Costs and Returns of Garlic Production

Department of Agriculture
BUREAU OF AGRICULTURAL STATISTICS

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FOREWORD

This report presents the results of the Survey on the Costs and Returns of Garlic Production conducted by the Bureau of Agricultural Statistics (BAS) in December 2006. The survey was designed to generate information on costs and returns of producing garlic in the three (3) major garlic producing provinces of Ilocos Norte, Ilocos Sur and Nueva Ecija.

In addition to the data on production costs and returns, this report presents the other socio-economic variables related to garlic production. The reference period of the survey is the last completed production cycle in 2006.

The Costs and Returns Surveys are being conducted by the BAS to fulfill its commitments to provide information that can enhance farm profitability and efficiency. These inquiries also support the objectives of the Diversified Farm Income and Market Development Project (DFIMDP),of promoting the competitiveness of Philippine agriculture in the global economy.

As in other BAS publications, we welcome comments and suggestions from data users and researchers.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF ANNEXES

EXPLANATORY NOTES

1. Average costs and returns of garlic production were computed and presented as follows:

$$\text{Per hectare} = \frac{\text{Total value of input (or output)}}{\text{Total harvest area}}$$

$$\text{Per farm} = \frac{\text{Total value of input (or output)}}{\text{Total number of farms}}$$

$$\text{Per kilogram} = \frac{\text{Total value of input (or output)}}{\text{Total production}}$$

2. The average of production costs and returns represented the consolidated data of the three (3) provinces (Ilocos Norte, Ilocos Sur and Nueva Ecija) covered in the study.

3. Data on input usage and costs and returns may not add up to total due to rounding off.

4. Blank spaces in cells in the statistical tables indicate that there was no report for a particular data item.

SUMMARY OF FINDINGS

- Garlic farmers in the three (3) provinces surveyed had an average age of 49 years with 13 years of experience in garlic production.

- All garlic farmers in Ilocos Norte and Ilocos Sur had formal schooling while 1.25 percent of those in Nueva Ecija had no formal schooling at all.

- Farming was the main occupation of the majority or 90.36 percent of the farm operators.

- The average farm size operated by garlic farmers was 0.894 hectare. However, the average area devoted to garlic production was 0.175 hectare.

- Across provinces, 45.00 percent of garlic farms were tenanted while 31.43 percent are owners operated.

- About 91.07 percent of farmers in the provinces surveyed planted the Ilocos White variety of garlic.

- Aside from garlic, 97.86 percent of the farmers planted palay while 30.71 percent grew corn, 38.57 percent, condiments and 21.43 percent, vegetables.

- Garlic was planted during October to December. Harvesting occurred during January to April of the following year.

- Across provinces surveyed, the average quantity of planting materials used in garlic farms was 323.35 kilograms per hectare. About 78.58 percent of the planting materials were farmers' own produce.

- Farmers applied an average of 630.39 kilograms per hectare of inorganic fertilizers on garlic farms. Common grades of fertilizers used by farmers were complete (14-14-14), urea (46-0-0) and ammonium sulfate (21-0-0).

- Average labor requirement in garlic production was 153.25 mandays per hectare. Hired workers provided 38.50 percent of the total labor input. Farm operator and family members contributed 36.93 percent and 23.58 percent to total labor requirements, respectively.

- **Costs and Returns of Garlic Production**

  - Cost of producing garlic in Ilocos Norte averaged P105,023 per hectare. Production averaged 2,936 kilograms per hectare worth P202,772. Thus, net returns averaged P97,749 per hectare. Farmers netted P0.93 for every peso invested in garlic production.

  - Average production of garlic in Ilocos Sur was estimated at 2,138 kilograms per hectare worth P155,741. Average cost of production amounted to P94,635 per hectare. Net returns averaged P61,106. Net profit - cost ratio was computed at 0.65.

  - Production of garlic in Nueva Ecija averaged 3,231 kilograms per hectare which entailed an average cost of P97,047. Farmers grossed P219,821 per hectare and netted P122,774 per hectare. Net profit stood at P1.27 for every peso invested in garlic production.

- About 81.56 percent of production were sold. About 11.29 percent were allotted for seeds. The rest were disposed of as landowners' share, farm workers' share, for home consumption and given away.

- Major production problems cited by garlic farmers were the high cost of fertilizers, occurrence of pests and diseases, bad weather conditions and natural calamities, high cost of seeds and lack of capital.

- Close to 30 percent each of the garlic farmers reported wholesaler-retailers and retailers as their buyers. Agents and wholesalers were the buyers of 25.00 percent and 17.50 percent of the farmers, respectively.

- About 41.07 percent of farmers perceived that P101 and above per kilogram is the right price of the garlic they produced. Some 26.79 percent of farmers perceived that the right price ranges from P91 to P100 per kilogram while 10.71 percent mentioned P81 to P90 per kilogram.

- The major marketing problems encountered by garlic farmers were the low price of produce, competition with the imported garlic in the market and unstable price of garlic.

- About 5.72 percent of farmers availed of loans for garlic production. Loans were mostly sourced from private individuals.

- There were 13.21 percent of garlic farmers who accessed the services of government extension agents and 10.36 percent who accessed the services of private extension agents.

- Farmers who will maintain their current operation in garlic production comprised 53.21 percent. Some 38.93 percent will expand their operation.

- The major recommendations of farmers to further improve garlic production were the provision of government price support or higher price of produce, stopping the importation of garlic and lowering the price of inputs.

COSTS AND RETURNS SURVEY OF GARLIC PRODUCTION

Introduction

Garlic, scientifically known as *Allium sativum L*., is a species in the onion family *Alliaceae.* The bulb is the most commonly used plant part, cosisting of cloves. Its leaves and stems are sometimes eaten, particularly when immature and tender. Garlic is widely used around the world for its pungent flavour, as a seasoning or condiment. Depending on the form of cooking, the flavor is either mellow or intense.

Garlic has been used also as medicine. It is claimed to help prevent heart disease, including atherosclerosis, high cholesterol, high blood pressure, and to improve the immune system. Like onion, garlic contains compounds that can reduce inflammation. It may also be a protection against cancer. Cooking garlic with meat appears to reduce the production of carcinogenic (cancer-causing) chemicals that can occur in meat as a result of cooking methods, such as grilling, that exposes meat to high temperatures.

Production of garlic in the Philippines was observed to be on the downtrend. Production was down to 12,581 metric tons in 2006 from 16,257 metric tons in 2002. It posted an average decline of 6.2 percent annualy. The cheap imported garlic is one of the major factors affecting the trend in the local production. Another is the continuous increase in the costs of inputs.

Information on profitability and cost structures of garlic production is needed by agribusiness players who are interested to venture in garlic farming. It is also the primary concern of policy makers in setting-up goals and strategies to prepare the garlic industry in the global competition. To address these needs, the Bureau of Agricultural Statistics (BAS), has conducted this Costs and Returns Survey of garlic production to generate updated information on the costs and returns of producing garlic.

Objectives

The survey is intended to generate updated data on the levels and structure of costs and returns of onion production. Specifically, it aims to generate:

- production cost structures;
- indicators of profitability such as gross and net returns, returns above cash costs, net profit-cost ratio, etc.;
- information on average use of materials and labor inputs; and
- other related socio-economic variables including information on new production technologies.

Survey Methodology

The survey covered garlic farmers in the provinces of Ilocos Norte, Ilocos Sur and Nueva Ecija, the top three (3) garlic producing provinces in the country. The domain of the study is the province, with the last completed production cycle in 2006 as reference period.

The lists of garlic producing barangays by province prepared by the concerned BAS Provincial Operations Centers (POCs) serve as the sampling frame for this study. The lists contain data on the area devoted to garlic production and number of garlic farmers by barangay as of 2006. These data were obtained from the Municipal Agriculturists Offices, Agricultural Technicians, barangay officials and other key informants in the barangay and updated results of the Barangay Screening Survey (BSS).

A two-stage sampling design was employed with the barangays as the primary sampling unit, and the garlic farmers as the secondary and ultimate sampling unit. The barangays were drawn using systematic sampling from an ordered list of barangays with at least five garlic farmers. Systematic sampling was used in the selection of sample barangays so that both large and small barangays in terms of area would be represented in the sample. For Nueva Ecija, all garlic producing barangays were taken as samples. Sample farmers were identified using snowball approach during data collection. During the search for sample operators, a set of screening questions was applied to see to it that the samples satisfy the following criteria:

1) must be engaged in garlic farming, and
2) must have harvested garlic in 2006

The sample size was 100 garlic farmers each in Ilocos Norte and Ilocos Sur, equally allocated to 20 sample barangays. In Nueva Ecija, the sample size was 80 garlic farmers.

SURVEY RESULTS

Characteristics of Garlic Farmers (Tables 1 - 5)

Sex, age, educational attainment and farming experience

- Across the three (3) provinces, 93.93 percent of garlic farmers were males. The highest proportion of females at 10.00 percent was reported in Nueva Ecija.

- Ages of garlic farmers averaged 47 years in Nueva Ecija, 49 years in Ilocos Norte, and 51 years in Ilocos Sur.

- All garlic farmers in Ilocos Norte and Ilocos Sur had formal schooling while 1.25 percent of operators in Nueva Ecija had no formal schooling at all.

- In Ilocos Sur, 41.00 percent were high school graduates. In Nueva Ecija, 36.25 percent of farmers completed secondary education. In Ilocos Norte, 32.00 percent of farmers were elementary graduates. Farmers who were able to obtain college degrees accounted for 12.00 percent in Ilocos Sur, 13.00 percent in Ilocos Norte and 13.75 percent in Nueva Ecija.

- Across provinces, the average farming experience in garlic production was 13 years. However, 58.93 percent of the farmers were into garlic production for less than eleven (11) years.

- Farming experience of farmers averaged 16 years in Ilocos Norte, 15 years in Ilocos Sur and 8 years in Nueva Ecija.

Main occupation

- Farming was the main occupation of 83.75 percent of garlic farmers in Nueva Ecija, 91.00 percent in Ilocos Norte and 95.00 percent in Ilocos Sur.

Farm Characteristics
(Tables 6 - 9)

Farm size and area devoted to garlic

- The average farm size operated by garlic farmers across the three (3) provinces was 0.894 hectare. However, the average area devoted to garlic production was only 0.175 hectare.

- By province, average farm size was biggest in Nueva Ecija at 1.244 hectares and smallest in Ilocos Norte at 0.729 hectare.

- Nueva Ecija reported the biggest average area devoted to garlic production at 0.182 hectare. Ilocos Norte reported the smallest at 0.171 hectare.

- By variety, area harvested for Batangas Strain averaged 0.138 hectare, 0.177 hectare for Ilocos White, 0.190 hectare for Romblon, 0.600 hectare for Ilocos Pink, and 0.300 hectare for Taiwan variety.

Tenure status

- Across the three (3) provinces, 45.00 percent of garlic farms were tenanted. Owned farms accounted for 31.43 percent. Other forms of tenures comprised 0.71 percent to 9.65 percent of farms.

- About 66.00 percent of garlic farms in Ilocos Norte were tenanted. In Ilocos Sur, 57.00 percent of the farms were tenanted and 40.00 percent were owned. In Nueva Ecija, 32.50 percent were owned.

Farm investments

- Garlic farmers invested mostly in farm tools, equipment and other implements. Specifically, at least 65.00 percent of garlic farmers invested in sprayer, scythe, water hose and bolo.

- About 23.21 percent and 71.79 percent of farmers invested in two-wheel tractor and irrigation pump, respectively.

- Few farmers invested in work animals such as carabao (17.86 percent) and cattle (4.29 percent).

- Investments in farm buildings and other structures such as pump house, warehouse and farm house were reported by 1.79 percent to 3.93 percent of farmers.

Farm Practices
(Tables 10 - 15)

Variety planted

- The survey noted that 91.07 percent of garlic farmers in the three (3) provinces surveyed planted the Ilocos White variety of garlic. About 0.36 percent to 5.35 percent of farmers planted other varieties such as the Ilocos Pink, Taiwan, Romblon and Batangas Strain.

- By province, the proportions of farmers who planted the Ilocos White variety were 80.00 percent in Ilocos Norte, 96.25 percent in Nueva Ecija and 98.00 percent in Ilocos Sur.

Other crops grown aside from garlic

- Among the other crops grown by garlic farmers, palay was the most popular as reported by 97.86 percent of farmers. Corn was grown by 30.71 percent, condiments, by 38.57 percent, vegetables, by 21.43 percent and commercial crops by 13.57 percent.

- Planting of legumes and nuts, fruits and gabi, was reported by 7.86 percent, 2.50 percent and 1.43 percent of farmers, respectively.

- In Ilocos Norte, 99.00 percent of garlic farmers reported that they planted palay aside from garlic. On the other hand, there were only 5.00 percent and 4.00 percent of garlic farmers who planted fruits and gabi, respectively.

- All farmers in Ilocos Sur planted palay and at least 45.00 percent planted corn and condiments.

- In Nueva Ecija, 93.75 percent of garlic farmers planted palay. Planting of condiments was also reported by 40.00 percent of farmers.

Month of planting and harvesting

- Across the three (3) provinces, garlic was planted from October to December. However, peak month of planting was November with 67.50 percent of farmers reporting. Those who planted in October accounted for 20.71 percent and in December, 11.79 percent.

- Some 81.00 percent of farmers in Ilocos Norte planted garlic in November and 15.00 percent in October.

- In Ilocos Sur, 59.00 percent and 40.00 percent of farmers planted in November and October, respectively.

- In Nueva Ecija, 61.25 percent planted in November and 35.00 percent in December.

- The peak harvest month was February as reported by 56.07 percent of garlic farmers across the three (3) provinces. Specifically, in Ilocos Norte and Ilocos Sur, 71.00 percent and 79.00 percent of garlic farmers, respectively, harvested their crop in February. In Nueva Ecija, peak harvest month was March with 87.50 percent of garlic farmers reporting.

Plowing and harrowing

- The use of tractors for plowing and harrowing activity was minimal. Across provinces, the use of two-wheeled tractors was reported by 2.5 percent of farmers for plowing and 3.21 percent for harrowing. Four-wheeled tractors were used by about 4 percent for plowing.

- In Nueva Ecija, 10 percent of farmers used two-wheeled tractors for harrowing activity. In plowing operation, 7 percent of the farmers in Ilocos Norte used four-wheeled tractors.

- In the case of Ilocos Sur, plowing and harrowing activities were not practiced by garlic farmers on their farm operation, instead irrigating the farm was done to soften the soil in preparation for planting. Garlic is planted after palay, thus the hay/palay stalks left on the farm served as mulching materials. Some farmers in Ilocos Norte do the same farm practice.

Weeding

- About 91.43 percent of the garlic farmers practiced chemical spraying to prevent/eradicate weeds, while 77.14 percent practiced manual weeding.

- The use of chemical spraying was reported by 99 percent of farmers in Ilocos Sur, 90 percent in Nueva Ecija and 85 percent in Ilocos Norte. On the other hand, farmers practicing manual weeding ranged from 63 percent in Ilocos Norte to 98.75 percent in Nueva Ecija.

User of fertilizers

- All farmers across the three (3) provinces applied inorganic fertilizers on garlic farms. About 78.57 percent used complete (14-14-14), 55.36 percent used urea (46-0-0), and 36.79 percent used ammonium sulfate (21-0-0). Only 1.43 percent of garlic farmers reported using organic fertilizers.

- By province, 56.00 percent to 65.00 percent of garlic farmers in Ilocos Norte reported the use of complete (14-14-14), urea (46-0-0), and ammonium sulfate (21-0-0). The users of these fertilizer grades ranged from 36.00 percent to 80.00 percent of garlic farmers in Ilocos Sur. In Nueva Ecija, 93.75 percent of garlic farmers used complete (14-14-14), 56.25 percent used urea (46-0-0), and 52.50 percent used complete (15-15-15).

- Liquid fertilizer was used in Ilocos Norte and Nueva Ecija by 6.00 percent and 3.52 percent of the garlic farmers, respectively.

User of pesticides

- About 91.43 percent of garlic farmers across the three (3) provinces applied herbicide/weedicide on their farms. This was reported by 85.00 percent of farmers in Ilocos Norte, 99.00 percent in Ilocos Sur and 90 percent in Nueva Ecija.

- Garlic farms were also applied with insecticides. Around 59.64 percent of farmers in all the three provinces surveyed used insecticides in liquid form while 22.14 percent used the solid type.

- In Nueva Ecija, 66.25 percent of farmers applied liquid insecticides on their farms. About 46.25 percent used the solid type.

- In Ilocos Sur, 75.00 percent of garlic farmers applied liquid insecticides and only 4.00 percent used the solid form.

- About 39 percent of garlic farmers in Ilocos Norte applied liquid insecticides and 21.00 percent used the solid type.

Input Usage
(Tables 16 - 22)

Planting materials

- Across the three (3) provinces, the average quantity of planting materials used in garlic farms was 323.35 kilograms per hectare. About 78.58 percent of the planting materials were farmers' own produce. The remaining 21.36 percent were purchased.

- Farmers in Nueva Ecija reported the biggest quantity of planting materials used at 393.79 kilograms per hectare. In Ilocos Sur and Ilocos Norte, farmers utilized average quantities of 307.00 kilograms and 279.95 kilograms per hectare, respectively.

Fertilizers

- Across the three (3) provinces, garlic farmers applied an average of 630.39 kilograms of solid inorganic fertilizer per hectare. Complete (14-14-14) accounted for about 47.44 percent and urea (46-0-0), 22.49 percent of total inorganic fertilizer utilized.

- Garlic farmers in Ilocos Norte applied an average of 0.35 liter of liquid inorganic fertilizer per hectare.

- Application of organic fertilizer averaged 34.28 kilograms per hectare in Nueva Ecija and 8.77 kilograms per hectare in Ilocos Norte.

Mulching materials

- Garlic farmers used rice straw as mulching materials. Extensive use of mulch was noted in Ilocos Sur and Ilocos Norte, averaging 9,104.07 kilograms and 5,587.58 kilograms per hectare, respectively.

- In Nueva Ecija, mulching garlic farms averaged only 1,123.76 kilograms per hectare.

Pesticides

- Across the three (3) provinces, garlic farmers applied herbicides/weedicides at an average quantity of 3.41 liters per hectare. This ranged from 2.16 liters per hectare in Ilocos Sur to 5.90 liters in Nueva Ecija.

- Application of insecticides on garlic farms in all the provinces surveyed averaged 1.19 kilograms per hectare of solid type and 1.78 liters per hectare of liquid.

- Heavy users of insecticides were farmers in Nueva Ecija who applied 3.19 kilograms per hectare of solid type and 3.38 liters per hectare of liquid type.

- Average use of insecticides in Ilocos Norte and Ilocos Sur was less than a kilogram per hectare of solid type and around one (1) liter per hectare of liquid type.

- Garlic farms in the provinces surveyed were also applied with fungicides. Average application rate ranged from 1.46 kilograms per hectare in Ilocos Sur to 1.63 kilograms per hectare in Ilocos Norte.

Labor

- Garlic production required an average labor input of 153.25 mandays per hectare across the three (3) provinces. Labor utilization was biggest in Nueva Ecija at 155.72 mandays per hectare and smallest in Ilocos Sur at 150.58 mandays per hectare.

- Male workers provided the bulk of the labor inputs. Across the three (3) provinces, males contributed about 80 percent of the total labor inputs.

- By source of labor, hired workers provided about 44 percent of the total labor utilized in garlic production per hectare in Nueva Ecija. Farm operator and family members contributed 31 percent and 23 percent, respectively.

- In Ilocos Norte and Ilocos Sur, labor inputs provided by the operators constituted 40.10 percent and 39 percent of the total labor requirements per hectare, respectively. Hired workers in the said provinces contributed 36 percent each of the total labor utilized in garlic production per hectare. Labor provided by family members in Ilocos Norte accounted for 23 percent and those in Ilocos Sur, 25 percent.

- By farm activity, planting was the most labor-intensive activity in garlic farms averaging 22.23 mandays per hectare across the three (3) provinces. Another labor-intensive activity was harvesting at 19.89 mandays per hectare. Cleaning of bulbs/grading/braiding utilized 16.77 mandays per hectare.

Average Production Costs and Returns
(Tables 23 - 31)

Three selected provinces

- In the three provinces covered by the survey, the average cost of producing garlic was P98,968 per hectare. Cash costs were estimated at P45,676, non-cash costs at P27,202, and imputed costs at P26,090 per hectare.

- With an average production of 2,740 kilograms of garlic per hectare, farmers grossed P191,138.

- Returns above cash costs amounted to P145,463 per hectare while returns above cash and non-cash costs were computed at P118,261 per hectare. Considering all production costs, net returns to farmers stood at P92,170 per hectare. Farmers netted P0.93 for every peso invested in garlic production.

- Variable costs of production amounted to P83,936 per hectare or 84.81 percent of all costs. Fixed costs figured to P15,032 per hectare.

Ilocos Norte

- Costs of producing garlic in Ilocos Norte averaged P105,023 per hectare.

- Cash costs were estimated at P39,351 per hectare or 37.47 percent of the total costs. Cash costs were mainly expenditures on hired labor, fertilizers, food expense, fuel and oil, mulching materials and pesticides.

- Non-cash costs averaged P39,332 per hectare. Of this, P19,327 were costs of planting materials and P19,794 were land owner's share from the produce.

- Imputed costs stood at P26,341 per hectare. Cost of operator labor was the major contributor at P8,855 per hectare.

- Garlic production was estimated at 2,936 kilograms per hectare worth P202,772.

- Net returns to farmers was computed at P97,749 per hectare resulting in a net gain of P0.93 for every peso of investment.

- Average variable costs were computed at P91,730 per hectare while fixed costs summed up to P13,293 per hectare.

Ilocos Sur

- Average cost of garlic production in Ilocos Sur was P94,635 per hectare. Cash and non-cash expenses were 46.12 percent and 25.26 percent of the total costs, respectively.

- Major cash expense items included mulching materials at P10,297 per hectare, fuel and oil at P8,244, hired labor at P7,224, and fertilizers at P6,847 per hectare.

- Non-cash costs comprised only of own-produced planting materials at P18,180 per hectare and landowners share from produce at P5,722 per hectare.

- With an average production of 2,138 kilograms per hectare, gross returns amounted to P155,741.

- Returns above cash costs were P112,098 per hectare while returns above cash and non-cash costs were P88,196 per hectare.

- Farmers netted P61,106 per hectare resulting in the net profit - cost ratio of 0.65.

- On a per kilogram basis, average cost of production was P44.26. With gross returns of P72.84, garlic farmers earned P28.58.

- On a per hectare basis, variable costs of production averaged P79,010 and fixed costs, P15,625.

Nueva Ecija

- Average cost of producing garlic in Nueva Ecija was estimated at P97,047 per hectare.

- Cash expenses totalled P55,524 per hectare. Fertilizer, planting materials and hired labor were the major expense items at P13,191, P10,400 and P7,923 per hectare, respectively.

- Non-cash costs stood at P16,922 per hectare where the cost of own-produced planting materials comprised the bulk at P16,213 per hectare.

- Imputed costs were estimated at P24,601 per hectare.

- Average production was 3,231 kilograms per hectare. To produce a kilogram of garlic, farmers spent P30.03.

- Gross earnings of farmers averaged P219,821 per hectare. Returns above cash and non-cash costs were P147,375 per hectare. Net returns amounted to P122,774 per hectare.

- Farmers gained P1.27 for every peso invested in garlic production.

- Variable costs of production averaged P80,684 per hectare while fixed costs figured to P16,363 per hectare.

Other Information
(Tables 32 - 40)

Disposition of produce

- Throughout the provinces surveyed, 81.56 percent of garlic produced were sold. The proportion was even higher in Nueva Ecija at 90.74 percent. In Ilocos Norte and Ilocos Sur, 74.53 percent and 79.23 percent of garlic produced were sold, respectively.

- About 11.29 percent of the total production were allotted for seeds while 4.70 percent were landowner's share. Others were set aside for home consumption and given away.

Production - related problems

- High cost of fertilizer was the major problem reported by 81.07 percent of farmers in the three provinces surveyed. A bigger proportion of farmers in Ilocos Norte at 90.00 percent and in Ilocos Sur at 83.00 percent encountered this problem.

- Occurrence of pests and diseases was reported by 41.79 percent of garlic farmers across the three (3) provinces. The majority of farmers in Ilocos Norte and Ilocos Sur reported this problem.

- In Nueva Ecija, 57.50 percent of farmers complained on the high cost of seeds while another 55.00 percent was affected by bad weather and/or natural calamities.

Major buyers of produce

- About 30 percent each of the farmers sold their produce to wholesaler-retailers and retailers. Specifically, 55.00 percent of farmers in Ilocos Sur reported that retailers were their buyers while 40.00 percent of farmers in Ilocos Norte mentioned wholesaler-retailers.

- Agents were the buyers of 25.00 percent of the farmers and wholesalers by 17.50 percent of farmers across the provinces surveyed. In Nueva Ecija, 43.75 percent of farmers preferred the agents as buyers.

- About 2.50 percent transacted with consumers and 0.71 percent of farmers sold their produce to processors.

Perceived right price of the produce

- The survey revealed that garlic farmers across the three (3) provinces wanted higher price for their produce. Biggest proportion at 41.07 percent of farmers perceived that P101.00 and above per kilogram is the right price of garlic they produced. The proportion was even higher in Ilocos Sur at 52.00 percent.

- About 26.79 percent of farmers mentioned the price range of P91-100 per kilogram for their produce. The price of P81-90 per kilogram was perceived by 10.71 percent of farmers.

Marketing - related problems

- Low price of garlic, competition with imported supply in the market and unstable price were the major marketing problems cited by at least 40 percent of garlic farmers in the three provinces surveyed.

- In Ilocos Norte, about 72 percent each of the farmers encountered low and unstable prices of garlic as their marketing problems. Problem on competition with the imported supply in the market was also mentioned by another 38.00 percent.

- In Ilocos Sur, low price of garlic was the primary concern of 89.00 percent of farmers while the problem on competition with the imported supply in the market was mentioned by 71.00 percent.

- In Nueva Ecija, problem on low price of garlic was reported by 61.25 percent of farmers. Another 53.75 percent of farmers complained about the competition with the imported supply in the market while another 47.50 percent had limited buyer/market outlet.

Access to credit

- Few farmers in the three provinces availed of loans for garlic production. Specifically, only 3.00 percent of farmers in Ilocos Sur availed of loans, 6.00 percent in Ilocos Norte and 8.75 percent in Nueva Ecija.

- Among borrowers, 5 percent availed of loans from private individuals. The remainder was either from cooperative or money shop.

Access to Extension Services

- Across the three (3) provinces, 13.21 percent of garlic farmers accessed the services of government extension agents and 10.36 percent accessed the services of private extension agents.

- In Ilocos Norte, 21 percent of farmers consulted/used the advice of government extension agents. Likewise, 20 percent in Nueva Ecija.

- Garlic farmers who consulted/used the advice of private extension agents were 21.25 percent in Nueva Ecija and 12.00 percent in Ilocos Norte.

- No farmers in Ilocos Sur consulted/used the advice of extension agents.

Plans of garlic farmers

- About 53.21 percent of farmers across provinces would maintain their current operation while 38.93 percent would expand. Around 7.86 percent would stop garlic production.

- Among provinces, majority or 62.50 percent of farmers in Nueva Ecija and 58.00 percent in Ilocos Norte would maintain current operation.

- About 59 percent of farmers in Ilocos Sur would expand operation.

Recommendations for further improvement of garlic production

- To further improve the production of garlic, 42.86 percent of farmers across provinces recommended that there should be government intervention or policy on price support/higher price of produce. In particular, majority or 53 percent of farmers each in Ilocos Norte and Ilocos Sur made this recommendation.

- Other recommendations by farmers were to stop the importation of garlic (19.64 percent), lower the price of inputs (16.07 percent), conduct of seminar to farmers (12.86 percent), and improve the quality of seeds (6.79 percent).

- About 11.43 percent of farmers recommended the provision of credit assistance, irrigation facilities, market assistance, and input subsidy.

STATISTICAL TABLES

Table 1. Percentage distribution of garlic farmers by sex, selected provinces, Philippines, 2006

PROVINCE	MALE	FEMALE
All 3 Provinces	93.93	6.07
Ilocos Norte	99.00	1.00
Ilocos Sur	92.00	8.00
Nueva Ecija	90.00	10.00

Table 2. Average age of garlic farmers and percentage distribution by age group, selected provinces, Philippines, 2006

PROVINCE	AVERAGE AGE (year)	AGE GROUP (year)					
		< 31	31-40	41-50	51-60	61-70	> 70
All 3 Provinces	49	5.00	23.57	25.35	24.29	17.50	4.29
Ilocos Norte	49	6.00	24.00	22.00	23.00	21.00	4.00
Ilocos Sur	51	4.00	17.00	29.00	25.00	21.00	4.00
Nueva Ecija	47	5.00	31.25	25.00	25.00	8.75	5.00

Table 3. Percentage distribution of garlic farmers by educational attainment, selected provinces, Philippines, 2006

EDUCATIONAL ATTAINMENT	ALL 3 PROVINCES	ILOCOS NORTE	ILOCOS SUR	NUEVA ECIJA
Elementary Level	9.29	12.00	12.00	2.50
Elementary Graduate	26.79	32.00	21.00	27.50
High School Level	6.79	8.00	4.00	8.75
High School Graduate	33.21	23.00	41.00	36.25
College Level	6.79	9.00	6.00	5.00
College Graduate	12.86	13.00	12.00	13.75
Vocational	3.21	2.00	3.00	5.00
Post Graduate	0.71	1.00	1.00	
Pre-school/ Day care				
No Schooling	0.35			1.25

Table 4. Average farming experience of garlic farmers and percentage distribution by number of years engaged in garlic production, selected provinces, Philippines, 2006

PROVINCE	AVERAGE FARMING EXPERIENCE (year)	YEARS ENGAGED IN GARLIC PRODUCTION			
		< 11	11 - 20	21 - 30	> 30
All 3 Provinces	13	58.93	23.57	12.14	5.36
Ilocos Norte	16	51.00	23.00	16.00	10.00
Ilocos Sur	15	48.00	34.00	13.00	5.00
Nueva Ecija	8	82.50	11.25	6.25	

Table 5. Percentage distribution of garlic farmers by main occupation, selected provinces, Philippines, 2006

OCCUPATION	ALL 3 PROVINCES	ILOCOS NORTE	ILOCOS SUR	NUEVA ECIJA
Officials of Government	0.71			2.50
Professional	2.14	5.00		1.25
Technicians and Associate Professionals	0.36		1.00	
Clerks	0.36		1.00	
Service Workers and Shop and Market Sales Workers	2.86	2.00	3.00	3.75
Farmers, Forestry Workers and Fishermen	90.36	91.00	95.00	83.75
Plant and Machine Operators and Assemblers	2.14	1.00		6.25
Laborers and Unskilled Workers	0.71			2.50
Special Occupations	0.36	1.00		

Table 6. Average farm size and area devoted to garlic production, selected provinces, Philippines, 2006

(hectare)

PROVINCE	AVERAGE FARM SIZE	AREA CULTIVATED TO GARLIC
All 3 Provinces	0.894	0.175
Ilocos Norte	0.729	0.171
Ilocos Sur	0.780	0.174
Nueva Ecija	1.244	0.182

Table 7. Average area planted / harvested by variety planted, selected provinces, Philippines, 2006

(hectare)

PROVINCE	BATANGAS STRAIN	ILOCOS WHITE	ROMBLON	ILOCOS PINK	TAIWAN	ALL VARIETIES
All 3 Provinces	0.138	0.177	0.190	0.060	0.300	0.175
Ilocos Norte	0.138	0.175	0.190	0.060		0.171
Ilocos Sur	0.250	0.173				0.174
Nueva Ecija	0.025	0.185			0.300	0.182

Table 8. Percentage distribution of garlic farms by tenure status, selected provinces, Philippines, 2006

LAND TENURE	ALL 3 PROVINCES	ILOCOS NORTE	ILOCOS SUR	NUEVA ECIJA
Owned	31.43	22.00	40.00	32.50
Tenanted	45.00	66.00	57.00	3.75
Leased	2.86		1.00	8.75
Held under CLT/CLOA	7.14			25.00
Owned-Like Possession other than CLT/CLOA	9.65	7.00		25.00
Mortgaged	3.21	4.00	2.00	3.75
Rent Free	0.71	1.00		1.25

CLT / CLOA - Certificate of Land Transfer / Certificate of Land Ownership Award

Table 9. Percentage of garlic farmers by type of farm investment, selected provinces, Philippines, 2006

FARM INVESTMENT	ALL 3 PROVINCES	ILOCOS NORTE	ILOCOS SUR	NUEVA ECIJA
Work animals				
Carabao	17.86	16.00	11.00	28.75
Cattle	4.29	2.00	10.00	
Farm buildings and other structures				
Farm house	3.93	1.00		12.50
Warehouse	2.14	2.00	1.00	3.75
Pump house	1.79	1.00		5.00
Farm machinery and transport equipment				
Two-wheel tractor	23.21	13.00	5.00	58.75
Four-wheel tractor	1.79	3.00		2.50
Irrigation pump	71.79	69.00	93.00	48.75
Cart	0.36	1.00		
Tricycle	0.36	1.00		
Jeep	0.71	2.00		
Truck	0.36	1.00		
Farm tools, equipment and other supplies				
Plow	8.57	2.00		27.50
Harrow	7.86	2.00		25.00
Sprayer	83.21	72.00	89.00	90.00
Air plotter	2.14	3.00		3.75
Shovel/spade	29.64	7.00	22.00	67.50
Bolo	65.00	52.00	61.00	86.25
Scythe	70.71	58.00	72.00	85.00
Weighing scale	23.21	15.00	35.00	18.75
Sprinkler	7.14	6.00		17.50
Spading fork	5.00	5.00	2.00	8.75
Hose	69.64	71.00	96.00	35.00
Scissors	46.07	33.00	78.00	22.50
Sled	16.79	25.00	18.00	5.00
Trailer	17.86	3.00	19.00	35.00
Grass cutter	2.14	2.00	3.00	1.25

Table 10. Percentage distribution of garlic farmers by variety planted, selected provinces, Philippines, 2006

PROVINCE	BATANGAS STRAIN	ILOCOS WHITE	ROMBLON	ILOCOS PINK	TAIWAN
All 3 Provinces	5.35	91.07	2.86	0.36	0.36
Ilocos Norte	11.00	80.00	8.00	1.00	
Ilocos Sur	2.00	98.00			
Nueva Ecija	2.50	96.25			1.25

Table 11. Percentage of garlic farmers planting crops other than garlic, selected provinces, Philippines, 2006

CROPS	ALL 3 PROVINCES	ILOCOS NORTE	ILOCOS SUR	NUEVA ECIJA
Palay	97.86	99.00	100.00	93.75
Corn	30.71	37.00	47.00	2.50
Vegetables a/	21.43	34.00	15.00	13.75
Fruits b/	2.50	5.00	2.00	
Gabi	1.43	4.00		
Condiments c/	38.57	31.00	45.00	40.00
Legumes & nuts d/	7.86	16.00	4.00	2.50
Commercial crops e/	13.57	29.00	9.00	

a/ eggplant, bitter gourd, gourd, tomato, squash, pechay

b/ watermelon and banana

c/ onion, black pepper and chili pepper

d/ mongo, stringbeans, beans and peanut

e/ tobacco and coconut

Table 12. Percentage distribution of garlic farmers by month of planting and harvesting, selected provinces, Philippines, October 2005 - April 2006

YEAR / MONTH	PLANTING				HARVESTING			
	ALL 3 PROVINCES	ILOCOS NORTE	ILOCOS SUR	NUEVA ECIJA	ALL 3 PROVINCES	ILOCOS NORTE	ILOCOS SUR	NUEVA ECIJA
2005								
October	20.71	15.00	40.00	3.75				
November	67.50	81.00	59.00	61.25				
December	11.79	4.00	1.00	35.00				
2006								
January					6.07	3.00	13.00	1.25
February					56.07	71.00	79.00	8.75
March					37.14	26.00	8.00	87.50
April					0.72			2.50

Table 13. Percentage of garlic farmers by type of tractor used and method of weeding applied, selected provinces, Philippines, 2006

PROVINCE	PLOWING		HARROWING		WEEDING	
	2- WHEEL TRACTOR	4- WHEEL TRACTOR	2- WHEEL TRACTOR	4- WHEEL TRACTOR	MANUAL	CHEMICAL SPRAYING
All 3 Provinces	2.50	3.93	3.21	0.36	77.14	91.43
Ilocos Norte	3.00	7.00	1.00		63.00	85.00
Ilocos Sur					74.00	99.00
Nueva Ecija	5.00	5.00	10.00	1.25	98.75	90.00

Table 14. Percentage of garlic farmers by type of fertilizers used, selected provinces, Philippines, 2006

FERTILIZER	ALL 3 PROVINCES	ILOCOS NORTE	ILOCOS SUR	NUEVA ECIJA
Solid Fertilizer				
Organic Fertilizer a/	1.43	3.00		1.25
Inorganic Fertilizer	100.00	100.00	100.00	100.00
Urea (45-0-0)	8.21	4.00	15.00	5.00
Urea (46-0-0)	55.36	57.00	53.00	56.25
Ammonium Sulfate (21-0-0)	36.79	56.00	36.00	13.75
Ammonium Phosphate (16-20-0)	14.64	24.00	5.00	15.00
Complete (14-14-14)	78.57	65.00	80.00	93.75
Complete (16-16-16)	1.79	2.00	3.00	
Complete (15-15-15)	19.64	4.00	9.00	52.50
Complete (19-19-19)	15.00	2.00	15.00	31.25
Muriate of Potash (0-0-60)	0.71	1.00		1.25
Others b/	10.36	6.00	2.00	26.25
Liquid Fertilizer				
Inorganic Fertilizer	3.15	6.00		3.52
Green Bee	0.71	2.00		
Foliar (15-15-30)	0.36	1.00		
Micro	0.36	1.00		
Super Fast	0.36	1.00		
Atonik	4.29			15.00

a/ Include processed chicken manure and sagana (3.5-3.5-3.5)

b/ Include crop giant (15-15-30), di-ammonium phosphate (18-46-0), foliar, improve (15-15-30) and MRG

Table 15. Percentage of garlic farmers by type of pesticides used, selected provinces, Philippines 2006

PROVINCE	HERBICIDE / WEEDICIDE	INSECTICIDE		FUNGICIDE	
	LIQUID	SOLID	LIQUID	SOLID	LIQUID
All 3 Provinces	91.43	22.14	59.64	61.07	0.71
Ilocos Norte	85.00	21.00	39.00	39.00	
Ilocos Sur	99.00	4.00	75.00	85.00	
Nueva Ecija	90.00	46.25	66.25	58.75	2.50

Table 16. Average quantity of planting materials used per hectare of garlic farm by source, selected provinces, Philippines, 2006

(kilogram)

PROVINCE	PURCHASED	OWN PRODUCED	RECEIVED FROM OTHERS	ALL SOURCES
All 3 Provinces	69.07	254.09	0.19	323.35
Ilocos Norte	29.76	250.19		279.95
Ilocos Sur	49.94	257.05		307.00
Nueva Ecija	138.04	255.12	0.63	393.79

Table 17. Average quantity of fertilizers applied per hectare of garlic farm, selected provinces, Philippines, 2006

FERTILIZER	ALL 3 PROVINCES	ILOCOS NORTE	ILOCOS SUR	NUEVA ECIJA
Solid Fertilizer (kg)				
Organic Fertilizer a/	13.23	8.77		34.28
Inorganic Fertilizer	630.39	663.10	463.21	791.94
Urea (45-0-0)	28.14	4.82	63.07	13.71
Urea (46-0-0)	141.76	153.74	121.56	151.87
Ammonium Sulfate (21-0-0)	109.35	223.66	60.03	34.28
Ammonium Phosphate (16-20-0)	44.82	66.77	10.03	60.68
Complete (14-14-14)	299.07	206.97	201.43	523.83
Complete (16-16-16)	3.52	6.43	3.61	
Complete (15-15-15)	1.34	0.15	0.68	3.53
Complete (19-19-19)	1.05	0.12	1.29	1.85
Muriate of Potash (0-0-60)	0.07	0.15		0.07
Others b/	1.26	0.30	1.49	2.13
Liquid Fertilizer (l)				
Inorganic Fertilizer	0.18	0.35		0.19
Green Bee	0.04	0.12		
Foliar (15-15-30)	0.02	0.06		
Micro	0.02	0.06		
Super Fast	0.04	0.12		
Atonik	0.06			0.19

a/ Include processed chicken manure and sagana (3.5-3.5-3.5)

b/ Include crop giant (15-15-30), di-ammonium phosphate (18-46-0), foliar, improve (15-15-30) and MRG

Table 18. Average quantity of fertilizer nutrients applied per hectare of garlic farm, selected provinces, Philippines, 2006

ITEM / PROVINCE	NITROGEN (N)	PHOSPHOROUS (P)	POTASSIUM (K)
Solid fertilizer (kg)			
All 3 Provinces	151.400	43.534	43.453
Ilocos Norte	160.634	30.093	30.225
Ilocos Sur	127.897	29.786	29.126
Nueva Ecija	168.674	75.736	76.096
Liquid fertilizer (l)			
All 3 Provinces	0.003	0.003	0.018
Ilocos Norte	0.009	0.009	0.021
Ilocos Sur			
Nueva Ecija			

Table 19. Average quantity of mulching materials used per hectare of garlic farm, selected provinces, Philippines, 2006

(kilogram)

PROVINCE	RICE STRAW
All 3 Provinces	5,510.70
Ilocos Norte	5,587.58
Ilocos Sur	9,104.07
Nueva Ecija	1,123.76

Table 20. Average quantity of pesticides applied per hectare of garlic farm by type, selected provinces, Philippines 2006

PROVINCE	HERBICIDE / WEEDICIDE	INSECTICIDE		FUNGICIDE	
	LIQUID (l)	SOLID (kg)	LIQUID (l)	SOLID (kg)	LIQUID (l)
All 3 Provinces	3.41	1.19	1.78	1.57	0.02
Ilocos Norte	2.57	0.63	1.01	1.63	
Ilocos Sur	2.16	0.06	1.19	1.46	
Nueva Ecija	5.90	3.19	3.38	1.62	0.05

Table 21. Average labor utilization for garlic production per hectare, by source of labor and sex, selected provinces, Philippines 2006

(manday)

SOURCE OF LABOR	ALL 3 PROVINCES	ILOCOS NORTE	ILOCOS SUR	NUEVA ECIJA
Operator				
Both Sexes	56.60	61.71	58.60	48.22
Male	55.41	60.96	57.19	46.77
Female	1.19	0.75	1.41	1.44
Family				
Both Sexes	36.14	34.90	37.11	36.44
Male	20.12	21.98	22.45	15.16
Female	16.02	12.92	14.66	21.28
Exchange				
Both Sexes	1.52	1.51	0.69	2.53
Male	0.98	1.24	0.69	1.04
Female	0.54	0.28		1.49
Hired				
Both Sexes	58.99	55.74	54.19	68.54
Male	46.18	43.72	42.85	53.06
Female	12.81	12.03	11.34	15.48
All Sources				
Both Sexes	153.25	153.86	150.58	155.72
Male	122.70	127.90	123.17	116.03
Female	30.55	25.97	27.41	39.69

Table 22. Average labor utilization for garlic production per hectare, by farm activity and sex, selected provinces, Philippines, 2006

(manday)

FARM ACTIVITY	ALL 3 PROVINCES			ILOCOS NORTE			ILOCOS SUR			NUEVA ECIJA		
	BOTH SEXES	MALE	FEMALE	BOTH SEXES	MALE	FEMALE	BOTH SEXES	MALE	FEMALE	BOTH SEXES	MALE	FEMALE
Clearing of field	7.81	6.84	0.97	5.81	5.67	0.15	3.75	3.59	0.16	14.99	12.08	2.91
Plowing												
Man-animal	0.30	0.30		0.29	0.29					0.66	0.66	
Man-machine (2-wheel)	0.04	0.03	0.01	0.03	0.01	0.02				0.09	0.09	
Man-machine (4-wheel)	0.08	0.06	0.02	0.19	0.13	0.06				0.06	0.06	
Harrowing												
Man-animal	0.25	0.25		0.24	0.24					0.54	0.54	
Man-machine (2-wheel)	0.06	0.06		0.01	0.01					0.19	0.19	
Man-machine (4-wheel)	0.01	0.01								0.02	0.02	
Plotting/levelling of plots	0.10	0.10								0.35	0.35	
Man	0.09	0.09								0.31	0.31	
Man-animal	0.01	0.01								0.03	0.03	
Sorting / Selection of planting materials	10.99	6.04	4.96	13.36	7.47	5.89	10.23	5.71	4.52	9.14	4.75	4.39
Planting	22.23	16.94	5.30	19.45	15.96	3.49	24.46	19.87	4.59	22.82	14.57	8.25
Mulching	8.29	7.77	0.52	8.25	8.14	0.11	9.68	9.14	0.54	6.66	5.70	0.96
Watering / Irrigating	16.45	16.09	0.36	19.83	19.43	0.41	19.77	19.19	0.57	8.52	8.48	0.03
Weeding												
Manual	12.86	9.15	3.71	9.04	6.80	2.24	10.16	7.77	2.39	20.55	13.54	7.01
Chemical spraying	2.12	2.10	0.02	1.58	1.58		2.40	2.40		2.41	2.34	0.07
Fertilizer application	6.06	5.92	0.15	5.85	5.85		6.95	6.55	0.40	5.25	5.24	0.02
Chemical spraying	3.36	3.31	0.05	2.92	2.92		3.73	3.73		3.44	3.27	0.17
Harvesting	19.89	14.96	4.93	16.60	13.47	3.13	20.05	14.94	5.11	23.58	16.75	6.83
Hauling	4.37	4.21	0.16	6.39	6.05	0.34	3.92	3.87	0.04	2.56	2.45	0.10
Drying	9.39	7.91	1.48	9.00	7.56	1.45	8.48	7.36	1.12	10.92	8.98	1.94
Bundling	11.83	9.95	1.87	15.16	13.28	1.88	9.96	8.54	1.42	10.14	7.74	2.40
Cleaning of bulbs / Grading / Braiding	16.77	10.71	6.06	19.85	13.04	6.81	17.04	10.51	6.53	12.84	8.23	4.61
Total	153.25	122.70	30.55	153.86	127.90	25.97	150.58	123.17	27.41	155.72	116.03	39.69

Table 23. Average costs and returns of garlic production, **Three Selected Provinces**, 2006

ITEM	PER HECTARE			PER FARM	PER KILOGRAM
	QUANTITY	UNIT	VALUE	(P)	(P)
Production	2,740	kg	191,138	33,537	69.75
Area harvested = 0.175 ha					
Number of farms = 280					
CASH COSTS			**45,676**	**8,014**	**16.67**
Planting materials	69.07	kg	5,514	968	2.01
Fertilizers					
Organic	13.23	kg	56	10	0.02
Inorganic					
Solid	630.39	kg	9,506	1,668	3.47
Liquid	0.18	l	79	14	0.03
Mulching materials	5,510.70	kg	5,782	1,014	2.11
Pesticides					
Solid	2.76	kg	1,322	232	0.48
Liquid	5.20	kg	3,107	545	1.13
Hired Labor	58.99	manday	7,746	1,359	2.83
Land tax			462	81	0.17
Rentals:					
Land			390	68	0.14
Machine			1,349	237	0.49
Animal			30	5	0.01
Tools and equipment			16	3	0.01
Fuel and oil			6,548	1,149	2.39
Transport cost of inputs			633	111	0.23
Interest payment on crop loan			157	28	0.06
Electricity			47	8	0.02
Irrigation fee			74	13	0.03
Red bag			34	6	0.01
Food expense			2,093	367	0.76
Repairs			712	125	0.26
Others a/			17	3	0.01
NON-CASH COSTS			**27,202**	**4,773**	**9.93**
Planting materials					
Own produced	254.09	kg	17,995	3,157	6.57
Received from others	0.19	kg	7	1	b/
Harvesters' share	0.92	kg	69	12	0.03
Other laborers' share	1.89	kg	122	21	0.04
Landowner's share	129.45	kg	8,945	1,570	3.26
Lease rental (palay)	6.31	kg	62	11	0.02
IMPUTED COSTS			**26,090**	**4,578**	**9.52**
Operator Labor	56.60	manday	7,377	1,294	2.69
Family Labor	36.14	manday	4,577	803	1.67
Exchange Labor	1.52	manday	175	31	0.06
Depreciation			5,874	1,031	2.14
Interest on operating capital			5,298	930	1.93
Rental value of owned land			2,789	489	1.02
TOTAL COSTS			**98,968**	**17,365**	**36.12**
GROSS RETURNS			191,138	33,537	69.75
RETURNS ABOVE CASH COSTS			145,463	25,523	53.08
RETURNS ABOVE CASH AND NON-CASH COSTS			118,261	20,750	43.16
NET RETURNS			92,170	16,172	33.64
NET PROFIT-COST RATIO			0.93	0.93	0.93

a/ Include bamboo strips, twine and sacks
b/ Less than 0.01

Table 24. Average variable and fixed costs of garlic production, **Three Selected Provinces**, 2006

(peso)

ITEM	PER HECTARE	PER FARM	PER KILOGRAM
VARIABLE COSTS	**83,936**	**14,727**	**30.63**
Planting materials			
Purchased	5,514	968	2.01
Own produced	17,995	3,157	6.57
Received from others	7	1	a/
Fertilizers			
Organic	56	10	0.02
Inorganic			
Solid	9,506	1,668	3.47
Liquid	79	14	0.03
Mulching materials	5,782	1,014	2.11
Pesticides			
Solid	1,322	232	0.48
Liquid	3,107	545	1.13
Labor			
Hired Labor	7,746	1,359	2.83
Operator labor	7,377	1,294	2.69
Family labor	4,577	803	1.67
Exchange labor	175	31	0.06
Rentals:			
Machine	1,349	237	0.49
Animal	30	5	0.01
Tools and equipment	16	3	0.01
Fuel and oil	6,548	1,149	2.39
Transport cost of inputs	633	111	0.23
Electricity	47	8	0.02
Irrigation	74	13	0.03
Red bag	34	6	0.01
Food expense	2,093	367	0.76
Repairs	712	125	0.26
Harvesters' share	69	12	0.03
Other laborers' share	122	21	0.04
Landowner's share	8,945	1,570	3.26
Others	17	3	0.01
FIXED COSTS	**15,032**	**2,638**	**5.49**
Land tax	462	81	0.17
Lease rental	452	79	0.16
Interest payment on crop loan	157	28	0.06
Depreciation	5,874	1,031	2.14
Interest on operating capital	5,298	930	1.93
Rental value of owned land	2,789	489	1.02
TOTAL COSTS	**98,968**	**17,365**	**36.12**

a/ Less than 0.01

Table 25. Average costs and returns of garlic production, **Ilocos Norte**, 2006

ITEM	PER HECTARE			PER FARM	PER KILOGRAM
	QUANTITY	UNIT	VALUE	(P)	(P)
Production	2,936	kg	202,772	34,682	69.07
Area harvested = 0.171 ha					
Number of farms = 100					
CASH COSTS			**39,351**	**6,731**	**13.40**
Planting materials	29.76	kg	3,145	538	1.07
Fertilizers					
Organic	8.77	kg	45	8	0.02
Inorganic					
Solid	663.10	kg	9,076	1,552	3.09
Liquid	0.35	l	96	17	0.03
Mulching materials	5,587.58	kg	4,227	723	1.44
Pesticides					
Solid	2.26	kg	1,316	225	0.45
Liquid	3.59	kg	2,631	450	0.90
Hired Labor	55.74	manday	8,127	1,390	2.77
Land tax			219	37	0.07
Rentals:					
Land			384	66	0.13
Machine			153	26	0.05
Animal			6	1	b/
Tools and equipment			47	8	0.02
Fuel and oil			6,592	1,128	2.25
Transport cost of inputs			253	43	0.09
Interest payment on crop loan			267	46	0.09
Electricity			124	21	0.04
Irrigation fee			3	1	b/
Red bag			34	6	0.01
Food expense			2,421	414	0.82
Repairs			175	30	0.06
Others a/			8	1	b/
NON-CASH COSTS			**39,332**	**6,727**	**13.40**
Planting materials					
Own produced	250.19	kg	19,327	3,306	6.58
Other laborers' share	3.51	kg	210	36	0.07
Landowner's share	288.56	kg	19,794	3,386	6.74
IMPUTED COSTS			**26,341**	**4,505**	**8.97**
Operator Labor	61.71	manday	8,855	1,514	3.02
Family Labor	34.90	manday	4,874	834	1.66
Exchange Labor	1.51	manday	189	32	0.06
Depreciation			5,670	970	1.93
Interest on operating capital			4,586	784	1.56
Rental value of owned land			2,167	371	0.74
TOTAL COSTS			**105,023**	**17,963**	**35.77**
GROSS RETURNS			202,772	34,682	69.07
RETURNS ABOVE CASH COSTS			163,421	27,952	55.67
RETURNS ABOVE CASH AND NON-CASH COSTS			124,090	21,224	42.27
NET RETURNS			97,749	16,719	33.30
NET PROFIT-COST RATIO			0.93	0.93	0.93

a/ Include bamboo strips and sacks
b/ Less than 0.01

Table 26. Average variable and fixed costs of garlic production, **Ilocos Norte**, 2006

(peso)

ITEM	PER HECTARE	PER FARM	PER KILOGRAM
VARIABLE COSTS	**91,730**	**15,690**	**31.25**
Planting materials			
Purchased	3,145	538	1.07
Own produced	19,327	3,306	6.58
Fertilizers			
Organic	45	8	0.02
Inorganic			
Solid	9,076	1,552	3.09
Liquid	96	17	0.03
Mulching materials	4,227	723	1.44
Pesticides			
Solid	1,316	225	0.45
Liquid	2,631	450	0.90
Labor			
Hired Labor	8,127	1,390	2.77
Operator labor	8,855	1,514	3.02
Family labor	4,874	834	1.66
Exchange labor	189	32	0.06
Rentals:			
Machine	153	26	0.05
Animal	6	1	a/
Tools and equipment	47	8	0.02
Fuel and oil	6,592	1,128	2.25
Transport cost of inputs	253	43	0.09
Electricity	124	21	0.04
Irrigation	3	1	a/
Red bag	34	6	0.01
Food expense	2,421	414	0.82
Repairs	175	30	0.06
Other laborers' share	210	36	0.07
Landowner's share	19,794	3,386	6.74
Others	8	1	a/
FIXED COSTS	**13,293**	**2,274**	**4.53**
Land tax	219	37	0.07
Lease rental	384	66	0.13
Interest payment on crop loan	267	46	0.09
Depreciation	5,670	970	1.93
Interest on operating capital	4,586	784	1.56
Rental value of owned land	2,167	371	0.74
TOTAL COSTS	**105,023**	**17,963**	**35.77**

a/ Less than 0.01

Table 27. Average costs and returns of garlic production, **Ilocos Sur**, 2006

ITEM	PER HECTARE			PER FARM	PER KILOGRAM
	QUANTITY	UNIT	VALUE	(P)	(P)
Production	2,138	kg	155,741	27,161	72.84
Area harvested = 0.174 ha					
Number of farms = 100					
CASH COSTS			**43,643**	**7,611**	**20.41**
Planting materials	49.94	kg	3,752	654	1.75
Fertilizers					
Inorganic	463.21	kg	6,847	1,194	3.20
Mulching materials	9,104.07	kg	10,297	1,796	4.82
Pesticides					
Solid	1.52	kg	844	147	0.39
Liquid	3.35	kg	2,436	425	1.14
Hired Labor	54.19	manday	7,224	1,260	3.38
Land tax			497	87	0.23
Rentals:					
Land			485	85	0.23
Machine			20	4	0.01
Animal			21	4	0.01
Fuel and oil			8,244	1,438	3.86
Transport cost of inputs			221	39	0.10
Interest payment on crop loan			10	2	b/
Food expense			1,548	270	0.72
Repairs			1,157	202	0.54
Others a/			40	7	0.02
NON-CASH COSTS			**23,902**	**4,168**	**11.18**
Planting materials					
Own produced	257.05	kg	18,180	3,171	8.50
Landowner's share	80.45	kg	5,722	998	2.68
IMPUTED COSTS			**27,090**	**4,725**	**12.67**
Operator Labor	58.60	manday	7,589	1,323	3.55
Family Labor	37.11	manday	4,800	837	2.25
Exchange Labor	0.69	manday	69	12	0.03
Depreciation			5,248	915	2.45
Interest on operating capital			5,024	876	2.35
Rental value of owned land			4,361	760	2.04
TOTAL COSTS			**94,635**	**16,504**	**44.26**
GROSS RETURNS			155,741	27,161	72.84
RETURNS ABOVE CASH COSTS			112,098	19,550	52.43
RETURNS ABOVE CASH AND NON-CASH COSTS			88,196	15,381	41.25
NET RETURNS			61,106	10,657	28.58
NET PROFIT-COST RATIO			0.65	0.65	0.65

a/ Includes bamboo strips
b/ Less than 0.01

Table 28. Average variable and fixed costs of garlic production, **Ilocos Sur**, 2006

(peso)

ITEM	PER HECTARE	PER FARM	PER KILOGRAM
VARIABLE COSTS	**79,010**	**13,779**	**36.95**
Planting materials			
Purchased	3,752	654	1.75
Own produced	18,180	3,171	8.50
Fertilizers			
Inorganic			
Solid	6,847	1,194	3.20
Mulching materials	10,297	1,796	4.82
Pesticides			
Solid	844	147	0.39
Liquid	2,436	425	1.14
Labor			
Hired Labor	7,224	1,260	3.38
Operator labor	7,589	1,323	3.55
Family labor	4,800	837	2.25
Exchange labor	69	12	0.03
Rentals:			
Machine	20	4	0.01
Animal	21	4	0.01
Fuel and oil	8,244	1,438	3.86
Transport cost of inputs	221	39	0.10
Food expense	1,548	270	0.72
Repairs	1,157	202	0.54
Landowner's share	5,722	998	2.68
Others	40	7	0.02
FIXED COSTS	**15,625**	**2,725**	**7.31**
Land tax	497	87	0.23
Lease rental	485	85	0.23
Interest payment on crop loan	10	2	a/
Depreciation	5,248	915	2.45
Interest on operating capital	5,024	876	2.35
Rental value of owned land	4,361	760	2.04
TOTAL COSTS	**94,635**	**16,504**	**44.26**

a/ Less than 0.01

Table 29. Average costs and returns of garlic production, **Nueva Ecija**, 2006

ITEM	PER HECTARE			PER FARM	PER KILOGRAM
	QUANTITY	UNIT	VALUE	(P)	(P)
Production	3,231	kg	219,821	40,076	68.03
Area harvested = 0.182 ha					
Number of farms = 80					
CASH COSTS			**55,524**	**10,123**	**17.18**
Planting materials	138.04	kg	10,400	1,896	3.22
Fertilizers					
Organic	34.28	kg	137	25	0.04
Inorganic					
Solid	791.94	kg	13,191	2,405	4.08
Liquid	0.19	l	152	28	0.05
Mulching materials	1,123.76	kg	2,206	402	0.68
Pesticides					
Solid	4.81	kg	1,901	347	0.59
Liquid	9.32	kg	4,467	814	1.38
Hired Labor	68.54	manday	7,923	1,444	2.45
Land tax			706	129	0.22
Rentals:					
Land			284	52	0.09
Machine			4,340	791	1.34
Animal			69	13	0.02
Fuel and oil			4,469	815	1.38
Transport cost of inputs			1,572	287	0.49
Interest payment on crop loan			203	37	0.06
Electricity			12	2	b/
Irrigation fee			247	45	0.08
Red bag			75	14	0.02
Food expense			2,359	430	0.73
Repairs			810	148	0.25
Others a/			1	b/	b/
NON-CASH COSTS			**16,922**	**3,085**	**5.24**
Planting materials					
Own produced	255.12	kg	16,213	2,956	5.02
Received from others	0.63	kg	25	5	0.01
Harvesters' share	3.09	kg	233	43	0.07
Other laborers' share	2.26	kg	165	30	0.05
Landowner's share	1.44	kg	77	14	0.02
Lease rental (palay)	21.25	kg	209	38	0.06
IMPUTED COSTS			**24,601**	**4,485**	**7.61**
Operator Labor	48.22	manday	5,390	983	1.67
Family Labor	36.44	manday	3,962	722	1.23
Exchange Labor	2.53	manday	287	52	0.09
Depreciation			6,861	1,251	2.12
Interest on operating capital			6,460	1,178	2.00
Rental value of owned land			1,640	299	0.51
TOTAL COSTS			**97,047**	**17,693**	**30.03**
GROSS RETURNS			219,821	40,076	68.03
RETURNS ABOVE CASH COSTS			164,298	29,954	50.85
RETURNS ABOVE CASH AND NON-CASH COSTS			147,375	26,868	45.61
NET RETURNS			122,774	22,383	38.00
NET PROFIT-COST RATIO			1.27	1.27	1.27

a/ Includes twine
b/ Less than 0.01

Table 30. Average variable and fixed costs of garlic production, **Nueva Ecija**, 2006

(peso)

ITEM	PER HECTARE	PER FARM	PER KILOGRAM
VARIABLE COSTS	**80,684**	**14,710**	**24.97**
Planting materials			
Purchased	10,400	1,896	3.22
Own produced	16,213	2,956	5.02
Received from others	25	5	0.01
Fertilizers			
Organic	137	25	0.04
Inorganic			
Solid	13,191	2,405	4.08
Liquid	152	28	0.05
Mulching materials	2,206	402	0.68
Pesticides			
Solid	1,901	347	0.59
Liquid	4,467	814	1.38
Labor			
Hired Labor	7,923	1,444	2.45
Operator labor	5,390	983	1.67
Family labor	3,962	722	1.23
Exchange labor	287	52	0.09
Rentals:			
Machine	4,340	791	1.34
Animal	69	13	0.02
Fuel and oil	4,469	815	1.38
Transport cost of inputs	1,572	287	0.49
Electricity	12	2	a/
Irrigation	247	45	0.08
Red bag	75	14	0.02
Food expense	2,359	430	0.73
Repairs	810	148	0.25
Harvesters' share	233	43	0.07
Other laborers' share	165	30	0.05
Landowner's share	77	14	0.02
Others	1	a/	a/
FIXED COSTS	**16,363**	**2,983**	**5.06**
Land tax	706	129	0.22
Lease rental	493	90	0.15
Interest payment on crop loan	203	37	0.06
Depreciation	6,861	1,251	2.12
Interest on operating capital	6,460	1,178	2.00
Rental value of owned land	1,640	299	0.51
TOTAL COSTS	**97,047**	**17,693**	**30.03**

a/ Less than 0.01

Table 31. Average costs and returns of garlic production per hectare by major cost item, selected provinces, Philippines, 2006

(peso)

ITEM	ILOCOS NORTE	ILOCOS SUR	NUEVA ECIJA
Cash costs	39,351	43,643	55,524
Non-cash costs	39,332	23,902	16,922
Imputed costs	26,341	27,090	24,601
Total costs	105,023	94,635	97,047
Average yield (kg / ha)	2,936	2,138	3,231
Gross returns	202,772	155,741	219,821
Returns above cash costs	163,421	112,098	164,298
Returns above cash and non-cash costs	124,090	88,196	147,375
Net returns	97,749	61,106	122,774
Net profit-cost ratio	0.93	0.65	1.27
Cost per kilogram	35.77	44.26	30.03

Table 32. Percentage distribution of garlic produce by disposition item, selected provinces, Philippines, 2006

DISPOSITION ITEM	ALL 3 PROVINCES	ILOCOS NORTE	ILOCOS SUR	NUEVA ECIJA
Sold/ To be Sold	81.56	74.53	79.23	90.74
Harvester's Share	0.03			0.09
Other Laborers' Share	0.07	0.12		0.07
Landowner's Share	4.70	9.83	3.76	0.04
For Home Consumption	0.97	0.75	0.75	1.38
To be used for seeds	11.29	12.69	15.01	6.93
Given Away	1.16	1.58	1.25	0.66
Wastage	0.22	0.50		0.09

Table 33. Percentage of garlic farmers reporting problems on production, selected provinces, Philippines, 2006

PRODUCTION PROBLEM	ALL 3 PROVINCES	ILOCOS NORTE	ILOCOS SUR	NUEVA ECIJA
Pests and diseases	41.79	56.00	51.00	12.50
High cost of seeds	25.36	12.00	13.00	57.50
High cost of fertilizer	81.07	90.00	83.00	67.50
High cost of other inputs a/	16.43	33.00	12.00	1.25
Bad weather / Natural calamities	31.79	45.00		55.00
Lack of capital	24.29	38.00	8.00	27.50
Poor road condition	6.43	4.00		17.50
Inadequate transport facilities	0.36	1.00		
Lack of water / Problems on irrigation	0.36	1.00		
Poor soil condition	13.57	37.00	1.00	
Low quality of seeds	8.93	12.00	8.00	6.25
Unavailability of seeds	14.64	23.00	1.00	21.25
Others b/	3.21	6.00	2.00	1.25

a/ Include chemicals, electricity, fuel, gasoline, herbicide, insecticide, labor and transport cost

b/ Include poor/decayed garlic upon harvest, seeds shrink and no technical assistance

Table 34. Percentage of garlic farmers reporting on major buyer of produce, selected provinces, Philippines, 2006

PROVINCE	AGENT	WHOLESALER	RETAILER	WHOLESALER-RETAILER	CONSUMER	PROCESSOR
All 3 Provinces	25.00	17.50	29.64	29.64	2.50	0.71
Ilocos Norte	23.00	23.00	13.00	40.00	5.00	2.00
Ilocos Sur	12.00	13.00	55.00	21.00		
Nueva Ecija	43.75	16.25	18.75	27.50	2.50	

Table 35. Perceived average right price of garlic and percentage of farmers reporting by price range, selected provinces, Philippines, 2006

PROVINCE	AVERAGE PRICE PER KILOGRAM	PRICE RANGE (peso / kg)						
		40 - 50	51 - 60	61 - 70	71 - 80	81 - 90	91 - 100	101 and above
All 3 Provinces	109.91	1.43	1.43	7.50	7.86	10.71	26.79	41.07
Ilocos Norte	104.95	4.00		11.00	13.00	9.00	33.00	30.00
Ilocos Sur	120.94		2.00	2.00	3.00	12.00	25.00	52.00
Nueva Ecija	102.40		2.50	10.00	7.50	11.25	21.25	41.25

Table 36. Percentage of garlic farmers reporting problems on marketing of produce, selected provinces, Philippines, 2006

PROVINCE	LIMITED BUYER / MARKET OUTLET	COMPETITION WITH IMPORTED SUPPLY IN THE MARKET	UNSTABLE PRICE	LOW PRICE	POOR MARKET FACILITIES
All 3 Provinces	18.93	54.29	40.71	75.00	1.07
Ilocos Norte	14.00	38.00	72.00	72.00	1.00
Ilocos Sur	1.00	71.00	25.00	89.00	
Nueva Ecija	47.50	53.75	21.25	61.25	2.50

Table 37. Percentage of garlic farmers that availed loans for garlic production by source, selected provinces, Philippines, 2006

PROVINCE	COOPERATIVE	PRIVATE INDIVIDUAL	MONEY SHOP
All 3 Provinces	0.36	5.00	0.36
Ilocos Norte	1.00	5.00	
Ilocos Sur		2.00	1.00
Nueva Ecija		8.75	

Table 38. Percentage of garlic farmers that consulted/used advice of government and private extension agents, selected provinces, Philippines, 2006

PROVINCE	GOVERNMENT EXTENSION AGENTS	PRIVATE EXTENSION AGENTS
All 3 Provinces	13.21	10.36
Ilocos Norte	21.00	12.00
Ilocos Sur		
Nueva Ecija	20.00	21.25

Table 39. Percentage distribution of garlic farmers by future plan in garlic operation, selected provinces, Philippines, 2006

PROVINCE	MAINTAIN CURRENT OPERATION	EXPAND OPERATION	STOP OPERATION
All 3 Provinces	53.21	38.93	7.86
Ilocos Norte	58.00	30.00	12.00
Ilocos Sur	41.00	59.00	
Nueva Ecija	62.50	25.00	12.50

Table 40. Percentage of garlic farmers reporting on the recommendations for further improvement of the garlic industry, selected provinces, Philippines, 2006

PROVINCE	GOVERNMENT PRICE SUPPORT/ HIGHER PRICE OF PRODUCE	STOP IMPORTATION OF GARLIC	LOWER THE COST OF INPUTS	CONDUCT SEMINAR TO FARMERS	IMPROVE QUALITY OF SEED	OTHERS a/
All 3 Provinces	42.86	19.64	16.07	12.86	6.79	11.43
Ilocos Norte	53.00	24.00	26.00	6.00	9.00	16.00
Ilocos Sur	53.00	22.00	12.00	18.00	1.00	5.00
Nueva Ecija	17.50	11.25	8.75	15.00	11.25	13.75

a/ Include provision of credit assistance, irrigation, market assistance and input subsidy

ANNEXES

Annex Table 1. Average quantity applied per hectare of garlic farm by fertilizer users, selected provinces, Philippines, 2006

FERTILIZER	ALL 3 PROVINCES	ILOCOS NORTE	ILOCOS SUR	NUEVA ECIJA
Solid Fertilizer (kg)				
Organic Fertilizer a/	13.23	8.77		34.28
Inorganic Fertilizer	630.39	663.10	463.21	791.94
Urea (45-0-0)	28.14	4.82	63.07	13.71
Urea (46-0-0)	141.76	153.74	121.56	151.87
Ammonium Sulfate (21-0-0)	109.35	223.66	60.03	34.28
Ammonium Phosphate (16-20-0)	44.82	66.77	10.03	60.68
Complete (14-14-14)	299.07	206.97	201.43	523.83
Complete (16-16-16)	3.52	6.43	3.61	
Complete (15-15-15)	1.34	0.15	0.68	3.53
Complete (19-19-19)	1.05	0.12	1.29	1.85
Muriate of Potash (0-0-60)	0.07	0.15		0.07
Others b/	1.26	0.30	1.49	2.13
Liquid Fertilizer (l)				
Inorganic Fertilizer	5.09	5.31		4.69
Green Bee	1.16	1.77		
Foliar (15-15-30)	0.58	0.88		
Micro	0.58	0.88		
Super Fast	1.16	1.77		
Atonik	1.63			4.69

a/ Include processed chicken manure and sagana (3.5-3.5-3.5)

b/ Include crop giant (15-15-30), di-ammonium phosphate (18-46-0), foliar, improve (15-15-30) and MRG

Annex Table 2. Average quantity of nutrients applied per hectare of garlic farm by fertilizer users, selected provinces, Philippines, 2006

ITEM / PROVINCE	NITROGEN (N)	PHOSPHOROUS (P)	POTASSIUM (K)
Solid fertilizer (kg)			
All 3 Provinces	151.400	43.534	43.453
Ilocos Norte	160.634	30.093	30.225
Ilocos Sur	127.897	29.786	29.126
Nueva Ecija	168.674	75.736	76.096
Liquid fertilizer (l)			
All 3 Provinces	0.087	0.087	0.173
Ilocos Norte	0.133	0.133	0.265
Ilocos Sur			
Nueva Ecija			

Annex Table 3. Average quantity applied per hectare of garlic farm by pesticide users, selected provinces, Philippines 2006

PROVINCE	HERBICIDE / WEEDICIDE	INSECTICIDE		FUNGICIDE	
	LIQUID (l)	SOLID (kg)	LIQUID (l)	SOLID (kg)	LIQUID (l)
All 3 Provinces	3.50	1.55	1.82	2.04	0.02
Ilocos Norte	2.74	0.96	1.08	2.50	
Ilocos Sur	2.16	0.07	1.19	1.66	
Nueva Ecija	5.98	4.10	3.42	2.08	0.05