



**AgEcon** SEARCH  
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

*The World's Largest Open Access Agricultural & Applied Economics Digital Library*

**This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.**

**Help ensure our sustainability.**

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

[aesearch@umn.edu](mailto:aesearch@umn.edu)

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

# Analysis of Effects of Different Operation Patterns of Returning Farmland to Forest( grass) on Rural Economy

—A Case of Wuqi County, China

LUO Meng<sup>1,3\*</sup>, LI Gui-xian<sup>2</sup>

1. College of Resources and Environment A&F University, Yanglin 712110, China; 2. College of Forestry, Northwest A&F University, Yanglin 712110, China; 3. Department of Life Sciences, Yan'an University, Yan'an 716000, China

**Abstract** Taking Wuqi county, Shanxi Province as an example, this paper is based on the introductions of the researched regions and according to the planting model and some factors influencing economy. After systematic analysis and selection, it selects ecological forestry, wood-grass-husbandry, wood-medicine, economic forestry and greenhouse vegetable these five models of returning farming to grass, with Wuqi town, Baibao town, Wu Cangbao county, Xinzhai county, Xuecha county and Wugu town these five sites as examples. This paper has carried out a research on these 5 models at county, town and household levels through Participatory Rural Appraisal and Document Search to gain the related data. And making a comparison on the contribution of the 5 models to the economy among towns in Wuqi project returning farmland to forestry( grass) through variance analysis to affirm the different degrees of the 5 models having to the economy growth. The results show that there are extinct differences among the 5 models except the tiny differences existing between the economic forestry model and the wood-medicine model. The Wood-grass-husbandry model and the economic forestry are best efficient ones ranking number 1 and 2. The Wood-medicine, the economic forestry and the greenhouse vegetable models are ranking respectively number 3, 4 and 5.

**Key words** Model, Wuqi county, Returning farmland to forest and grassland, Economic, Efficiency, China

The project of returning farmland to forest( grassland) is an important initiative to promote the sustainable development of human being and society and improve the environment by Party Central Committee and the State Council, which is also an efficient way in accelerating the rural economy restructuring. Since the project being carried out, the situation of the environment change and the development of the rural area of the project area has become one of the commonly centered issues of the public<sup>[1]</sup>. Wuqi county is a region made notable achievements in the national more than 150 counties returning farmland to forestry( grassland), which had been set as the pilot demonstration county of returning farmland to forest( grassland), national advanced county in forestation, advanced group in water reservoir and national combination pilot of returning farmland to forest( grassland) and Poverty Alleviation and Development and so on. The author discusses the influences of different models of returning farmland to forest( grassland) of Wuqi county on economic growth, attempting to afford some help in policy-making of returning farmland to forest( grassland).

## 1 Overview of the researched area

Wuqi county lies in the northwest of Yan'an city, Shanxi province, with Dingbian county to the northwest, Zhidan county to the southeast, Jingbian county to the southeast and Huachi county in Gansu province to the southwest, locating 107°38'57"–108°32'49" East Longitude, 36°33'33"–37°24'27" north lon-

gitude. It is 93.4 km long from north to south, 79.89 km wide from west to east, with a total area of 3 791.5 square kilometers. The county includes 4 towns and 8 villages, 164 village committees, with a total population of 125 000. In which, the rural population is 106 000, covering 84.8 percent in the total population. The population of the township is 19 000, covering 15.2 percent in the total population. The population density is 32.7 person per square kilometer, averagely 3.2 square hectometers per person. The county is about 1 233 meters to 1 809 meters above sea level, and the landforms is a kind of Trabecular Hilly Region of Loess Plateau. It is cold and dry in winter, windy and dry in spring, alternating drought and floods in summer and mild and wet in autumn. The rainfall distribution is uneven with all kinds of natural disasters like droughts, high frost, hailstone, gale and rainstorm frequently happened<sup>[3-4]</sup>. Until now, the total accumulated area of returning farmland to forest( grassland) is 1 579 000 square hectometers, enjoying national cash subsidy equivalent to 1.28 billion RMB, with 105 426 farmers directly benefited, averaging enjoying 1 520.92 RMB a year per person in rural county. With the deep operation of the forestry important projects centering on returning farmland to forest( grassland), the ecological environment of Wuqi county and the rural economy have changed dramatically<sup>[5-6]</sup>.

## 2 Model selection and research methods

**2.1 Model selection** Through the practical survey of the farmland-retrieving area, complying with the principles of site situation like degree, position and direction of the slope in the researched area<sup>[7]</sup> and according to the local models and some factors influencing economy, this paper finally selects 5 operation models of returning farmland to forest( grassland) after

systematic analysis and selection (Table 1).

**2.2 Sample selection** In order to make the reflected situation more representative, objective and universal, this research, based on the situations of Wuqi county, selects randomly 6 sites as samples. And the samples titled A to F respectively are Wuqi town, Baibao town, Wu Cangbao village,

Xinzhai village, Xuecha village and Wugu town. To the 5 models of each county, the paper conducts surveys in terms of county, village and household to reflect the practical situations. And in surveys, Participatory Rural Appraisal (PRA) and Document Search are adopted, so it successfully avoids the limits of single data<sup>[8]</sup>.

**Table 1 Basic situation of models of returning farmland to forest and grassland in Wuqi**

Model types	Site situation	Altitude//m	Slope degree//°	Slope position	Model collocation
Ecological forest	Arid, barren land	1 780	30	High	Strains mixed
Wood-grass-hudsbandy	Former farmland	1 680	25	Middle	Lines mixed
Wood-medicine	Former farmland	1 680	20	Middle-low	Bands mixed
Economic forest	Former farmland	1 350	20	Middle-low	Bands mixed
Greenhouse vegetable	Former water land	1 233	0	Low	Lines mixed

**2.3 Research methods** Making a variance analysis on the economic benefits of the 5 models, dividing the total variances into the responding variances of each element and making out the quantity estimation in order to discover the degree of importance of elements in variances, reflecting from quantity of the elements and the influences of qualities of elements on experimental results<sup>[9]</sup> and at the same time reflecting not only the randomness of the samples but also the universality of the analysis of the results.

## 3 Conclusions and analyses

### 3.1 Economic benefits analysis of different models

**3.1.1 Analysis of Ecological Forest Model.** Selection of Ecological Forest Model is based on poor site conditions, high altitude, steep slope, poor soil and serious soil erosion. Native species and bush which are strong in resistance to bad weather and strong in adaption are the preferred selections of plants. The ecological forest model should be multiple species, combining with shrubs and with many various types mixed. The configuration of ecological forest model should be that Joe is Joe, irrigation is irrigation, shrubs and grass on the other. Principles

of arbor, bush and combination of the two should be adopted in the configuration of the Ecological Forest Model, arbor-types. Tree-type (Orientalis, Pine, Larch, Simonii, Locust, Elm, Bunge, Ailanto), shrub (Amorpha, Seabuckthorn, Caragana, Typhina), the combination type (selecting the corresponding plants according to the local condition). Putting into a mountains horizontal belt operation, to some places where serious soil erosion exists horizontal platform is needed, mending the land with Fish-Scale Pit. The densities of the Pure Coniferous Forest, the Mixed Forest and the Broad-leaved Forest are from 1995 to 3 300 per hundred meters. Taking environment into consideration, the fall of woods should be done at regular intervals. In order to make it easy to calculate, we view it as one-time harvest. Densities of Pure Coniferous forest and the mixed are different. Calculating with 1995 per hundred meters as unit, we get that there is an output of 120 cubic meters per hundred meters, with a total value of 48 000 Yuan per hundred meters. The net profit is 45 440 Yuan per hundred meters deducting the seeds cost 2 000 Yuan and the management cost 360 Yuan. In the same way, we may calculate the total area and the profits of the 6 different models. (Table 2)

**Table 2 Economic profit situation of ecological forest model**

Sample site	Planting area hm <sup>2</sup>	Total cost ×10 <sup>4</sup> yuan	Total output ×10 <sup>4</sup> yuan	Total profit ×10 <sup>4</sup> yuan	Annual mean profit ×10 <sup>4</sup> yuan
A	937.3	221.2	4 499.0	4 259.1	425.9
B	805.0	189.9	3 864.0	3 657.9	365.8
C	670.0	158.1	3 216.0	3 044.5	304.4
D	850.0	200.6	4 080.0	3 862.4	386.2
E	700.0	165.0	3 360.0	3 195.0	319.5
F	685.0	161.6	3 288.0	3 112.6	311.3

Note: The data is based on the *Statistical Yearbook of Wuqi County* in 2007. The same with the following table.

**3.1.2 Analysis of forest-grass-husbandry model.** By planting high-quality forage grass in the forest, it will not only achieve goals of changing the planting structure of land, restoring vegetation, reducing soil erosion and improving the ecological environment, but also by feeding the livestock with the vegetation, it will promote the development of animal husbandry and gain economic benefits, achieving aims of increasing farmers' incomes and wealth-acquiring. There are 3 kinds of figuration of this model: Forest-grass-strip Type, Forest-arbor-grass Type and Grass-block Distribution Pattern. The Forest Grass Stripe

Type is mingled with forest strip and grass strip, with each 30 meters wide. The Forest-arbor-grass Type is an area of 750 hm<sup>2</sup> to 1 500 hm<sup>2</sup> economic trees or the timber, and among the trees, plants high-quality forage grass. The Grass-Block Distribution Pattern is forest mixing with grass. The main species and the configuration are Orientails-grass, Locust-grass, local species-grass. The main types of forage are Red Clover, White Clover, Ryegrass, Alfalfa, Goose feather grass, Duck Feather grass in a Mountains horizontal belt operation. The spacing distance of Coniferous forest in Forest-arbor-grass type is 3 me-

ters by 3 meters, the spacing distance of Broad-leaved Pure Timber forest or mixed forest is 3 meters by 4 meters, and the spacing distance of Economic forest and Nuts trees is 4 meters by 5 meters, planting forage under the trees. The forest strip and the grass strip of the Forest Grass Stripe Type are 30 meters wide, mingled with configuration and the selected species are Orientals, Locust, *Prunus davidiana*, Apricot and Date, 2 250 per hundredmeter. The forest-grass block type is based on the practical terrain, mingled with forest and grass blocks. Because of its complicated configuration, we adopt blocks type. The density of production planting value is 1 900 per hundred meters. After 10 years, they would be reap. And at that time, the output is 110 m<sup>3</sup> per hundredmeter. According to the offer price of timber 400 Yuan per cubic meter, it worths 44 000 Yuan per hundred meters. The total profit is 41 450 Yuan per hundredmeter deducting the seeds cost 2 000 Yuan and the management cost 350 Yuan. And the configuration planting under the trees is Purple Alfalfa and so on. The forage grass are 5 times harvest, 8 tons per hundred meters each time, reaching 40 tons per hundred meters a year. It can afford 27 sheep forage supply continuously. Calculating the averaging profit 260 Yuan a sheep a year, there are 6 600 Yuan a year. The situation of profit of the 6 different models is in the Table 3.

**3.1.3 Analysis of Wood-Medicine Model.** The wood-medicine model is a good embodiment of combination of ecological benefits and economic benefits. In the premise of maintaining the structure and functions of the ecological system, the Wood-Medicine Model realises the large-scale and specilized production of medicinal plants. The main plants of this model are Seabuckthorn and *Scutellaria*. Seabuckthorn is a kind of Arbor species, and the density is 1568 per hundred meters, the spacing

distance between the two is 1.5 meters by 2 meters. It is possible both in spring and autumn. After 3 to 4-year-growth, it begins to flower and bear fruits. And its fruits are reap after 10 to 11 months, which after drying can be sold out. The total output is 6 730 kilograms per hundred meter pricing 0.6 Yuan per kilogram. And the wood, for a period of 10 years, cut off at one time, would have a total output of 100 cubicmeter per hundred-meter, creating a whole profit of 40 000 Yuan deducting seeding plants cost 2 000 Yuan and management cost 460 Yuan, with a net profit of 37 540 Yuan. *Scutellaria* harvest is in the late autumn after 1 or 2-year-growth. The spacing distance is 20 centimeters to 27 centimeters, and the planting spacing is 1.5 centimeters to 2.0 centimeters, the best density is 335 per hundred meters. Scratching the root, removing the stems and leaves, shaking the soil and drying the bunches, then it can be used in medicine. With 3 years as a period, there will be 4 000 kilograms per hundredmeter of roots, realizing the total profit of 37 300 Yuan, deducting seeds cost, fertilizer cost and management cost 4 000 Yuan and each year having net profit of 34 300 Yuan. And situations of planting and profit of the 6 models are in the Table 4.

**Table 3 Economic Profit Situation of Wood-Grass-Animal Husbandry**

Sample site	Planting area hm <sup>2</sup>	Total cost ×10 <sup>4</sup> yuan	Total output ×10 <sup>4</sup> yuan	Total profit ×10 <sup>4</sup> yuan
A	189 × 6 800	1 364.4	4 843.1	3 478.3
B	232 × 7 020	1 409.5	5 016.1	3 601.6
C	305 × 6 430	1 293.1	4 635.2	3 341.4
D	156 × 5 980	1 199.7	4 254.6	3 054.7
E	170 × 6 900	1 383.9	4 904.8	3 520.4
F	195 × 7 010	1 406.5	4 998.2	3 585.2

**Table 4 Economic Profit Situation of Wood-medicine Model**

Sample site	Planting area//hm <sup>2</sup>	Yield//t	Total cost// ×10 <sup>4</sup> yuan	Total output// ×10 <sup>4</sup> yuan	Total profit// ×10 <sup>4</sup> yuan
A	283 × 230	1 900	161.60	1 085.10	1 009.1
B	300 × 165	1 900	139.80	849.50	792.6
C	265 × 310	1 900	189.19	1 376.30	1 276.8
D	180 × 155	1 200	106.30	722.15	671.2
E	118 × 350	800	169.00	1 400.70	1 292.8
F	140 × 180	900	106.40	781.40	724.1

**3.1.4 Analysis of Economic Forest Model.** The ecological and economic species not only reduce the soil erosion and sand hazard, playing some certain ecological function, but also produce fruits, edible oil, drink, flavoring, industrial raw materials and medicinal materials, playing some certain economic function. By creating an ecological and economic enviroment, soil is maintained, water kept and the sructure of species adjusted, but also at the same time the economic function and the scenery view have been optimized. The entire configuration method is shrub, similar to shrub of ecological model and the density is smaller than that of the ecological model. And the main species are Walnut, Jujube, *Prunus davidiana*, Apricot, Ginkgo and Chestnut. In a complete block, the density and the spacing distance are different for different species, which are respectively 3 meters by 3 meters, 4 meters by 5 meters and 5 meters by 6 meters and so on. Different species have different yields,

prices and profits. In order to avoid the influences of which brought on results and make the information more correct, we averaged the number of yields of different plants. Through surveys, we found that the output of one hundred meters is 75 000 kilograms, worth 3.2 Yuan per kilogram. Deducting the seeds cost, fertilizer cost and management cost 4 000 Yuan per kilogram, we have a net profit of 2.8 Yuan per kilogram. And situations of planting and profit of the 6 models are in the Table 5.

**3.1.5 Analysis of Greenhouse Vegetable Model.** The operation of returning farmland to forest (grass) not only adjusts the agricultural, industrial structure, but also changes the allocation of labor resource. Because the Greenhouse Vegetable Model may make a high efficient use of land resource and improve the economic efficiency of land, some farmers choose to build greenhouses to plant vegetables in original low farmland. In the greenhouses, there are tomatoes, eggplants, chillies and cu-

cumber and so on. Twice in a year, and the total output value is 30 000 Yuan a year averagely. There is a net profit of 20 000 Yuan deducting costs of equipment, management, fertilizer and

seeds, irrigation and anti-pest diseases. And situations of planting and profit of the 6 models are in the Table 6.

**Table 5 Economic Profit Situation of Wood-medicine Model**

Sample site	Planting area//hm <sup>2</sup>	Yield//t	Total cost// ×10 <sup>4</sup> yuan	Total output// ×10 <sup>4</sup> yuan	Total profit
A	3 016	4 546	181.8	1 454.7	1 272.9
B	2 852	3 040	121.6	972.8	851.2
C	1 856	2 060	82.4	659.2	576.8
D	3 268	4 604	184.2	1 473.3	1 289.1
E	3 368	4 882	195.3	1 562.2	1 367.0
F	2 986	3 558	119.4	955.5	836.1

**Table 6 Economic Profit Situation of Greenhouse Vegetables Model**

Sample site	Number of greenhouses	Total cost ×10 <sup>4</sup> yuan	Total output ×10 <sup>4</sup> yuan	Total profit ×10 <sup>4</sup> yuan
A	35	35	105	70
B	25	25	75	50
C	10	10	30	20
D	17	17	51	34
E	15	15	45	30
F	15	15	45	30

**3.2 Comparative Analysis of the 6 models** In order to make a comparative analysis of economic efficiency of these 6 models, we made an variance analysis through SAS method. Because all the statistics of the 6 models are balanced, so we made a variance analysis through ANOVA method of SAS software. And the results are in the Table 7. We may know from the analysis results of economic efficiency of the 5 models that there are extinct differences among the models except the tiny differences existing between Economic Forestry Model and Wood-medicine Model. Wood-grass-husbandry Model and Economic Forestry are best ranking number 1 and 2. Wood-medicine, economic forestry and greenhouse vegetable models are ranking respectively number 3, 4 and 5. (Table 7)

**Table 7 The results of ANONA analysis**

Model	Duncan grouping	Mean	Samples	Group
Wood-grass-husbandry model	A	3 430.3	6	2
Economic forest model	B	1 032.2	6	4
Wood-medicine model	B	961.1	6	3
Ecological forest model	C	352.2	6	1
Greenhouse vegetables model	D	39.0	6	5

Note: A, B, C, D are the marked letters of extinct differences. The same letter signals that the differences existing between them are not obvious. Or they are distinguished.

## 4 Discussion

(1) Although the profit of wood of ecological forest is big, the growth circle is long. Its economic benefit is not high and cannot bring big profits averagely. Because Ecological Wood Model aims at restoring vegetation, reducing soil erosion and changing the ecological environment. So we may put a great

force in developing green ecological tourism centering on Forest Park, improving the ecological quality and promoting a whole development of tourism.

(2) The profit of Wood-grass-husbandry is the highest. And the income mostly comes from the Aquaculture brought by forage grass. In the southern towns of Wuqi county, black sheep are promoted. And in the northern towns, white sheep are promoted to increase income. Besides, the stool by the husbandry reduces the amount of fertilizer using, and to some extent bringing some certain economic and ecological benefits.

(3) Species of Wood-medicine Model are mainly Seabuckthorn and Scutellaria. Although Seabuckthorn has an ecological advantage, its general yield is not high. And at the same time, its price is usually influenced by the prices of medicine market and it is hard to pick. So it is risking. Therefore, there is a proposal that the farmers change the structure to plant some crops suitable for the local land like tomatoes to increase incomes.

(4) Because the ecological forest model has not formed a systematic management and market guidance, investment in it is not big, marketing scale is relatively smaller which needs to be improved more. If the government increases its management power and guidance principles, making the economic forest systematic to form a scientific and unified marketing system and has a good fruits chain, which will have a great significance in optimizing the agricultural structure, increasing the farmers' incomes and maintaining a sustainable development of ecological environment.

(5) The Greenhouse Vegetable Model is a kind of model which is high-investment, high-output and high-tech. Although the entire profit is low, the profit of specific one is relatively high. So it should be potentially promoted to some extent. Besides, farmers may plant some greenhouse flowers and trees besides vegetables to extend the agricultural chain and promote multiple incomes.

## References

- [1] HU CX, FU BJ, CHEN LD. Impacts of "grain for green project" on agriculture and rural economics development in the Loess Hilly and Gully Area—a case study in Ansai County[J]. Journal of Arid Land Resources and Environment, 2006, 20(4): 67–72. (in Chinese).
- [2] LIU ZC, DU Y, XU LP, *et al.* Analysis on economical effect of project of "returning farmland to forest and grassland" in the Loess Hilly and Gully Area: a case study in Ansai County[J]. Acta Ecologica Sinica, 2008, 28(4):1476–1482. (in Chinese).

- [3] Agriculture Bureau of Wuqi County. Summary of 2007 agricultural and rural work and plan for 2008 work in Wuqi County[Z]. Agriculture Bureau of Wuqi County, 2007. (in Chinese).
- [4] PENG KM, CHEN DW. A consideration about agricultural sustainable development in the perspective of conceding the land and reforestation[J]. Inner Mongolia Forestry Science and Technology, 2006 (3):73-75. (in Chinese).
- [5] WANG YL. Report on the forestry of Wuqi County[R]. The Central County Committee of Wuqi, The People's Government of Wuqi County, 2007;1-2. (in Chinese).
- [6] ZONG YL. Report on the implementation of the 2007 plan for Wuqi County national economic and social development and on the 2008 draft plan for Wuqi County national economic and social development[R]. Wuqi County Economic Development Board, 2008;1-2. (in Chinese).
- [7] WEN ZM, WANG F, LI R. Cropland conversion into forest or grass land in Loess Hilly and Gully Region as perceived by farmers—as seen by the case study of Ansai County[J]. Bulletin of Soil and Water Conservation, 2003, 23(3): 31-35. (in Chinese).
- [8] LI SD, ZHANG LX. Mechanism analysis of optimized model of conversion from farmland to forestland in the hill-gully sub-region of Loess Plateau[J]. Chinese Journal of Applied Ecology, 2004, 15(9): 1541-1546. (in Chinese).
- [9] HU XP, WANG CF. SAS foundation and statistics examples tutorial [M]. Xi'an:Xi'an Cartographic Publishing House, 2001: 73-74. (in Chinese).
- [10] LI BP, HUANG CB, ZHUANG J, *et al.* Research on the runoff characteristics of small watershed under the reforestation patterns in Northwest Guangxi[J]. Journal of Anhui Agricultural Sciences, 2009, 37(7):268-270. (in Chinese).
- [11] ZHANG X, LU DN. Research on the development mode of rural economy in Wuqi County[J]. Journal of Anhui Agricultural Sciences, 2009, 37(28):13853-13855. (in Chinese).
- [12] HE YF, XIE YS. Study on effects of returning land for farming to forestry (grass) on agricultural industrial structure adjustment[J]. Journal of Anhui Agricultural Sciences, 2009, 37(16):421-423, 431. (in Chinese).
- [13] JIA HJ, MA JJ, WANG J, *et al.* Model and measures of restoration and rebuilding on agriculture eco-environment—a case study in Wuqi County[J]. Bulletin of Soil and Water Conservation, 2005, 25(4):38-41. (in Chinese).
- [14] LIU J, LIU M. Study on the farmer-oriented evaluation model of returning farmland to forest policy[J]. Journal of Anhui Agricultural Sciences, 2009, 37(23):418-420, 490. (in Chinese).
- [15] FANG XJ. Allocation models of *Hippophae rhamnoides* L. stands in Wuqi County[J]. The Global Seabuckthorn Research and Development, 2006, 4(3):40-44. (in Chinese).
- [16] LI JP, GUAN JD, HAN YJ, *et al.* The vegetation classification of the return farmland to woods or forest region in Shan'anxi - Gansu - Ningxia based on SPOT/VEGETATION data[J]. Journal of Anhui Agricultural Sciences, 2009, 37(27):454-456, 481. (in Chinese).

## 退耕还林(草)不同经营模式对农村经济影响的分析

——以陕西省吴起县为例

罗萌<sup>1,3</sup>, 李桂显<sup>2</sup> (1. 西北农林科技大学资源环境学院, 陕西杨凌 712100; 2. 西北农林科技大学林学院, 陕西杨凌 712100; 3. 延安大学生命科学学院, 陕西延安 716000)

**摘要** 以陕西省吴起县为例, 在介绍研究区概况的基础上, 依据当地种植模式和影响经济效益的因素, 经过系统分析和筛选, 选取生态林、林一草一牧、林一药、经济林和大棚蔬菜 5 种退耕还林(草)经营模式, 选择吴旗镇、白豹镇、吴仓堡乡、新寨乡、薛岔乡和五谷城乡 6 个乡镇为样本地, 对每个乡镇的 5 种模式分别从乡(镇)、村、农户 3 个层次采用参与性农村评估和文献查阅相结合的方法进行调查访问获取相关数据, 采用方差分析法对吴起县退耕还林(草)工程 5 种经营模式的经济效益进行分析比较, 确定各种经营模式对农村经济效益不同程度的影响。结果表明, 各种模式之间有显著性差异; 除经济林模式和林一药模式之间没有显著性差异外, 其余各模式均达到差异极显著性; 林一草一牧模式和经济林模式的效果最好, 分别位于 1、2 位, 林一药、生态林和大棚蔬菜模式分别位于 3、4、5。

**关键词** 模式; 吴起县; 退耕还林(草); 经济效益

(From page 4)

## 山东省区域发展差异的综合分析——基于 1990、2000 和 2008 年的数据

杨忠臣 (临沂师范学院商学院, 山东临沂 276000)

**摘要** 依据 1990、2000、2008 年相关数据, 利用主成份分析方法, 从区域经济发展、社会发展和资源与环境发展 3 个方面, 选取 36 个指标构建了反映区域发展差异的综合评价指标体系, 对山东省 16 个地级市发展差异进行综合分析。结果表明, 1990~2008 年, 青岛与济南综合得分稳居山东省省前列, 威海、烟台、东营等区位与资源富庶的地区综合得分与位次稳步提升, 淄博、枣庄等传统工业城市综合得分呈下降趋势, 地处鲁西北菏泽、聊城等地区综合得分位列全省末位; 山东半岛与胶济沿线依然是山东省综合实力最强的地区, 东、西部间区域差距格局继续存在, 且有持续拉大的趋势; 山东省区域发展的空间结构由传统的双中心集聚格局转变为山东半岛城市群的整体集聚, 初步实现由点、点轴结合、再到点与面结合带动的区域发展格局的转变。

**关键词** 山东省; 综合得分; 区域发展差异