in the twenty-first century. Following questions should be answered in order for our forestry to survive in the future.

The first is whether or not the present level of our forestry can be continued, given the social, technological, and industrial changes. The yielding of profits in forestry is questionable, because of the transition of industrial structure from the primary industry to the secondary and tertiary industry, and the lack of labor. Especially, the country which has a high price of land because of limited land has troubles keeping its forestry competitive. Countries like Russia, Canada, America, Australia, Brazil, and Indonesia which have huge land resources and plenty of labors keep their forestry competitive. Except harvesting natural forests, no country which is short of land makes any profit in producing woods. Therefore, small-scaled forestry needs to produce multi-products for making profits. Also,

forestry with advanced technologies can produce high quality products with inexpensive prices and can easily survive.

The second question is what our forestry should be in 2000s, given the situation above. It should be decided whether the forest has to be managed to produce timber or environmental resources. If the least amount of wood should be produced for the long-term plan of self-sufficiency in wood consumption, economics for the forest management needs to be considered. However, management for producing both environmental products and timber resources should be conducted in order to meet the fast growing demand of environment resources.

The third question is how to make the forest industry profitable for the twenty-first century. In order to make it profitable, we have to find ways to manage it by adjusting economy of scale, producing higher value-added merchandise, and developing new technologies.

III. Direction and Strategy for Reforming Structure of Forestry

1. Framework and Sight for Reforming Forestry Structure

It is urgent that the structure of Korean forestry be reorganized so that it can survive in the worldwide competition. At first, the commercial forestry should be created by guaranteeing profits from managing forestry. At the same time the environmental forestry also should be created to meet various demands from the society.

The changes in production input markets such as deficient labor, increased wage, and high rent of the land requires reformation of our forestry which started with inexpensive land and labor. The production structure of forestry in the future should be capital intensive instead of land and labor intensive. The fundamental problem is to find the method which can escape from the extensive forest management and realize the land-intensive forestry. In other word, it is about whether or not our forestry can find the possibility of small-sized forest management because the extensive forest management cannot work with highly expensive price of the land. It is inadequate to discuss the extension of the management size with

TABLE 2 Limitations and Directions of the Korean Forestry of the Future

Condition and Limitations	Future Directions
limited land (high rent)	land saving (small sized management)
limited labor (high wage)	labor saving (high technology)
finance to spare	capital intensive (mechanization)
small market (limited demand)	small production of various products (demand extension)
inexpensive forestry (extensive forestry)	forestry of high value-added (high technology, intensive management)

highly priced forest lands and various purposes of owning forest lands.

To solve the high rent problem and utilize the advantage of the extensive forest management, the government is searching for two approaches which unite several small-sized forest lands into one large-sized management unit. Two approaches are the cooperative management and agent's management. However, the cooperative management turned out to be only the continuation of the small-sized management and forestland in reality is not scaled up. The agent's management is also far from the large-scaled management, as it is just the support for the small-sized forestland owners who cannot manage their lands due to the poor capital and technology.

In reality, the extensive management of forest land cannot be achieved in Korea in any case. Therefore, capital and land intensive forestry should be performed under the condition of limited labor and land. As a way to be successful in small- scaled management, highly value-added products should be produced and land productivity should be enhanced. Germany's forestry is a good example of success in performing a small-scaled forestry because it produces one thousand dollar trees sometimes. Under the small-scaled production structure, Korean forestry can sustain yields and secure income even with the management size of 2-3ha.

The forestry with high value-added production is adapting advanced technologies to produce small amounts of each products

with high quality. On the contrary, Korean forestry is still far from adapting to high value-added production system because it is land-extensive and labor-intensive. The extensive management of forestry requires large markets for wood consumption because it will produce a large scale of timbers. However, the domestic timber market is not huge enough to consume timbers produced within the country. Even, we cannot imagine the domestic market to be covered by domestically produced timbers, and domestically produced timbers will be exported to the world market because of lack of competitiveness. Therefore, producing small amount of products with high value-added is more lucrative for the survival of Korean forestry.

However, it is not easy to transfer the present production system of forestry to the higher value-added production system. Therefore, a gradual change in the present production structure into the new one would be suitable for the trend of what the economic condition requires.

2. Direction of Commercial Forestry and Utilization of Forestland

As the economy continues to grow, the restrictions of using labor and land will be accelerated and the available capital for investment will increase. The forestry is expected to follow the trend of agriculture's progress which is becoming inclined to use more of advanced technologies and sophisticated equipments. Unless the forestry cannot achieve the efficiency in production, it will not be easy to exist in the high income society such as the twenty first century.

In this regard, the creation of commercial forestry can be approached in two ways. The first way is to increase the land productivity, and the second is to decrease the production cost. The land productivity can be increased by selecting commercial species or by using only qualified forestland for producing timber. The production cost can be saved by decreasing the labor cost and increasing the labor productivity through mechanization and the construction of forest roads. The forestland with low site quality will be excluded for management. Commercially manageable forestland is estimated as 2,000-2,500 thousand hectares presently.

IV. Reformation of Forestry Structure and Creation of Commercial Forestry

1. Manager of Forest Land and Agro-forestry

1.1. Characteristics of Forestland Owners and Farmhouse Economy

Forestry is carried on by humans, not only by forest itself. In Korea, management and production activities can be diversified by the purpose of owning forest lands and the idea of forestland owners. Therefore, fostering managers of forest lands could be an important task for the future forestry in Korea.

(Table 3) shows the status of 195 forestland owners who own over 5 hectares. Of 195 owners, sixty nine owners do not even earn any income from their forestlands, while only two owners(1%) are fully involved fully in managing their forests. The number of owners who obtain income from their forest is 126 persons(65%) of whose ratio is pretty higher than other regions.

TABLE 3 Status of Forestland Owners' Occupations

Unit: household

Part-time Full-time	No. of house- holds*	Forest area per house- hold(ha)	Primary income			Secondary income			Total**	No profit from forestry	
			A	F	O	A	F	O			
	A	98	9.5	-	31	11		48	9	99	19
	F	2	34.1	2					2	4	-
	O	64	7.9	16	4	25	18	10	13	86	50
Management	A	26	6.3		20	2		6	1	29	-
	F	5	41.3	5						5	-
		195	-	23	55	38	18	64	25	223	69

Note : 1. A stands for agriculture, F for forestry, S for services, GO for government office, and O for others.

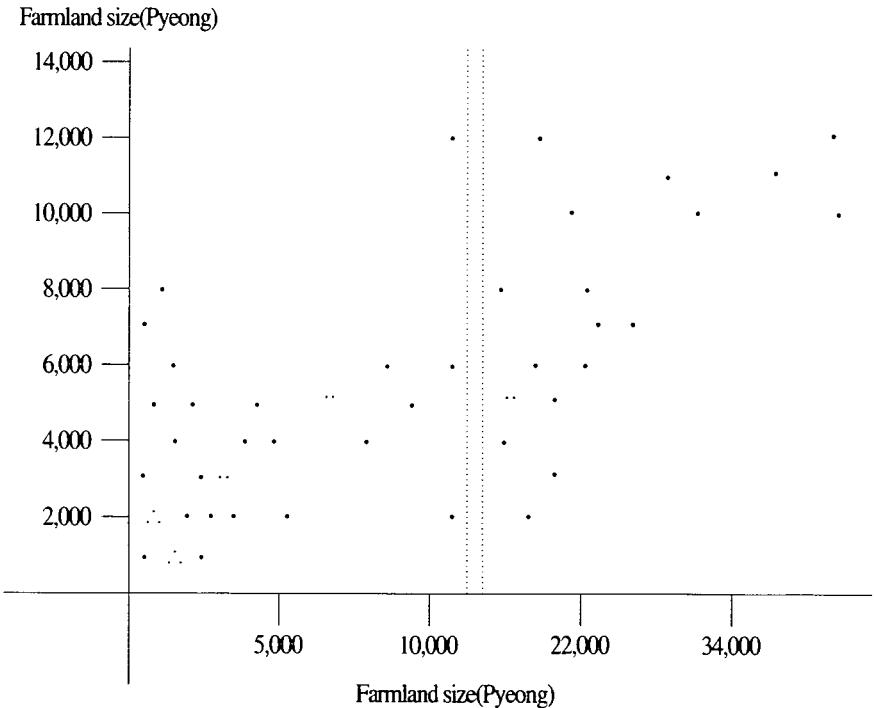
2. A household can sometimes have both primary and secondary income from its part-time job. Therefore the number of households(*) and the total number of part-time jobs(**) do not coincide.

Data source: questionnaires of forestland owners in Bong-Pyeong Cooperatives.

Meanwhile, 124 forestland owners(63.4%), including households which manage their farmlands by agencies, are engaged in farming as a primary job and 105(84.7%) of the farming households are engaged in forestry as a part-time job.

(Figure 1) shows the relationship between farmland and forestland sizes which are owned by household. It tells that the more farmland they have, the more forestland they have too. The characteristics of the farming houses which own forestlands is the mixed management of agriculture and forestry where agriculture is a primary business and forestry a secondary. In this regard the forestry of Korea has such close relationship with agriculture that cannot be separated. Therefore, the way to invest and manage the forest while keeping agriculture will decide the shape of future forestry.

FIGURE 1 The Relationship Between Farmland and Forestland Size Owned by Pyeongchang Area's Forest Cooperatives



1.2. Joint Management of Agro-forestry and Multiple Use

Compared to farming villages which have more opportunities to find an income source and better production condition, mountainous villages have limitation in increasing their income. Especially in mountainous areas with poor conditions for farming, to secure income sources for consistent income will decide the future of mountainous villages.

In the villages surrounded with mountains the only way to gain an extra-income is to utilize the forest resources around. Fortunately, the farming households that own forests are richer and have more farmlands than those that do not own forests, which means that the households owning forests can be investors if the conditions for investment are mature.

Even big farming households, however, are not able to invest in their forest in this state, unless there is a plan to broaden the opportunity of raising the income from their forests is made. Therefore, in order to make farming households who own forestland participate in the forest investment, the income they earn should cover their expenses.

Lee(1992) showed that the cooperatives consisted of 5 to 15 farming households which would be able to manage forests by themselves. Granting that 15 households managed a farmland of 20 hectares in cooperation, they were able to make enough profits to invest 2.3 million won per year for managing 800 hectares of forestland. Therefore, in order to encourage the forestry activities of the future, cooperatives between forest management and agriculture management will be needed.

This approach can enhance the efficient use of discarded forestlands as well as farmlands. Much forestland is owned by absent owners who don't live in the region around their forests. This factor hinders the forest from being developed and used. The above approach enables the management of forests owned by absentees through leaving the management of their forest to those living in the region. In this case, the region is the unit of management and conservation of the forest. As managers the households of the region can enhance their income by doing various activities, e.g., breeding wildlife and cultivating diverse mountainous vegetables.

2. Enhancement of Production Structures and Employment

In actuality it is hard to expect the development of regional forest by several forest owners who live in other regions, because a large number of small forestlands are scattered and each owner has his own interests which are quite different in many cases. Unless all owners in given area participate in the management, work efficiency goes down. Basically, the management by all forest owners is desired for the efficient use of forest resources.

All owners, however, cannot be engaged in the management, because there are many absentees and even local owners live far from each other. Also, most owners have their own occupations and are not interested in forest investment. This is why cooperation in forest management is not carried out well. If forestlands are scattered even if they are unitedly managed, the efficiency of utilizing forest machines drops down. Therefore, the forests which are in the same region should be merged and managed as a unit. In order to manage the forest as one unit, the separation of ownership and management is required and this enhances the efficiency in management of forests. For merging forests in the same area, new regulations are needed for including the forests which are not managed in the management planning mandatorily.

Although forests in the same area are unitedly managed, investment profits should be secure for the successful management. This means that the forest management body should be kept as a self sufficient body in business by way of managing a sustainable forest.

As a result of the study by Lee(1991), a self sufficient management scale can be varied by the species and ages of trees. The self-sufficient management scale for the highly productive species and ages of trees can be from 550 ha to 600 ha, while less productive of them can be 800 ha.

3. Establishing Foundation of Forestry Productions and Training Forest Labors

The high value-added and technology intensive forestry is accomplished by a well trained forest labors and managers, and sophisticated machines which can substitute labors. The most

important issue in the forestry now is the proper level of mechanization and the utilization of the machines and facilities. The inefficiency of and the surplus investment in machines are the main factors of raising management costs, which was already experienced in agriculture. Required are selecting the machine fit for the conditions of forests and training experts who can operate them. Presently, such forest operations as tending, thinning and harvesting need the most labors which means the machines for these activities are needed presently.

Meanwhile, farming machines can be used through their modification for forest activities. This helps to stop an excessive and fruitless investment in developing them and reduce management costs. Further study is necessary on modifying farming machines with ease fit for forest operations.

Forest road is also necessary for the forest management. Because constructing forest roads needs high cost and can cause damages, following facts should be considered. The first thing to be considered is acquiring the proper density of forest road. The forest road does not have to be constructed in the same way as in Germany where the forest is operated on the plain land. The highly dense forest road can be an obstacle of efficient management of the forest. It is said that the density of the forest road over 10m/ha can cause the destruction of forests. The second issue is the investment efficiency. The road should be built only in the commercial forests because the budget for constructing is limited. Also, efficient ways of constructing roads should be reconsidered to save management costs.

However, training foresters is more important than any other things for the future of forestry. It is the key for the enhancement of the forestry structure. In 2000s labor will be scarcer than today for forest operation. Therefore, securing high level of income is required for the sufficient supply of forest labor. As a result, the surrounding should be provided in which foresters can work without pressure from their income and fear of losing job.

(Table 4) shows that the net revenue occurred by the forest management becomes positive after the year of 2006 in case 341.2 billion won is invested for 2 million hectares of forests every 10 years. In 2045, the forest could supply 50% of domestic demand of woods and earn 470,000 won per hectare, which means that the forest

will have a sustained yield system and be autogenous. Also 9,147 labors will be hired, and 228.7 billion won will be made and allocated to 31,800 occupations which provide the income level of 800,000 won per month. When the management size is 500 hectares, it will give each of 7 permanently employed forest labors 9.6 million won of annual income in 2045 and 235 million won after 2045.

Another effect is the creation of the regulated forest in which all age-classes of the forest are evenly distributed and can be harvested evenly every year.

TABLE 4 Expected Production, Labor, and Profit by Periods of Commercial Forests

Classifications	Periods				
	1995~2005	2005~2015	2016~2025	2026~2035	2036~2045
harvested area(ha)	12.4	29.8	56.3	35.5	48.9
final harvest(m ³)	1,857.2	5,023.0	9,342.9	7,042.0	8,483.0
thinning(m ³)	893.4	1,354.8	211.0	452.3	848.8
total production(m ³)	2,750.9	6,377.7	9,553.9	7,494.2	9,331.8
labor for final harvest*	995.4	2,692.3	5,007.8	3,774.5	4,019.9
labor for tending*	1,391.1	2,067.2	285.6	684.2	1,294.6
labor for planting*	7,260.8	3,244.9	3,325.8	4,447.6	3,841.0
total labor*	9,647.3	8,004.4	8,619.1	8,906.4	9,146.5
total revenue**	94,723.6	228,138.3	366,451.5	274,706.1	312,558.4
total labor cost**	241,182.8	200,109.2	215,477.8	222,659.1	228,662.5
net revenue**	-146,459.2	28,029.1	150,973.7	52,047.0	83,895.9
net revenue/ha**	-486.0	39.0	389.0	241.0	470.0

* Unit is the number of men

** Unit is million won

Notes : 1. The price of wood is the present price of 1995.

2. Wage is 35,000won/day.

3. Harvesting year is 50.

Data source : Gwang-Won Lee, 1992. *Regional Forest Use and Forestry Model by Farming Household*, Korean Rural Economic Institute

V. Stimulation of Environmental Forestry and Regional Development

1. Designation of Environmental Forest and Extension of Services

The attention that people pay to the forest is changing now. As most people are suffering side effects such as air and water pollution resulting from industrialization, they want forests to produce such environmental resources as clean water, fresh air and amenities in addition to woods.

Since the pollution across the country spreads out rapidly nowadays, the demand for clean air and water will be increased in the near future. Especially, after the Rio Environment Conference, species' variety, protection of the forest environment and the agreement on the weather have been given a worldwide attention. The forest will be very improved since the above factors are closely related with the forest. As a result, the functions of forests as purifying pollution and conserving environment are desired. Upon completion of forest greening by the efforts of people, the new system for forest use has to be established to satisfy people's desires and draw their support.

Forests need to be separated and designated as areas to be conserved for their own unique functions such as the production of clean water, the conservation of species' variety and genetic resources, for nature and for keeping a scenic amenity. All forests except commercial and industrial forests are to be designated as the conservation area and protected from the development. As environmental forest is for the interests of the public, it would be desirable for the regional management system to be introduced. Thus, the forest planning has to be made for matching with the objects of the forest use and in connection with the regional planning.

The last one to be done for the environment is to establish and develop urban forests for providing citizens more greening spaces and stopping the spread of pollution. The local governments are expected to preserve the environmental forests with the financial aids from the central government.

2. Development of Recreation Areas in Farming Villages

Recently, the rapid increase of recreation demand shows a new

prospect of forestry. Many people are spending their leisure in the forest nowadays. Recreation areas do not have to be famous scenic sites or beautiful landscapes. In many cases, the most important requirement for a recreation site is the distance from the user's location which can be reached within 2-3 hours.

Developing recreation sites will help regional economy by increasing income and providing new employment opportunities. It is necessary to designate the suburban areas close to big cities as recreation areas and build facilities for recreational activities. This will provide suburbanites with the incentive to participate in the recreation business.

The selection of the tree species and the forest planning for the recreation areas are required. Especially, forests for recreation should be developed in connection with all purposes of forest managements, because it is a part of the multiple uses of the forests. Therefore, the construction of facilities and new management strategies will have to be devised on to make it easy to meet budgets and costs for the selection of a recreation area. The development model of the recreation forest suitable for Korean forestry should also be developed.

3. Enhancement of Regional Forestry and Further Research Thereof

The launching of WTO and local autonomous governments mean opening the new era of development administration. The development of the forest well-balanced with regional characteristics and the willingness to participate in the development require a new development administration. It should be considered that managing regional forests according to their own characteristics will be more competitive than managing all forests of the country in a single way. Forestland owners as well as regional residents are required to engage in the management and the local governments need to help them maximize the regional production and the efficiency of land use. Forestry needs to be sustained through a close relationship with other industries, because many problems cannot be solved by forestland owners themselves. Unlike the past when all interests were in greening mountains, present forestry is related with many things such as labor and technology, markets, finance, taxes, and land uses, etc.

Therefore, forestry must escape from the narrow perspective of only the forestland and trees.

Forestry has to contribute to the growth of income of the region, residents and owners. The region needs to be controlled by the local government rather than the central government for developing regional resources through its characteristics. As matter as fact, the forests of the Tebek Mountains and south-western forests have different characteristics, markets and demands. Each region has its own recognition and role on the forest. Therefore, the forestry fit for the regional characteristics and the market demand must be developed. In situations where the local governments have to participate in the forest management and support financial aids, it is wrong to expect their support in the field of forestry which is not related to the regional interests.

As a result, forestry of Korea should develop a new forestry structure in harmony with its own characteristics by adopting the effects of industrialization. The research for this direction is also needed. Local universities have to lead further research on developing tree species and management strategies for the region and the use of processed wood products. The study by the central government should be concentrated on comparing and developing policies based on the regional research.

Research methods should be changed from simple and microscopic approaches to comprehensive and macroscopic approaches for new socio-economic conditions. The new sight of researchers and the development of new methodology are required in that the change in forestry conditions is a new challenge to Korean forestry.

VI. Conclusions

With the advent of the WTO system, the situations concerning forestry will be changed rapidly in the twenty-first century. The WTO system is urging every country to open all kinds of markets, which means the internationalization of all markets. Forestry is no exception. Therefore, forestry is facing the question as to what the strategy for its surviving is in the midst of socio-economic changes

and free trade under WTO system. There are several problems our forestry has to resolve. These are as follows:

First, our forestry has to find the possibility of small-sized forest management because the extensive forest management cannot work with the high rent of the land. In reality, the extensive management of forestland cannot be achieved in Korea in any case. As ways to be successful in small-scaled management, highly value-added products should be produced and land productivity should be enhanced.

Second, forestry should achieve production efficiency to exist in the high income society such as the twenty-first century. To this end, the land productivity should be increased by planting commercial species or by using only qualified forestland for producing timber, while the production costs should be reduced by decreasing the labor cost and increasing the labor productivity through mechanization and construction of forest roads. The forestland with less scenic quality will be excluded from management.

Third, forests should be managed according to the characteristics of the region. The development of the forest well-balanced with regional characteristics and the willingness to participate in the development require a new administration, because the management of regional forests according to their own characteristics will be more competitive than managing all forests of the country in a single way. Forestland owners as well as regional residents are required to engage in the management and the local governments need to help them maximize the regional production and the efficiency of land use.

Fourth, the forestland owners who have a large-scaled farmland in the region should be provided with the leadership for managing the forest in the region. The characteristics of the farming houses which own forestlands is the mixed management of agriculture and forestry where agriculture is a primary business and forestry is a secondary. Those who have more farmland own more forestland and are able to invest in their forests. Under this aspect, the forestry of Korea has such a close relationship with agriculture that cannot be separated, and the forest in pace with agriculture will decide the shape of the future.

Fifth, trained forest labors and managers should be fostered and forest mechanization be accomplished. The important issues the

present forestry is facing are the proper level of mechanization and the utilization of machines. The inefficiency of and the surplus investment in machines are the main factors of raising management costs, which was already experienced in agriculture. The machineries fit for the conditions of forests need to be developed and experts who can operate them to be trained.

Finally, forests need to be separated and designated as areas to be conserved through their own functions such as the production of clean water, the conservation of species's variety and genetic resources, and the forest for keeping a scenic amenity. Forests except commercial and industrial forests are to be designated as the conservation areas and protected from the development. As environmental forest is for the public interests it would be desirable for the regional management system to be introduced. Thus, the forest planning has to be set up in harmony with the objects of the forest use and in connection with regional planning.

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