朱长宁◎著

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——基于陕南的实证
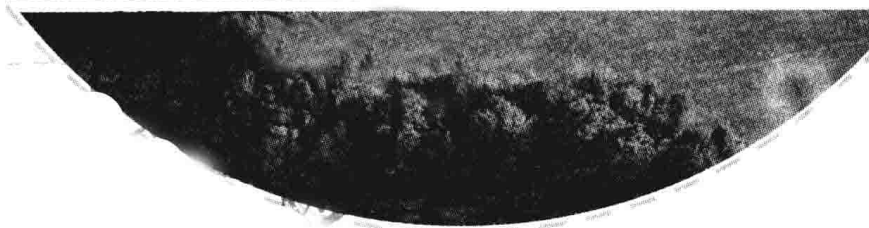
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序

早在 2008—2010 年期间，在西安交通大学孙海鹰教授主持的国家软科学研究计划重大项目"秦巴山区（陕南）可持续发展战略及实验园区建设可行性研究"（2008GXS1D040）中，我负责主持子课题"陕南绿色产业可持续发展实验园区可行性研究"，当时朱长宁副教授就是我们团队中最重要的成员。他不仅坚持参与我们团队的集体活动，还主动开展了很多独立的延伸调研。在漫长的、艰苦的调研过程中，他发现农户的经济行为是决定陕南绿色产业能否可持续发展的关键因素之一，后来又进一步发现以退耕还林为背景来解析农户的经济行为，对制定绿色产业可持续发展的激励政策，可能会得到有益的启示。

捕捉到目标并明确了路径，他便义无反顾地继续前行。尽管那个软科学课题于 2011 年就圆满结束，但他的探索一直没有停止。

终于，五年后的今天，我们欣喜地看到了这本著作问世。

本书描述了退耕还林政策实施前后陕南农户经济行为的变迁，作者以陕南的证据，阐明了农户经济行为变迁的特征、影响因素及其对退耕还林工程实施的影响机理，揭示了退耕还林政策对农户就业行为及家庭收入的影响方向和作用机理，对如何促进农业资源科学利用、促进农民收入水平提升、促进农村生态环境改善，提出了可操作性的政策建议。虽然以退耕还林为背景进行研究，但研究方法与得出的结论，对制定和评价各类促进可持续发展的政策措施，具有一定的借鉴意义。

农户经济行为是动态的，其规律可以认知，但变化无穷。故对农户经

济行为的研究永无止境。如果从恰亚诺夫（Chayanov）的研究算起，关于农户经济行为的研究，至少也有100多年的历史。其间的西奥多·舒尔茨（Theodore Schultz）、加里·斯坦利·贝克尔（Becker）、张五常（Steven N. S. Cheung）、中岛（Nakajima）、斯科特（Scott）、巴鲁姆和斯奎尔（Barnum and Squire）、黄宗智、张林秀、孔祥智、傅晨、樊胜根、胡豹、钟甫宁、李明桥等人的研究所构成的星空，照耀了本书作者夜行的道路。相信本书将能为后人的进一步探索贡献光芒，也祝愿本书作者在探索的星空中更加闪亮。

是为序。

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2015 年 10 月 15 日

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退耕还林背景下农户经济行为研究
——基于陕南的实证

摘　要

　　水土流失是我国面临的诸多环境问题中最严重的问题之一。西部地区一直是我国生态系统最为脆弱的地区之一，也是我国贫困人口最为集中的地区之一。迫于生计和提高家庭收入水平的压力，陡坡毁林、毁草等不合理的土地开发利用行为愈趋普遍，给该地区生态环境带来了较大的破坏。1999 年，为了遏止水土流失加剧的态势，四川、陕西、甘肃 3 省率先启动了退耕还林试点工作。

　　中央设计的退耕还林工程的目标是既要实现"保护生态环境"，又要实现"促进增加农民收入"，同时还要兼顾农业产业结构的调整与优化。这种多元化的政策目标必然加大了退耕还林工程实施的难度。退耕还林的持续推进，打破了农户生产经营的传统均衡状态，改变了农户家庭的资源禀赋与约束条件，必将对农户经济行为产生一定的影响，与此对应，退耕区农户经济行为也在一定程度上决定了这些目标能否实现。那么，退耕还林对农户经济行为的影响究竟如何，退耕还林实施十余年后，通过有效引导农户经济行为，是否实现了增加农民收入的目标？另外，从环境优化的视角来看，留在当地经营农业的农户生态农业生产方式选择行为及其影响因素、作用方向和作用机理如何？只有廓清农户经济行为变迁的规律及其影响因素，才能找到持续有效推进退耕还林工程的内核与微观机理，才有可能为西部贫困和生态脆弱地区寻找出一条环境友好、增效增收的农业发

展之路。

陕南地区北靠秦岭、南倚巴山，汉江自西向东穿流而过。它既是我国南北水系和暖温带与亚热带的交汇处，又是南水北调中线源头丹江口水库的主要水源地。该地区地质构造复杂，泥石流、山体滑坡等地质灾害频繁发生。由于生活自然条件恶劣、缺乏基本生存条件以及农业现代化水平较低，陕南地区的农民普遍比较贫困。2012年5月国务院批复《秦巴山片区区域发展与扶贫攻坚规划》，秦巴山区被列为全国14个集中连片特困地区之一，贫困人口占农业人口比例高达44.64%。1999年开始，陕南地区成为我国首批退耕还林试点区域之一。2001年，经国务院批准，国家环保总局将秦岭山地列为中国首批国家级生态功能保护区，因此该地区属于国家级限制开发区和生态功能保护区。落后的经济和特殊的保护责任形成了强烈的反差，如何在限制开发的前提下谋求突破发展，形势、任务相当艰巨。

作为南水北调中线工程的水源地和我国贫困人口最为集中的地区之一，退耕还林工程大背景下的陕南地区的农户经济行为将直接决定该地区退耕还林工程的持续进行和当地农业生态环境质量。因此，找寻退耕还林前后农户经济行为的变化及其对工程持续执行的不利方面，并规范引导农民有序迁出或采取生态农业生产方式，是确保该地区特殊生态环境得以良性维持和缓解农民贫困、促进农民增收的必然选择。

因此本研究的总目标是在比对分析退耕前后农户经济行为变迁的基础上，阐明退耕还林背景下农户经济行为变迁的特征、影响因素及其对退耕还林工程实施的影响机理，探寻持续有效推进退耕还林工程的微观机理，同时定量探讨退耕还林政策对农户就业行为及家庭收入的影响方向和作用机理，并根据地方特点选取生态农业生产行为这一特定的农户生产行为，实证分析退耕还林背景下农户经济行为优化的影响因素，探寻在此背景下如何促进当地农业资源充分利用、农民收入水平提升和农业生态化水平提高的政策着力点。

本书围绕以上研究内容，得出了如下主要结论：

1. 农户种植、投入、收入和消费结构等均发生了较大的变化

退耕还林十余年来，受退耕还林导致耕地资源紧缺和提高家庭农业经营收入的双重影响，当地的农业生产结构发生了较明显的变化。农户的种

植业收入、林业收入、畜牧业收入比例从退耕前的 1：0.08：0.42 变为退耕后 1：0.13：0.68，这说明当地林业和畜牧业较传统种植业有了较快的发展。从种植业内部来看，该地区的小麦、水稻、玉米等传统粮食作物播种面积均呈逐年下降趋势，而经济作物如油菜、茶叶、中药材、蔬菜的种植面积则大幅度增加。退耕还林后，该地区单位面积耕地经营的集约化程度和现代农业科技利用水平明显提高，农作物平均产量上升显著。林业方面，退耕还林工程加快了农户的造林绿化步伐，森林覆盖率明显上升，核桃、板栗、花椒等特色经济林发展已初具规模，已成为当地农户增收的重要来源。调研结果显示，退耕户的林业收入增长速度明显快于非退耕户，但由于林产品的生产周期较长，大多数退耕户的林产品还未到完全的收获期，农户林业收入占比不高。畜牧业方面，该地区已探索形成了多种形式的生态养殖方式，户均生猪出栏量和肉鸡屠宰量明显增加，畜禽的规模养殖水平较退耕还林前提升明显，畜禽养殖成了农户主要的增收源泉。

退耕还林后陕南农户增长速度最快的收入是转移性收入，其次是工资性收入、畜牧业收入和林业收入，增长速度最慢的是种植业收入；退耕还林工程在一定程度上促进了农民的非农就业。退耕还林十二年后，工资性收入已经取代种植业收入成为陕南农户最大的收入来源，其次分别是畜牧业收入、转移性收入，林业收入在农户总收入中的比重最低。

在消费支出方面，食品支出依然是陕南地区农户家庭的最大支出项目，但是所占比重已明显下降，说明该地区农户的富裕程度有所提高，居住支出仍排第二位，转移性支出排名第三，医疗保健支出排第四位，交通和通讯支出上升最快，排第五位，教育文化娱乐退居第六位，比退耕前下降三个位次，衣着支出排名第七，家庭设备支出（主要指家用电器）排名最后。值得注意的是，退耕区农户的能源消费结构也已发生了可喜的转变，沼气、太阳能、天然气等清洁能源逐渐替代烧柴成了陕南农村主要的生活与生产能源。

总体而言，退耕还林工程在一定程度上促进了该地区农业生产结构的改善，农户的收入和消费水平都有了一定程度的提高，但是消费的能力、意愿和水平仍显不足。

2. 退耕还林背景下农户非农就业及其收入水平明显提高

本书的实证结果表明，与非退耕户相比，退耕还林工程的实施能够有效促进退耕农户家庭总收入的增长，进而达到退耕还林工程的减贫目标。退耕还林工程的实施影响了家庭劳动力资源的配置，促使退耕区剩余农业劳动力逐渐向城镇和非农产业转移，从而提高了农户家庭的非农收入水平。调研结果显示，与非退耕户相比，退耕户的非农劳动力数量明显增加，而且在本地非农兼业的现象也更加普遍，因此退耕户的非农收入水平增长速度明显快于非退耕户。

实证结果进一步显示，户主的健康程度、户主的受教育程度、户主接受农技培训以及农户地处城镇郊区对农户的收入水平具有正向的影响作用，其中农户地处城镇郊区对农户家庭总收入、农业收入以及非农收入均存在显著的正向影响。

对于不同的收入阶层，退耕还林对农户家庭总收入的影响途径有所差别，中低层收入的农户家庭中，退耕还林主要对农业收入的增加有显著正向促进作用，而中高层收入的农户家庭中，退耕还林主要对非农收入的增加有显著的正向作用。

进一步的双重差分模型测算了退耕还林政策对退耕户收入水平的净效应，结果同样表明退耕还林政策显著增加了农户家庭总收入和非农收入水平，而对农业收入水平并没有产生显著的正向作用，但是两者的显著性水平低于多元回归模型得到的结果，这说明其他因素（例如劳动力就业市场的完善、农产品价格的合理提升以及政府其他惠农政策）可能也在一定程度上促进了农户家庭总收入和非农收入水平的提高。

3. 农业技术培训、农产品质量安全意识和政府政策支持等变量直接影响农户生态农业生产方式的认知和选择

调研结果显示，陕南地区仅有34.7%的农户从事过生态农业生产，比例较低。本书的实证结果表明，户主年龄与生态农业认知程度成正相关；农户受教育程度与认知比率正相关；农户是否参与退耕还林与农户的生态农业认知程度具有显著关系，参与退耕还林提高了农户的认知程度；是否参与农技培训对农户的生态农业认知影响较大，参与培训的农户认知比率高于未参与的农户；信息获取的难易程度很大程度地影响了农户的认知行为，信息越易获取，农户对生态农业的认知水平越高；农户对农产品质量安全越关注，对生态农业生产方式的认知水平越高。

对农户进行生态农业生产方式选择行为的实证研究表明，农户的年龄与受教育程度、是否参与退耕还林以及农户对于生态农业的认知行为对其生态农业生产方式的选择行为影响并不显著；但农户是否进行农技培训影响了农户对生态农业生产方式选择行为。对农户进行农技培训，促进了农户进行生态农业生产；政府是否实施技术与资金扶持政策对农户的生态农业生产方式选择行为有显著影响，具有政策扶持的农户选择生态农业生产方式的可能性较大；家庭非农就业程度对生态农业生产方式采用行为有很大的负向影响，家庭非农就业收入比例越高，农户选择生态农业生产方式的可能性反而越小；农户对农产品质量安全的关注程度对生态农业生产方式的选择行为有很大影响，农户越关注农产品质量安全，进行生态农业生产的可能性越大。

为使农户经济行为能够更有利于生态环境保护和农村产业结构调整，进而推进退耕还林工程的持续有效实施，基于前述研究结论，并从优化农户经济行为的角度出发，本文提出如下主要政策建议：实施长期、浮动的退耕还林补贴政策；结合生态移民搬迁工程，加快推进陕南农村城镇化进程；完善农村教育体制，提高农民的人力资本素质；着力拓展退耕区农户的非农就业渠道；建立、完善林权交易市场；有序推进新型农村合作医疗制度；政府应提供长期的技术与资金扶持等政策建议。

关键词：农户经济行为；退耕还林；陕南；生态农业

STUDY ON THE ECONOMIC BEHAVIOR OF RURAL HOUSEHOLDS IN THE CONTEXT OF GRAIN FOR GREEN PROJECT
——BASED ON EMPIRICAL STUDY OF SOUTHERN SHAANXI

ABSTRACT

Soil erosion is one of the most serious environmental problems facing our country. Western China has always been one of the regions which has the most vulnerable ecosystems, and also one of the most concentrated areas of poverty population in China. Under the pressure of surviving and improving household income levels, the irrational behaviors of land development and utilization like deforestation on steep slope, destruction of grass are becoming more common, which brought great damage to the ecological environment in this region. In 1999, in order to curb the trend of increased soil erosion, Sichuan, Shaanxi, Gansu Province first launched pilot project of conversion of cropland to forest.

The goal of this project which was designed by the central government is not only to achieve the "protection of the ecological environment", but also to achieve the "promotion of farmers' income increase", while also taking into account the agricultural structure adjustment and optimization. This diversified policy objectives will inevitably increase the difficulty of implementation of the Grain for Green Project. The continuous promotion of this project breaks the

traditional equilibrium state of production and operation of farmers, changes the resource endowments and constraints of households. It will have a certain impact on the economic behavior of farmers. And correspondently, the household economic behavior in reforestation area, to some extent, determines the possibility of achieving these goals.

Then, what are the effects of the conversion of cropland to forest on the economic behavior of farmers? Has the project increased farmers' income after it has been implemented more than ten years? In addition, from the perspective of environmental optimization, what are the ecological agriculture production mode choice behavior of those farmers who stay in the local agricultural operations and its effects, direction and themechanism? Only after we figure out the law of the changes of household economic behavior and its influencing factors, can we find the kernel and microscopic mechanism of sustained and effective promotion of the Grain for Green Project, and have the possibility of seeking out an environment-friendly, efficiency and income increasing agricultural development way for the poor and ecologically fragile areas in western region.

Southern Shaanxi, with Qinling Mountains to the north, Bashan Mountains to the south, Hanjiang River flowing through from west to east, is the junction of north and south water systems, also that of warm temperate zone and subtropical zone, and also is the main water source of Danjiangkou reservoir, the source area of the middle route in the Water Diversion Project. The geological structure in this area is complicated, and debris flow, landslides and other geological disasters occur frequently. Because of the harsh natural conditions, lack of basic living conditions and the low level of agricultural modernization, the farmers in Southern Shaanxi are generally quite poor. In May, 2012, the State Council approved the " Regional Development and Poverty Alleviation Plan of Qin Bashan Area ", in which Qin Bashan Area was listed as one of the 14 concentrated destitute areas since its impoverished population accounts for as high as 44.64% of agricultural population.

Beginning in 1999, Southern Shaanxi became the first pilot area in Grain for Green Project. In 2001, approved by the State Council, the State Environmental

Protection Administration listed Qinling Mountains in the first batch of national ecological function reserves in China, therefore the area belongs to the State – level restricted development zones and ecological function protected areas. The backward economy and the special responsibility to protect forming a strong contrast, makes it a quite arduous task to seek a breakthrough development in the premise of limited development.

As the source area of the middle route in the Water Diversion Project and one of the most concentrated areas of impoverished population in China, the economic behavior of farmers in Southern Shaanxi in the background of the Grain for Green Project will directly determine the region's ongoing Grain for Green Project and the local agro-ecological environment quality. Therefore, looking for the changes in households' economic behavior before and after the conversion of cropland to forest and its negative effects on the continuous implementation of the project, and guiding farmers to orderly move out or take ecological agriculture production mode, is the inevitable choice to ensure that the special ecological environment in this area can be maintained, to alleviate poverty of farmers, and to increase farmers' income.

The overall objective of this study is, on the basis of comparing and analyzing the changes of households' economic behavior before and after the conversion of cropland to forest, to illustrate the characteristics, influencing factors and the mechanism of their impact on the implementation of Grain for Green Project and to explore the microscopic mechanism of promoting Grain for Green Project persistently and effectively. Meanwhile, this study also aims to investigate the direction and mechanism of the impact of the conversion of cropland to forest on the employment behavior and household income quantitatively, and based on the farmers' specific production behavior of selecting ecological agriculture production according to local characteristics, to analyze empirically the influence factors of the optimization of the households' economic behavior in this context. It also attempts to explore the policy focus of promoting the full utilization of local agricultural resources, enhancing the income levels of farmers and raising the agro-ecological level in this background.

Based on the above research contents, the main conclusions of this study are as follows:

1. Farmers planting, investment, income and consumption structure have undergone significant changes

Twelve years since the implementation of Grain for Green Project, influenced by the shortage of cultivated land resources, which resulted from the conversion of cropland to forest, and the goal of improving family farming income, the local agricultural production structure has undergone significant changes. The ratio of farmers' income from planting, income from forestry, and that from animal husbandry has changed from 1 : 0. 08 : 0. 42 (before conversion of cropland to forest) to 1 : 0. 13 : 0. 68 (after conversion of cropland to forest), which shows that the local forestry and animal husbandry has developed rapidly compared with the traditional planting industry. In the planting industry, the sown area of wheat, rice, corn and other traditional crops showed a downward trend year by year, while the planting area of the cash crops such as rape, tea, herbs, and vegetables is substantially increased.

After the conversion of cropland to forest, the intensification degree of land management of unit area and modern agricultural technology utilization levels were significantly increased, and the average yield of crops also increased greatly. In forestry, the project accelerated the farmers' afforestation pace and the forest coverage rate increased remarkably. The development of the distinctive economic forest trees like walnut, chestnut, pepper has taken shape, and become an important source of income of local farmers. However, due to long production cycle of forest products, the forest products of most farmers have yet to complete the harvest period. As a result, the farmers' forestry income share is not high. In animal husbandry, the area has formed various ecological farming methods, through exploration. The average amount of pig slaughter and broiler slaughter increased apparently, and the level of large−scale breeding of livestock and poultry improved significantly. Livestock and poultry breeding has become the main source of the increased income of farmers.

After the conversion of cropland to forest, the income with the fastest growth

of farmers in Southern Shaanxi is transfer income, followed by wage income, the income from animal husbandry and forestry, and that with the slowest growth is the income from planting. After ten years, wage income has replaced farming income as the largest source of income for farmers in Southern Shaanxi since the Grain for Green Project promoted non-farm employment of farmers, followed by animal husbandry income, transfer income, with forestry income accounting for the lowest proportion of total household income.

In consumer spending, food expenditure is still the biggest item of expenditure of households living in Southern Shaanxi (with obviously decreasing proportion, indicating the farmers in the region has increased in alluence) residential spending the second, transfer expenditure the third, health care spending fourth, transportation and communication expenses the fifth (rising fastest), educational and cultural entertainment the sixth (dropping three places), clothing expenditure the seventh, household equipment spending (mainly refers to household appliances) the last. It should be noted that the energy consumption structure in reforestation area has also undergone a welcome change. Biogas, solar energy, natural gas and other clean energy gradually replaced firewood as major energy sources of life and production in Southern Shaanxi rural areas.

Overall, the Grain for Green Project, to a certain extent, contributed to the improvement of agricultural production structure in this region. Farmers' consumption level has been improved to some degree, but the ability and willingness of consumption is insufficient.

2. Non-farm employment and income levels were significantly increased in the context of conversion of cropland to forest

The empirical results show that, compared with non-returning families, the implementation of Grain for Green Project can effectively promote the growth of totalhousehold income, thus achieving the goal of poverty reduction. The Grain for Green Project has changed the employment behavior of farmers', prompting the surplus agricultural labor force in reforestation area to transfer to towns and non-agricultural industries, thereby increasing the non-farm income level of

rural households. Survey results show that compared with non – returning households, the number of non–agricultural labour of the households who conduct conversion work significantly increased and the phenomenon of taking non – agricultural part–time jobs is more widespread. So their non–agricultural income is growing significantly faster than the the households who do not conduct conversion work.

Empirical results further demonstrate that the health condition, education level, as well as the agricultural technical training of the householder, and the location in the outskirts of town has positive effect on the household income level. Among them, the location in the outskirts of town has positive impact on the total household income, agricultural income and non–farm income.

For different income brackets, the effects of the conversion of cropland to forest on total household income show some differences. For the middle and lower income households, the conversion of cropland to forest exerts positive influence on the increase of agricultural income, while for the high income households, it mainly devotes to the increase of non–farm income.

Further DID Model estimates the net effect of the Grain for Green Project on the income levels of the households who conduct conversion work. The results also show the policy significantly increases total household income and non – agricultural income levels, while it exerts no significant positive effec on the level of agricultural income. However, the two significant levels are lower than the results obtained in the multiple regression model, which suggests that other factors (such as the improvement of labor market, reasonable upgrade of agricultural prices and other government's agricultural policies) also promote the increase of the total household income and non– agricultural income levels of the farmers.

3. Agricultural technical training, agricultural products quality and safety awareness and government policy support and other variables directly affect the consciousness and choice of the ecological agriculture production of farmer.

Survey results show that only 34.7% of Southern Shaanxi ruaul households engaged in ecological agricultural production. The empirical results show that the

householder's age ispositively related to the degree of ecological agriculture awareness; farmers' educational level and cognitive ratio positively correlated; whether the farmers are involved in the conversion of cropland to forest and the degree of ecological agriculture awareness has significant relationship, the involvement in the conversion of cropland to forest raising the awareness level of farmers; whether to participate in agricultural training impacts greatly on ecological agriculture awareness of farmers; the awareness of the farmers who participate in the project is higher than the non-participating farmers; the degree of difficulty in obtaining information affects the cognitive behavior of farmers, the more accessible the information is, the higher the farmers' cognition level of ecological agriculture is; the more attention the farmers pay on the quality of agricultural products, the higher the farmers' cognition level of ecological agricultural production mode is.

The empirical study on the farmers' choice behavior of ecological agricultural production mode indicates that the farmers' age and level of education, whether to participate in the conversion of cropland to forest, as well as their cognitive behavior of ecological agriculture exerts insignificant effects on their choice behavior of ecological agricultural production mode. But whether the farmers receive agricultural technical training influences their choice behavior.

Agricultural technical training for farmers promotes the farmers to choose ecological agricultural production. Whether the government implements technical and financial support policies has a notable impact on the farmers' choice behavior of ecological agricultural production mode and the rural households with policy support have greater possibility to choose the ecological agricultural production mode. The level of household non-farm employment has a great negative impact on the adoption of ecological agricultural production mode: the higher the household non-garm income is, the smaller the possibility of choosing ecological agricultural production mode. The level of concern on the agricultural product quality safety also has a great influence on the choice behavior; the more they are concerned, the higher the possibility of ecological agricultural production is.