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Development Plan for Under-forest Economy of Henan Province Based on Central Plains Economic Region

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Abstract Firstly, this paper analyzed current situations, major practice and existing problems of under-forest economy in Henan Province. Then, it made an in-depth discussion of guiding thought, principle and objectives, construction task and safeguarding measures of the under-forest economic development plan. Besides, it analyzed benefits of the under-forest economic development plan. By 2017, the area of under-forest economic land will reach 1.60 million hm^2 , create output value of 155.2 billion yuan (accounting for more than 20% of forest output value), provide 3.27 million jobs, and will greatly increase ecological carrying capacity of construction and development of the Central Plains Economic Region (CPEER).

Key words words Under-forest economy, Plan, Central Plains Economic Region (CPEER), Analysis, Henan Province

The construction objectives of Central Plains Economic Region (CPEER) are to realize coordinated development of new urbanization, new industrialization, and new agricultural modernization, and integrated urban and rural areas, and developing the under-forest economy is an optimal cutting point for under-forest economy integrating into the CPEER construction. Henan Province has clarified property right of 4.5847 million hm^2 collective forest land. Farmers plant medicinal materials, edible fungus, forage grass, raising poultry, livestock, domesticating wild animals, collecting and processing plant leaves, flowers, fruits, seeds and wild vegetable, and developing sightseeing and ecological health care using forest landscape. These not only increase land use area, but also increase job opportunities, and promote rapid development of rural economy. Therefore, formulating the under-forest economic development plan of Henan Province is of great guiding significance for coordinated development of the under-forest economy and will significantly promote construction of CPEER and sustainable forestry development of Henan Province.

1 Development of the under-forest economy of Henan Province

1.1 Current situations By the end of 2012, the output value of under-forest economy of Henan Province has reached 10.32 billion yuan. The forest land areas suitable for developing the under-forest economy is 2.5313 million hm^2 . Firstly, the under-forest planting has realized considerable achievements, mainly forest medicinal materials and edible fungus, flowers and forest economy, with area up to 174700 hm^2 , and output value up to 2.741 billion yuan. Secondly, the under-forest raising has begun to take shape.

At present, the under-forest raising scale has reached 28.74 million pieces, including more than 26 million chickens, ducks, and geese, 2.4 million pigs and cattle, 93000 boxes of bees, using forest land near 66700 hm^2 , and annual output value up to 2.43 billion yuan. Thirdly, related product collection and processing are developing stably. With the reform of collective forest tenure system, 3.2 million hm^2 collective forest land has been transferred to more than 10 million farmers in the form of household contractual operation. By the end of 2012, the weight of collection and processing has reached 118000 tons for leaves, flowers, fruits, seeds of forest plants and wild medicinal materials, vegetable, and rattan canes of forest land, the forest land use area has reached 156700 hm^2 and output value reached 816 million yuan. Fourthly, the forest landscape use area rapidly increases. It has becoming an essential choice for using excellent forest environment and landscape and under-forest harmless products and getting rid of poverty to develop sightseeing, recreation, ecological health care, fruit picking, and under-forest catering, and selling forest foods, fruits, tea products, Chinese medicinal materials, and handicrafts with local characteristics. According to statistics, the landscape use area of collective forest land in Henan Province has reached 406700 million hm^2 , annually receiving 50.1 million tourists, and output value up to 4.33 billion yuan^[1].

1.2 Major practice

1.2.1 Strengthening measures and policy support. Many cities under the jurisdiction of the provincial government and county-level government have established the under-forest economic development leading team with the person responsible for agriculture as leader, and persons responsible for forestry and finance as members, to organize and coordinate major issues of under-forest economical development, and issue policies to support the under-forest economic development. For example, Puyang City and Luohe City have promulgated opinions about developing the under-forest economy in 2009, and Luanchuan County printed and distributed *Incentive Measures for Developing Under-forest Economy*. Imple-

mentation of these measures provides organization guarantee and policy support for healthy development of the under-forest economy.

1.2.2 Cultivating typical enterprises to bring into play model functions. At the same time of clarifying property right and issuing certificate of collective forest land, the Department of Forestry of Henan Province launched pilot projects of deepening the reform in under-forest economic development, construction of specialized forestry cooperatives, circulation of forest property right, evaluation of forest resource assets, and mortgage loan of forest right. In the beginning of 2012, the Department of Forestry of Henan Province formulated standard for establishing modern bases of under-forest economy, organized and carried out construction of modern bases of under-forest economy, praised 34 under-forest economic counties, which play a positive role in promoting industrialized development of under-forest economy. All areas have taken model role as important driver for developing the under-forest economy. For example, Xihua County selected a good many large and profitable enterprises to cultivate and support, which expedites the emergence of under-forest economic development leading enterprises.

1.2.3 Improving the development level with the aid of science. Forestry scientific research institutions of Henan Province constantly strengthen scientific and technological tackling efforts, organize carrying out research of new varieties and technologies suitable for developing the under-forest economy. In particular, they have implemented researches of high efficient development models for forest medicinal materials, edible fungus, and livestock. In scientific research projects, it arranged planting konjaku, *Auricularia auriculajudae*, mushroom, and forest, grass and poultry compound operation under forest. Besides, it popularizes chicken raising, Chinese yam, button mushroom, *Ophiopogon japonicus* (Linn. f.), and peanut planting under forest, to promote under-forest economic development.

1.2.4 Strengthening services and improving system. All areas are actively building perfect service network, to remove difficulties and alleviate sufferings for forest farmers. For example, Wuyang County integrates technical forces of forestry, and science and technology departments, establishes under-forest economic development associations and specialized cooperatives, launches scientific and technological services for under-forest economy, and improves organizational level of forest farmers entering the market.

1.3 Existing problems The under-forest economic development of Henan Province remains in starting stage and there are some problems to be improved. (i) Some areas do not have forest right management service organizations and lack necessary guidance and service for under-forest economic development. (ii) Financial support for under-forest economic development is weak^[8], and infrastructure construction lags behind. (iii) The under-forest economic development is not balanced, and forest land utilization ratio is low; (iv) Organization level of under-forest economic organizations is low^[6], operation is decentralized, and the partici-

pation level of leading enterprises and forest farmer cooperatives is low, and their ability of resisting market risks is low; (v) The under-forest economic development lacks technological standard system and scientific planning^[1, 4].

2 Guiding thought and construction objectives of the under-forest economic development in Henan Province

2.1 Guiding thought It is required to take the spirit of the 18th National Congress of the Communist Party of China as guide, and Deng Xiaoping Theory, the important thought of Three Represents and the Scientific Outlook on Development as guidance, to energetically develop ecological civilization construction of CPER, maintain ecological safety, scientific and reasonably use forest resources, and take accelerating transformation of forestry development and increasing farmers' income as objectives, to promote construction of specialized cooperatives and market circulation system, and promote intensive, large-scale, standardized and industrialized development of under-forest economy^[3], to make greater contribution to CPER construction and Henan Province's forestry development.

2.2 Principles

2.2.1 Sticking to ecology first and reasonably utilizing forest resources. The CPER construction takes ecological protection as foundation and precondition. In this situation, it is required to develop under-forest resources. Besides, in the precondition of ensuring play of ecological functions, it is required to scientifically and reasonably use ecological public welfare forest to develop under-forest economy.

2.2.2 Sticking to scientific planning and classified implementation. According to natural environmental conditions and market demands of all areas of Henan Province, it is required to reasonably select development modes, cultivate regional characteristic industries, integrate benefits of interested parties, and reasonably determine development projects and scale.

2.2.3 Sticking to government guidance and policy support. All levels of government should formulate and improve policies for under-forest economic development, coordinate relationship between related departments, and consolidate effective resources of under-forest economic development^[9], provide support in policies, projects, and funds for under-forest economic development, and ensure effective implementation of policies, to really benefit farmers.

2.2.4 Sticking to scientific and technological support and providing demonstration and guidance. It is required to adopt advanced technical measures, implement scientific management, strengthen research, extension, and model functions of new technologies, new varieties, and new modes, and carry out intensive operation.

2.2.5 Sticking to model role of leading enterprises to realize cooperation and win-win. It is required to bring into full play model role of leading enterprises and model bases, optimize development mechanism of under-forest economy, and constantly improve organizational level and risk-resisting ability of forest farmers, to promptly solve problems of farmers in funds, technologies, pro-

duction, and sales.

2.3 Construction objectives

2.3.1 Overall objective. With development of five years, Henan under-forest economic output value has realized stable growth and the proportion to total forestry output value is significantly increasing. By 2017, under-forest economic land area of Henan Province will reach 1.6 million hm^2 , accounting for more than 30% of the whole forest land in Henan Province, the total output value of under-forest economy will reach 42 billion yuan, and it will build 30 under-forest economic industrial clusters.

2.3.2 Specific objectives. The under-forest planting area of

Henan Province is up to 486700 hm^2 , the output value up to 6.5 billion yuan; the under-forest raising scale is up to 62 million pieces, using 133300 hm^2 forest land, output value up to 16.1 billion yuan; related product collection and processing is 185000 tons, using forest land 246700 hm^2 , and output value up to 1.4 billion yuan. The forest landscape use area is up to 733300 hm^2 , receiving 95 million tourists, and output value up to 18 billion yuan; there are more than 1900 specialized cooperatives or family farms engaged in under-forest economy; 2.96 million farmer households develop the under-forest economy, providing jobs for more than 3.27 million people.

Table 1 Tasks of under-forest economic development plan of Henan Province

Region	Total area 10^4 hm^2	Total output value 10^5 yuan	Under-forest planting		Under-forest raising			Collection and processing of under-forest products			Utilization of forest landscape			Involving farmers 10^4 households	Quantity of employment persons 10^4	Involving cooperatives
			Area 10^4 hm^2	Output value 10^8 yuan	Area 10^4 hm^2	Scale $10^4 \text{ pieces (boxes)}$	Output value 10^8 yuan	Collection area 10^4 hm^2	Collection and processing volume 10^4 tons	Output value 10^8 yuan	Integrated output value 10^8 yuan	Area 10^4 hm^2	Quantity of tourists 10^4			
Total	160.00	420.00	730.00	65.00	200.00	6200.00	161.00	370.00	18.50	14.00	1100.00	9500.00	180.00	295.97	326.92	1958
Northern mountainous region	15.10	45.94	25.68	3.49	16.20	464.00	8.07	17.40	0.84	0.62	167.00	1819.00	33.76	-	-	-
Western mountainous region	77.69	199.82	282.92	31.75	98.74	2965.00	65.41	243.50	12.16	9.27	540.20	4639.90	93.39	-	-	-
Southern mountainous region	32.20	77.49	74.41	8.24	21.80	840.00	28.45	91.80	4.73	3.58	295.00	2389.80	37.22	-	-	-
Plain regions	35.01	96.75	346.99	21.52	63.26	1931.00	59.07	17.30	0.77	0.53	97.60	651.30	15.63	-	-	-

3 Construction task

3.1 Northern mountainous region Northern mountainous region mainly refers to Taihang Mountain area. In this area, the construction of under-forest economy by 2017 is respectively: under-forest planting 17100 hm^2 , under-forest raising 4.64 million pieces (boxes), collection and processing of related under-forest products 8400 tons, forest land area for forest landscape 111300 hm^2 , and annually receiving 18.19 million tourists.

According to operation mode, the construction task is specifically: under-forest planting: medicinal plants 15800 hm^2 , edible fungus 1000 hm^2 , and others 300 hm^2 ; under-forest raising: poultry 4.383 million pieces, livestock 200000 pieces, and bees 57000 boxes; collection and processing of related under-forest products: fruits (including seeds, the same below) 4900 tons, flowers and leaves 100 tons, branches and barks 200 tons, and others 3200 tons; forest land area for forest landscape: forest tour annually receiving 13.6105 million tourists, farmer houses and under-forest catering receiving 3.103 million tourists, picking and sightseeing receiving 448500 tourists, and ecological service and others receiving 1.028 million tourists.

3.2 Western mountainous region Western mountainous region mainly refers to Funiu Mountain area and hilly region of Loess Plateau. In this area, the construction of under-forest economy by 2017 is respectively: under-forest planting 188600 hm^2 , under-forest raising 29.65 million pieces (boxes), collection and processing of related under-forest products 121600 tons, forest land

area for forest landscape 360100 hm^2 , and annually receiving 46.399 million tourists.

According to operation mode, the construction task is specifically: under-forest planting: medicinal plants 121600 hm^2 , edible fungus 23900 hm^2 , vegetable 21300 hm^2 , forage grass 3700 hm^2 , and others 300 hm^2 ; under-forest raising: poultry 26.252 million pieces, livestock 2.215 million pieces, and bees 173000 boxes; collection and processing of related under-forest products: fruits (including seeds) 80300 tons, flowers and leaves 21800 tons, branches and barks 2000 tons, and others 17500 tons; forest land area for forest landscape: forest tour annually receiving 39.83 million tourists, farmer houses and under-forest catering receiving 2.576 million tourists, picking and sightseeing receiving 1.53 million tourists, and ecological service and others receiving 2.463 million tourists.

3.3 Southern mountainous region Southern mountainous region mainly refers to Dabie Mountain area and Tongbai Mountain area. In this area, the construction of under-forest economy by 2017 is respectively: under-forest planting 49600 hm^2 , under-forest raising 8.4 million pieces (boxes), collection and processing of related under-forest products 47300 tons, forest land area for forest landscape 2.95 million hm^2 , and annually receiving 28.398 million tourists.

According to operation mode, the construction task is specifically: under-forest planting: medicinal plants 33300 hm^2 , edible fungus 1800 hm^2 , vegetable 6500 hm^2 , forage grass 3600 hm^2 , tea

3800 hm², and others 300 hm²; under-forest raising: poultry 6.99 million pieces and livestock 1.41 million pieces; collection and processing of related under-forest products: fruits (including seeds) 26700 tons, flowers and leaves 12900 tons, branches and barks 3800 tons, and others 3900 tons; forest land area for forest landscape: forest tour annually receiving 21.535 million tourists, farmer houses and under-forest catering receiving 1.5 million tourists, picking and sightseeing receiving 0.47 million tourists, and ecological service receiving 0.393 million tourists.

3.4 Plain regions Plain regions mainly refer to Huang-Huai-Hai Plain and Nanyang Basin. By 2017, the construction task of under-forest economy in this area is respectively: under-forest planting 231300 hm², under-forest raising 19.31 million pieces (boxes), collection and processing of related under-forest products 7700 tons, forest land area for forest landscape 65100 hm², and annually receiving 6.513 million tourists. Specifically: under-forest raising: poultry 16.93 million pieces and livestock 2.38 million pieces; collection and processing of related under-forest products: fruits (including seeds) 2600 tons, flowers and leaves 200 tons, and others 4900 tons; forest land area for forest landscape: forest tour annually receiving 3.3825 million tourists, farmer houses and under-forest catering receiving 1.6285 million tourists, picking and sightseeing receiving 1.239 million tourists, and ecological service receiving 0.263 million tourists.

4 Key construction tasks

4.1 Cluster construction By 2017, Henan Province will build 30 industrial clusters of under-forest economy, using 1.0548 million hm² forest land, accounting for 65.9% of planed under-forest economic development, and providing 1.9 million jobs.

4.2 Construction of model bases In the process of under-forest economic development, it is required to actively cultivate model bases, to attract more farmers to participate in under-forest economic construction and promote healthy development of under-forest economy in the whole province. By 2017, it is expected to have built 180 under-forest economic model bases, using forest land 325600 hm², accounting for 30.9% of industrial clusters of under-forest economy, and providing 314000 jobs. These include 54 under-forest planting bases, 39 under-forest raising bases, 16 bases of related products collection and processing, 38 bases of forest landscape use, and 33 comprehensive bases of under-forest economy.

5 Estimation of funds

5.1 Standard of investment The standard of investment for developing the under-forest economy is as follows: under-forest planting: medicinal plants 7500 yuan/hm², edible fungus 4500 yuan/hm², economic crops and grains 3000 yuan/hm², vegetable 4500 yuan/hm², forage grass 4500 yuan/hm², tea products 3000 yuan/hm², and others 7500 yuan/hm²; under-forest raising: poultry 25 yuan/pcs, livestock 1000 yuan/pcs, bees 200 yuan/box, and others 200 yuan/pcs; collection and processing of related

products 1000 yuan/ton; forest landscape use: 30 million yuan/104 hm², under-forest economic cluster 1 million yuan for each; model bases 100000 yuan for each; under-forest economic management service organization 500000 yuan for each; specialized forestry cooperatives or family farms 50000 yuan for each; formulation of standards 50000 yuan for each; provincial training 500 yuan/person, actual training 200 yuan/person, and county-level training 100 yuan/person.

5.2 Investment estimation According to current development situation and development objective of 2017, the annual investment amount from 2013 to 2017 for under-forest economy should be 6.943 billion yuan, 8.232 billion yuan, 9.71 billion yuan, 11.610 billion yuan, 14.004 billion yuan, respectively, and the total investment amount in five years needs 50.560 billion yuan. These include 13.668 billion yuan for under-forest planting, 27.152 billion yuan for under-forest raising, 787 million yuan for collection and processing of related products, 8.808 billion yuan for forest landscape use, 30 million yuan for industrial clusters, 19 million yuan for model bases, 40 million yuan for construction of under-forest economic management service organizations, 50 million yuan for specialized cooperatives, and 7 million yuan for formulation of related standards and personnel training.

5.3 Fund raising For developing the under-forest economy, it is necessary to establish diversified investment mechanism with government as leader and enterprises and farmers as operation subjects. The provincial finance should set up special funds for under-forest economy, specifically for infrastructure construction, brand construction, centralized development of superior products, introduction of new varieties and technologies, and formulation and training of production technologies. City and county level finance should arrange special funds or corresponding support funds. The forestry department at all levels should actively coordinate development and reform, finance, science and technology, water conservancy, agriculture, commerce, and poverty alleviation, and closely connect project construction policies and planning, to support under-forest economic development.

6 Safeguarding measures

To ensure smooth implementation of planning, all levels of forestry administration authorities should fully understand significance of under-forest economy, include the implementation of plan into annual objective, implement system of reward and penalties, enhance inspection and examination, and perform management of objectives^[5], and integrate projects and funds for natural forest protection, forest fostering, public welfare forest management and protection, conceding the land to forestry, to safeguard rapid development of under-forest economy^[11] and promote construction of CPER.

6.1 Strengthening construction of service organizations

For developing the under-forest economy, it is required to strengthen construction of related management service organizations and establish perfect under-forest economic management

service system. Forestry departments of cities under the jurisdiction of the provincial government should set up under-forest development service organizations, provide evaluation of forest resource assets, guidance of forest land circulation and mortgage loan, support of cooperative organizations, consultation of forestry policies and technical information, to ensure healthy development of under-forest economy.

6.2 Accelerating construction of cooperatives It is recommended to implement the Law of the People's Republic of China on Farmers' Specialized Cooperatives, to guide and support forest farmers to voluntarily establish specialized forestry cooperatives and family farms, constantly expand operation scale, raise organizational level, and strengthen ability of resisting market risks. Besides, it is recommended to accelerate construction of specialized under-forest economic associations, and bring into full play their functions of policy inquiry, information services, and scientific and technological extension.

6.3 Reinforcing scientific research efforts It is recommended to strengthen communication and coordination with science, agriculture, animal husbandry and tourism, support scientific research institutions and leading enterprises to reinforce research effort in fine and deep processing of new varieties and technologies of under-forest economy^[7], and enhance research of under-forest planting and raising modes, to accelerate formulation of technical standards for under-forest economic development.

6.4 Actively implementing training^[10] Relying on Henan Forestry Vocational College, it is recommended to carry out regular technical training and make effort to cultivate a good many of model farmers of under-forest economy, technicians of specialized forestry cooperatives, and forestry experts. Through effective means such as news media and Internet, it is recommended to propagate significance, typical experience and successful practice of under-forest economic development planning, to create social environment and atmosphere of public opinions favorable for implementation of planning.

7 Benefit analysis

According to survey of the under-forest economic development in Henan Province, the ratio of input to output is 1:3; within the five-year plan period, the total investment amount is 50.560 billion yuan, and it can create output value of 151.7 billion yuan. By 2017, the under-forest economy will use forest land up to 1.6 million hm², the integrated output value is up to 4.2 billion yuan, and the proportion of under-forest economy to the forestry output

value of the whole province is more than 20%. Through implementation of planning can provide 3.27 million jobs, increase 900 yuan for forest farmers compared with 2012, and promote development of related industries, including processing, packaging, transportation, and service. Besides, it is expected to enhance market competitive awareness of farmers, improve their operation ability and technical level, and promote management of rural grass-roots democratic management and accelerate construction of CPER. Implementation of planning will improve intensive production level of forestry in Henan Province, reduce occurrence of forest diseases and pests, promote growth of forests, and greatly raise ecological carrying capacity of CPER construction and development.

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