

Division of Marketing  
Agricultural Development and Diversification (ADD) Program  
1989 Grant Final Report

Grant Number 04030

**Grant Title**     The Shiitake Mushroom Market Development Project (Phase 1)

**Amount Awarded**     \$13,800.00

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FINAL REPORT: The Shiitake Mushroom Market Development Project  
WDATCP - ADD Program Contract No. 4030  
March 20, 1990 - November 1, 1992

## I. Original Project Intent

Shiitake mushrooms are a high value crop that can be grown by many Wisconsin farmers and other individuals interested in diversifying their agricultural incomes. In 1989 prior to the start of this project, production of Shiitake in Wisconsin was highly fragmented. There were over a 150 small, part-time seasonal producers, who were confronted with marketing their product directly. In addition their production was highly unpredictable due to being grown in an outdoor environment. At the same time the market required a constant year around source of supply. The result was that it proved uneconomic for most growers to expand production, and the bulk of Shiitake sold in Wisconsin came from out of State.

The principle objective of this project was to create the infrastructure necessary for a viable year around Shiitake industry in Wisconsin. Specifically the project sought to develop cooperative marketing structures that would enable small producers to pool their production for sale through a common broker. In conjunction with this effort the project sought to establish grading standards for Shiitake and to have them widely adopted in Wisconsin. Finally the project sought to develop and disseminate the information necessary for growers to produce Shiitake on a consistent year around basis.

The economic impact on Wisconsin agriculture of a viable Shiitake industry was thought to be substantial. A year around small scale Shiitake operation of 1,000 logs typically yields 30 pounds of Shiitake a week or 1,560 pounds per year. The average price per pound over the project period has ranged from \$5.50 to \$8.00 per pound at the farm. At the lower figure a 1,000 log operation grosses \$8,580 yearly in additional income for the part time producer. At a typical production cost of \$2.50 per pound a 1,000 log operation would provide a net income of \$4,680 to the producer. Using the same figures, an expansion of the industry by just 50,000 logs in year around production would represent an additional \$429,000 a year in gross income to Wisconsin agriculture.

## II. Project Achievements

### A. Job Creation

In 1990 at the start of the project SHII-GAW was only able to identify 6 indoor year around Shiitake producers in Wisconsin. These six had approximately 12,000 logs in year around production. By the end of 1991 there were 17 year around producers with 35,000 logs in year around production. At the end of 1992 the number of indoor growers increased to 22 with 42,000 logs. Based upon current construction and inoculation plans there will be at least a total of 25 indoor growers with 60,000 logs in 1993. Since 3,000 logs typically represents a full time job, the direct increase in jobs

at an equated rate has been from four in 1990 to 20 in 1993. Although it is impossible to ascertain to what degree the project influenced the decisions to develop these new indoor facilities, we believe it had a significant impact as all of the new growers received technical assistance from the project prior to their decision to grow Shiitake indoors. In addition many of them received additional technical assistance after their facilities got into operation.

#### B. Capital Investment and Industry Expansion

Prior to this project, the Shiitake industry in Wisconsin was populated by many small outdoor producers with low capital investments. Returns from operations were erratic, and there was a high turnover among growers. Indoor production requires capital investment and thus a commitment to the industry. A typical 8,000 log facility requires an investment of \$48,000 for a new facility. The conversion of an existing building might require half this amount. SHII-GAW estimates that on average each of the 19 new indoor growers invested \$25,000 in their facilities for a total capital investment of \$475,000. This capital investment has helped to stabilize the level of predictable Shiitake production in Wisconsin, and thus further industry expansion will be more likely as consumers become more assured of a consistent supply of Wisconsin grown product.

#### C. Development of Production Technology

Information on the design and operation of an indoor Shiitake production facility was not widely available prior to the project. Individual producers in many parts of the country were in the process of acquiring this information by trial and error. A critical element in this project was the ability to visit a large number of existing facilities in other parts of the country and then to distill this collected experience into a technical manual. The indoor growing manual was widely disseminated and gave much impetus to the adoption of indoor natural log production technology.

#### D. Market Expansion

In the past the prime source of supply for Shiitake during the winter months in Wisconsin has been from growers in Pennsylvania. As production from the new indoor Wisconsin facilities comes on stream, Wisconsin producers are displacing some of this out of State supply. Most of the additional Wisconsin supply of Shiitake continues to be marketed directly by the producers. Some of the growers have also marketed production through the informal brokering system that was promoted by this project. To a large degree this system has been used to market incremental production that could not be sold directly by the grower. At the present time this system is handling approximately 100 pounds of Shiitake weekly.

#### E. Improvement of Wisconsin's Competitive Position

As noted above the bulk of Shiitake mushrooms consumed in Wisconsin in the past has come from out of State. Wisconsin production has not been able to meet internal demand. This is now changing with the increase in predictable year around production in Wisconsin. While the USDA does not break Shiitake production statistics down by State, the trend nationally in production over the past few years has been relatively flat. Thus it can be assumed that with increased production in Wisconsin there has been at least some marginal improvement in Wisconsin's share of the national market for Shiitake.

#### F. Efficient Resource Use

One of the virtues of Shiitake production on natural logs is that it converts low value wood lot material generally used for firewood to a high value agricultural product. A typical four foot log weighing forty pounds will produce four pounds of Shiitake over its production lifetime. At \$5.50 a pound this one log will gross \$22.00 for a farmer. When one considers what a cord of firewood sells for, the value of this resource use for Shiitake is clear. The 60,000 logs that will be in indoor production in 1993 have the potential of providing gross income of \$1,320,000 over their production lifetime, which is indeed a very efficient use of this renewable resource.

A major objective of the project was to encourage productive utilization of existing buildings that were essentially idle. While some growers have invested in new construction, many have turned old buildings into production facilities. These range from old barns, to an abandoned wood pallet factory to an old public school building. Returning these structures to productive use has been a very satisfying outcome for the project.

### III. Project Expectations and Results

The project's most noteworthy success was in the sharp increase in the number of growers who were willing to make a commitment to grow Shiitake indoors. SHII-GAW was happily surprised with this result because it had worked since its founding in 1985 to expand the base of predictable production in Wisconsin without success. The fact that this project made available the necessary technical advice in the form of the indoor growing manual and technical consultation visits certainly contributed significantly to this change in grower attitude. The fact that the manual contained financial information on different size operations was also extremely important in helping growers decide to make the necessary financial commitments. Once the technical and financial information was disseminated, two well attended field trips to prototype facilities helped additional growers to decide to go indoors. Finally the selection of the project's two consultants, Mary Ellen Kozak and Joe Krawczyk, was critical to this success. Not only did they produce excellent technical materials, but their boundless energy and enthusiasm for the project were directly correlated with its success.

Another significant aspect of the project was the development and dissemination of grading standards for Shiitake. Prior to the project there were no industrywide or State standards for grading Shiitake. In developing the project, it was felt that standards would be crucial to the development of any program of cooperative marketing as well as the creation of niche markets for Shiitake grown on natural logs. The grading manual developed by the project was widely distributed and its basic elements have been adopted by most Wisconsin producers. When one grower sells a particular grade to another grower there is now a common understanding of what that grade represents. The one disappointment with the standards is that some growers continue to sell lower grades as higher grades during periods of peak demand. This, however, is a minor problem compared to the period prior to the development of the grading standards.

The widespread adoption of the standards can be attributed to the clarity to which they are described in the grading manual developed by the project and to the three grading workshops that were held as part of the project. In addition their adoption by the larger growers has pressured smaller, more marginal producers to adopt them as well. Interestingly the market has not become as grade conscious as the producers, and thus the ability to exploit niche marketing has not been fully realized. This will require continuing market education.

The least successful aspects of the project were the attempts to foster increased cooperative marketing. Initially it was felt that since the largest volume Shiitake growers were scattered across the midwest, it made sense to try to organize them into a cooperative structure. Pooling their production for marketing purposes would produce sufficient volumes to interest the wholesale markets and then the production from small volume producers could be added to the pool. Project members had numerous meetings with officials from Agriculture Departments in Wisconsin, Minnesota, Iowa, and Missouri together with growers from these States. Out of these meetings the Midwestern Specialty Mushroom Growers Association was formed. To date, however, it has not developed into a marketing organization as most large growers prefer to sell directly to markets that they have developed. The Association intends to remain intact as a promotional and research and development association until there is a greater need for cooperative marketing among the large producers.

At the State level the project did establish a small pilot program of cooperative marketing by identifying growers willing to broker other growers' production. This system currently moves about 100 pounds of Shiitake weekly. As in the case at the regional level, the larger growers in Wisconsin preferred to develop their own markets rather than pay brokerage commissions. The smallest producers in most need of marketing assistance could not produce on a consistent basis and the brokers could not accommodate large variations in production as their customers' demand was relatively fixed. Thus the cooperative system is presently being used by the larger growers to sell marginal amounts of their production when there is reduced demand from their normal markets or when they are

beginning to expand production in advance of finding new markets. This system helps growers at the margins, but it has not developed into a major cooperative structure that was originally envisioned by the project. It is likely this goal was unrealistic given the project's time frame. The volume of production available in the State on a year around basis in 1990 and 1991 was not sufficient to interest large brokers and most could be placed by direct marketing. As volumes increase in future years from the new indoor producers, it is likely that there will be an increased need for cooperative marketing.

One unanticipated result of the grant and project was the creditability that it gave the crop. Potential growers, who had heard about the crop, seemed more willing to investigate its possibilities. The grant also generated considerable press coverage in both newspapers and television, which heightened consumer awareness as well as grower interest. The ADD Program exhibit at the State Fair was an additional important source of publicity for the crop. Finally publication of the manuals has allowed SHII-GAW to recruit additional members. Demand from outside Wisconsin has been so heavy that the manuals have been reprinted and sold to generate funds for additional promotional activities, which would not have been possible given SHII-GAW's limited budget.

#### IV. Description of Educational Materials and Informational Presentations

As noted above, the project produced two technical manuals. Both were co-authored by Mary Ellen Kozak and Joe Krawczyk, who are among the leading researchers on Shiitake production on natural logs in the nation. Each manual was designed to inform the grower in a practical and understandable manner. The first entitled "FROM HARVEST TO HEARTH" produced the first known published set of standards for grading Shiitake. In addition there is instruction on post harvest handling of Shiitake as well as on shipping procedures that will help to maintain mushroom quality. To date about 700 copies of the manual have been distributed.

The second manual is entitled "YEAR-ROUND SHIITAKE CULTIVATION IN THE NORTH". It gives detailed information on proper design of an indoor production facility and on how mushroom biology needs to mesh with building design. It provides advice on how different strains can be used to make up for the deficiencies in building design. It contains a section on trouble shooting common problems. There are illustrations of stacking methods, air exchange systems, and an organizational floor plan. The manual concludes with cost and operational data on two different size facilities, which can be used in developing a business plan. To date about 800 copies of this manual have been distributed.

The project conducted three two hour workshops on grading. Two of these were in conjunction with regular SHII-GAW meetings and reached about 80 growers. An additional workshop was held in Lanesboro, Minnesota for the Midwestern Specialty Mushroom Growers Association as part of the project effort to develop regional marketing cooperation.

The project also conducted two two hour workshops on using the indoor production manual. Each of these workshops was followed by a field trip to a prototype indoor production facility that was functioning profitably. These facilities were located in Falun and Peshtigo. In excess of 100 growers visited these facilities.

Project information was also made available at displays at the 1990 State Fair, at the 1990, 1991, and 1992 Farm Progress Days, at the annual Wisconsin Farm-City Council's State Farm-City Banquets for the same three years. Finally a display on the project was put on exhibit at the 1991 State of the Art Wisconsin Conference on Sustainable Agriculture.

#### V. Future Projections

This grant project has enabled Wisconsin's Shiitake industry to begin the transition from minimally profitable, seasonal outdoor production to a commercially viable one based on serious investment in year around production. We believe that this transition has just begun and that Wisconsin's industry is nearing the critical mass necessary to produce the volume necessary to sell directly to the wholesale market. As more potential growers become aware of the profit potential of indoor production, we anticipate a further shift away from outdoor production. Momentum is now beginning to be felt in the industry, but only time will tell the degree to which Shiitake will develop into an important Wisconsin specialty crop. In the meantime it is successfully improving the profitability of many individual farm operations.