AGRICULTURE RECONSTRUCTION AND DEVELOPMENT PROGRAM FOR IRAQ

POULTRY FARM SURVEY 2005, SULEIMANIYA

FINAL REPORT

POULTRY FARM SURVEY SULEIMANIYA

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Prepared by
Edgar Ariza-Nino
Habib Franci Qiji

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Foreword

In line with the program to strengthen the capacity of the agricultural sector in Iraq, the ARDI program carried out a rapid assessment sample survey of poultry farms during January 2005 in three northern governorates (Dohuk, Arbil and Suleimaniya). The survey aimed to assess the conditions of poultry farm (meat production, mortality, feed conversion) and additional support required by the sector in future. The first report presents a detailed analysis for Suleimaniya governorate. We hope the report will provide useful basic data for planning and development purposes.

With Best Regards,

Jane Gleason
Chief of Party
Agriculture Reconstruction and
   Development Program for Iraq

Poultry Farm Survey, 2004
Suleimaniya

Highlights – Executive Summary

- There are 244 licensed commercial broiler farms in Suleimaniya. The median farm is built to hold 10,000 birds; half of the farms have less than and the other half more than that size. A few farms have several times that size.

- Broiler production in Suleimaniya is entirely in the hands of private sector commercial operations in a highly competitive market. Nearly all (60 out of 62) farms in the sample are individual enterprises; one was a partnership, one a cooperative society. There were no companies.

- Two of the 62 sample farms (3.2 percent) have been out of operation for over two years. The roster of registered broiler farms needs periodic updating.

- Two thirds of the sample farms began operation after 1996, the year when the Food and Agriculture Organization began promoting poultry production under the Oil-for-Food program of the United Nations.

- Median production capacity among sample farms was estimated at 51,000 birds per year, on the assumption that five batches can be produced in one year per chicken coop. The largest sample farm has capacity to produce 270,000 birds per year.

- Poultry farmers are operating at less than half of their installed production capacity. A large gap exists between the potential production capacity of sample poultry farms and their actual production (sales) reported for 2004.

- The median farm sold 28,000 birds in 2004, compared with a median capacity of 51,000 birds per year. The pattern of bird sales approximated the bell-shape normal distribution curve. The mean value for 2004 sales was 30,599 birds.

- Mean percentage of capacity utilization among sample farms is 48.4 percent, and the median farm 52.8 percent. Most farms operate at between 50 to 75 percent of their capacity, but there are also a few working at less than 20 percent of production capacity. There is existing installed production capacity in Suleimaniya to double production with little additional investment.

- Only five out 62 sample farms (8 percent) were able to produce five batches in 2004. The remaining 92 percent only produced four or fewer batches. Seven sample farms sold only one batch in 2004. This low number of batches accounts for great part of the low utilization ratio.

- Broiler producers prefer to stop production in the extreme heat months in summer (July and August) and extreme cold months in winter (December and January).

These weather related stoppages account in great part for the low number of batches per year.

- Climate control is a major stumbling block on poultry production. The risk of high mortality from extreme cold or heat and the high cost of climatic controls discourage poultry farmers from operating year-round. Chicken houses are poorly insulated and manual temperature controls are unreliable.

- High bird mortality is the other factor resulting in low capacity utilization rate. The combined effects of few batches per year and low numbers of birds sold per batch result in low capacity utilization and financial losses for farmers.

- Half of the sample farms had mortality rates below the median 16.8 percent, and the other half were above that. Only one quarter of the farms have mortality rates below 10 percent. Mortality rates were reported only for the last batch of birds sold from the sample farms.

- Over eighty percent of the sample farms vaccinate against chicken (fowl) pox, Newcastle and Gomboro, and 67 percent vaccinate against IB (infectious bronchitis). But only few farms report using CRD and IBD vaccines or treatment against Coccidiosis. Farmers complain of the quality of the vaccines and veterinary medicines available in the market and lack of diagnostic laboratories to determine cause of death. Diagnosis is a critical challenge for the poultry industry.

- Cobb is the predominant breed used for broiler production in Suleimaniya (42 percent of farms), followed closely by Ross (32 percent of farms). An additional 16 percent of farms use both interchangeably. Suleimaniya's proximity to the border gives a few poultry farmers access to breeds available in Iran such as Aryan and Hybro.

- The Ross breed seems to have a slight but statistically not significant lower mortality rate – 18.3 percent – over the more popular Cobb breed – 21.5 percent; however, in view of the small number of farms in each group (26 and 24 farms respectively) no firm conclusion is possible. The lowest mortality was found in three farms using Aryan chicks (11.3 percent); the highest in one farm using Hybro (25.6 percent).

- Farms built after 1996 have mortality rates of 19 percent while in farms built before 1980 it reaches 30 percent, and for those built in 1986-90 the mortality rate is 25 percent. This suggests that mortality among newer farms is lower than in older farms.

- The main ingredients in the diet are wheat, soybean meal, protein premix, vegetable oil, and yellow maize. Other items include vitamins, mineral and veterinary supplements, and calcium. Only one sample farm uses pre-mixed rations directly; all others mix feed ingredients on farm.

- Wheat constitutes the bulk of the ration, contributing over half of the weight of starter ration and two-thirds of finishing rations. Locally produced wheat is widely and

cheaply available. The Government monthly food ration includes 9 kilos per person of free flour, mostly from imported wheat; there is no other market for local wheat apart from the little Government buys. Poultry and animal feed are the main consumers for local wheat.

- Imported soybean meal is the main source of protein in chicken diet, and it represents 30 percent of starter rations, and 20 percent of finishing rations. Most of it comes from Syria. Farmers often complain of poor quality from improper processing.

- Yellow maize is used by only a few farmers, and mainly in starter rations. Maize is nearly all imported from overseas and its higher price reflects sea and over land transport costs. It accounts for only about 5 percent of overall poultry feed.

- Neither sorghum nor barley is used in poultry rations; sorghum because is not known in the region; barley is cheap and available but farmers claim it hurts chicks when they eat it.

- Farmers add up to 40 kilograms of vegetable oil from the food ration distribution system to poultry rations as a cheap source of energy. Many families sell their cooking oil allowance in the secondary market.

- Except for domestic wheat, all other poultry feed ingredients are imported, including soybean meal, vegetable cooking oil, yellow maize, and high-protein and health supplements.

- Average cost of local market wheat is 219 dinars per kilo ($0.15/kg), compared with 544 dinars/kg ($0.38/kg) for soybean meal, 662 dinars/kg ($0.46/kg) for cooking oil, 370 dinars/kg ($0.26/kg) for yellow maize, and 1,284 dinars/kg ($0.86/kg) for pre-mixed high protein supplements.

- Wheat constitutes 58 percent of the weight but only accounts for 32 percent of the cost of an average ration, while soybeans account for 35 percent of the cost but only 26 percent of the weight. Protein supplements represent 18 percent of the cost, but only 5.5 percent of the weight. Vegetable oil and maize represent each about 5 percent of costs, but oil only 3 percent and maize 6 percent of weight.

- The average feed ration costs 398 dinars per kilogram, but starter rations average 418 and finishing rations 376. By contrast, ready to eat pre-mixed ration cost 450 dinars per kilo.

- The average feed conversion ratio estimated for the sample farms was 2.3. That is, it takes 2.3 kilos of feed ration to produce one kilo of live weight. A wide range of ratios was found, but three quarters of farms have rations between 2 and 2.6. The average cost of feed per bird sold amounts to 1,914 dinars.

- The estimated average price per kilogram of live weight reported was near 1,650 dinars. Birds are sold when they reach 2.25 kilograms at 50 to 55 days of age on

average, but some farmers keep birds a few days longer and get slightly higher prices.

- The median value for margin over feed and chick costs is 574 dinars per kilogram live weight. This value represent 35 percent margin of the average sale price received of 1,650 dinars per kilogram of live weight.

- Sixteen percent of farms do not make positive margins over variable costs, that is, the costs of feed, chicks, and other variable costs exceed the price received per kilogram live weight when birds are sold. The median margin over variable costs is 383 dinars per kilogram live weight, and the mean value only 283 dinars.

- There is a clear relationship between higher mortality rates and lower margins over variable costs, but the association is not as strong as expected.

- Feed conversion ratios are the main factor responsible for affecting profit margins. Fifty seven percent of the variation observed in margins over variable costs among sample farms can be attributed to the joint effect of higher feed conversion ratios and higher mortality. An increase of 0.1 in the conversion ratio reduces the margins by 73 dinars per kilogram of live weight. Similarly, an increase of 1 percent in mortality leads to a loss of 4 dinars per kilogram live weight.

- Accurate monitoring of feed consumption and feed conversion ratios can serve as critical indicators of the economic performance of poultry farms.

Poultry Farm Survey, 2005
Suleimaniya

Objectives

This survey of poultry farms aims to fulfill several objectives:
- To obtain reliable data concerning the conditions of commercial poultry sector activities including current practices, profitability, mortality, feed conversion efficiency, and to identify major problems faced by farmers;
- To evaluate the size of the poultry sector in the region and its impact on farm income and as a market for production inputs;
- To provide the private and public sector with basic information on which to base policy and investment decisions; and
- To strengthen the capacity of the Ministry of Agriculture to carry out similar statistical surveys, and carry out the appropriate analyses.

Main Findings

Location of poultry farms

There are 244 commercial poultry farms licensed by the Department of Veterinary and Animal Resources of the Ministry of Agriculture in Suleimaniya. This survey is only concerned with broiler producing farms. In each governorate there is one large company producing table eggs but they are not included in the survey; a separate study on egg production is contemplated for the future. Broiler farms are located throughout the governorate but with a higher concentration of farms in the districts closer to major urban centers and near the main roads.

Farm size of registered farms

Figure 1 shows a frequency distribution diagram of the registered farms according to farm size, that is, the number of birds that it can hold at a time given the installed housing capacity. The median farm has capacity to house 10,090 birds at a time; half of the farms have less and half have more than 10,090 birds. A few farms have several times that capacity. For sampling purposes we divided farms into five size groups and for each group we selected randomly one fourth of the farms. A total of 62 farms were thus selected for interview; the number of samples was rounded up for each category.

Basic Facilities

Poultry farms are simple rectangular cinder block structures with a solid concrete floor and roof supported by columns. Although all of them are connected to the electrical network, farmers need to have one or two generators ready to provide power because the supply of electricity is sporadic and uncertain. Water usually comes from a deep well next to the farm. For animal health purposes, most farms are built some distance away from human habitation, but a small house for the caretaker family is usually placed right next to the coops.

Ownership of Farms

All farms are private enterprises and nearly all are individual holdings in the name of one farmer. Only one farm in the sample of 62 was reported as a cooperative society and another as a partnership. Broiler production in Suleimaniya is entirely in the hands of private sector commercial operations in a highly competitive market. (See Table 1). Half of the sample farms have installed capacity for less than 10,000 birds, and 20 of the remaining 31 have an installed capacity of between 10,000 and 20,000 birds. Only 11 farms in the sample had capacity of over 20,000 birds at a time. (See Table 2).

Two out of the 62 sample farms (3.2 percent) had been out of operation for over two years and are therefore selectively included or excluded in subsequent calculations derived from the survey, depending on the context. The roster of licensed farms needs to be periodically updated to remove farms that go out of business for some time.

Half of the farms (29 of 60) were operated by the owner themselves and eleven farms were operated by farmers renting the facilities from the owner. Hired managers were running three farms, and relatives of the owner were running seven farms, but the relationship of the operators of the remaining twelve farms in the sample was undefined. (See Table 1 and Table 3).

When were farms built?

The oldest farm in the sample dates back to 1977. Figure 2 depicts the number of sample farms built in each year since 1977. A significant increase increased occurred between 1986 and 1990, a period when many government farms were privatized and sold to individual entrepreneurs. Only two farms were built between 1991 and 1997, the years when Iraq was subject to the trade embargo imposed by the United Nations. Starting in 1998 we see a major increase in the number of farms; half of the farms in the sample (31 out of 62) were built in that period. This period corresponds to the beginning of the United Nations Oil-for-Food program in which the Food and Agriculture Organization (FAO) initiated a major campaign in the three northern governorates of Arbil, Suleimaniyah and Dahuk to increase poultry meat production as a way to provide a source of animal protein intake to the population.

A lag of one to two years might elapse between the time when the farm is built and when it begins operation. Figure 3 and Table 4 provide a breakdown of the sample farms according to the period when they were built and started operations. Two thirds (65 percent) of the sample farms started operations after 1995.

Production capacity

There is a close correspondence between the built capacity recorded in the roster of licensed broiler farms with the Ministry of Agriculture and the capacity reported by sample farms. In only one farm was the reported capacity double that recorded in the license. Figure 4 shows the distribution of sample farms according their declared production capacity. Production capacity per year is here defined as five times the housing capacity of the farm, on the assumption that it is possible to produce five batches of broilers per year in

a single chicken coop. Median production capacity among sample farms is 51,000 birds per year, which means that half of farms have higher and half of farms lower production capacities. Mean production capacity is 64,827 birds per year, higher than the median, because there are a few farms with production capacity several times higher than most others. The median is used often in this report because it reflects better the conditions of most farmers.

Figure 5 shows the estimated production capacity for each sample farm. The top half of farms has production capacity under 50,000 birds per year, except one farm, because they correspond to the first group of smaller farms. Two blank lines correspond to the two farms that were out of business for over two years. Production capacity for the bottom half of farms are sorted by sample group. The largest sample farm has production capacity for 270,000 birds per year.

Utilization of productive capacity

Poultry farmers are operating at less than half of their installed production capacity. A large difference exists between the potential production capacity of sample poultry farms and their actual production reported for 2004. Actual production is the reported number of birds sold in 2004. Production capacity is based on the assumption that a farmer can produce five flocks of birds during one year in the same coop. This allows 73 days per batch, and most batches are sold at 50-55 days of age, which leaves 21 days (three weeks) for cleaning and disinfecting the facility and getting it ready for a new batch of day-old-chicks. The assumption of five batches per year is a conservative one, allowing for a long growing period and plenty of idle time between batches.

Actual sales of broilers during 2004 for each sample farm are shown in Figure 6, and a histogram of their frequency distribution is shown in Figure 7. Actual production and sales among sample farms exhibit far greater variation than their installed capacities, as can be appreciated in both graphs, and the overall distribution pattern approximates the bell-shape of a normal distribution curve. The median farm sold 28,000 birds in 2004, roughly half the median production capacity of 51,000 birds per year. The largest farm sold 82,000 birds in 2004 and the smallest sale was only 3,700 birds. Seven farms out of the sample of 62 report sales of 60,000 birds or more. The mean value for 2004 sales was 30,599 birds with a standard error of 2,564, which implies a 95% confidence interval for the mean of plus or minus 17 percent.

The gap between the potential production and actual sales is shown graphically in Figure 8 for each sample farm as a percentage of capacity utilization; Figure 9 shows the frequency distribution of those percentages. Over half (36 out of 62) of the farms operate between 50 and 75 percent of capacity, but there are also a few (9 of them) operating at less than 20 percent of the production capacity. The median utilization is 52.8 percent and the mean 48 percent. This means that there is at present in Suleimaniya sufficient installed capacity to increase broiler production by 100 percent with little or no additional investment.

Batches of birds per year

One of the main reasons for the low capacity utilization ratio is that sample farms rarely process the expected five batches of chickens per year. Figure 10 shows how many

batches were produced by sample farms in 2004. Only five farms (out of 62) were able to produce five batches, and none more than that. Thirty farms out of the 62 in the sample produced 4 batches; 15 farms produced three batches, and the remaining 10 even fewer. Two sample farms were out of business in 2004. This low number of batches processed per year explains in large part why capacity utilization ratios are so low.

Environmental factors are the main reason why sample farmers do not make continuous use of the chicken coops throughout the year. Farmers were asked in which months, if any, they suspended operations at their farms. Figure 20 shows how many of the sample farms stopped work in each month of the year. There are two obvious peaks, one for July-August; another one for December-January. Clearly, most broiler producers prefer to avoid production during the months of extreme heat in summer and extreme cold in winter. About two thirds of sample farms were not operating at the time of the survey. These weather related stoppages account for the low number of batches of chickens per year.

Climate control is a major stumbling block in poultry production. The physical structures used are poorly insulated and therefore subject to the extreme temperature variations typical of northern Iraq. During summer, large window opening along the walls are used to force air through water soaked straw mats for cooling. During the winter, gas heaters are needed to warm the air inside and those large windows must be sealed to prevent heat loss. The risk of high mortality from extreme heat or cold and the high cost of climatic controls discourage most farmers from operating year round. At least one unfortunate sample farmer had recently suffered the loss of a large number of birds from heat stress when in the middle of winter the climate control system malfunctioned and the attendant did not realize it in time to save the birds. Automatic air conditioning systems are not used because they are expensive and subject to breakdowns due to the poor electricity supply, and manual control systems are unreliable.

Mortality

Another major cause of the low utilization ration of production capacity is the incidence of mortality. Production capacity estimates are based on the number of birds that can be processed in a batch in a given space. High mortality reduces the final number of birds sold from each batch. The combined effects of a few batches per year and low number of birds per batch result in an overall utilization rate of about 50 percent among sample farms.

Figure 12 shows the distribution of sample farms according to the mortality rate reported. The mortality data obtained was for the last batch sold from the farm, whether the farm was operating at the time of the visit or not. Two thirds of the farms have mortality rates between 5 and 20 percent, but a large remaining percentage (35 percent) suffers mortality rates between 20 and 50 percent. Only one quarter (23.3 percent) of the farms had mortality rates of 10 percent or below. Half of the farms have morality below the median of 16.7 percent, and the other half above that rate. The average mortality among sample farms was 18.7 percent.

Vaccinations

Broiler farmers are highly aware of the need to vaccinate their chickens against contagious diseases. One hundred percent of them vaccinate against chicken (fowl) pox, and 85

percent of farms against both Newcastle and Gomboro. Only about two thirds of the sample farms vaccinate against IB (infectious bronchitis). By contrast, only few farms report using CRD and IBD vaccines or treatment against Coccidiosis. (See Figure 13 and Table 5). Farmers complain in informal conversations about the quality of the vaccines and veterinary medicines available in the market, their high price and low effectiveness. They also report not knowing what accounts for the death of many of their birds and the lack of easily accessible diagnostic laboratories to determine cause of death. Determining the cause of high mortality is one of the most difficult challenges for the poultry sector.

Breeds of day-old-chicks

Broiler producers in Suleimaniya have several options regarding the breed of chickens to use. The most popular breed is Cobb, used by 42 percent of the farms (see Figure 14 and Table 6). Ross is the second most popular with 32 percent of the market. Sixteen percent of the farms report using both Ross and Cobb at different times. Aryan, a breed of day-old-chicks from Iran, accounts for five percent of the farms and imported Hybro chicks for two percent. A couple of farms did not recall the breed of chicks used. Cobb day-old-chicks are mainly from Dr. Mohsin's hatchery in Arbil, but also from another hatchery in Dohuk; Ross chicks are also purchased from the egg poultry company in Arbil. Suleimaniya's proximity to the border gives them easy access to the breeding material available in Iran. There is no hatchery in Suleimaniya for day-old-chicks; all baby chicks are imported from elsewhere and that might contribute to high mortality. Farmers believe that some of the diseases are brought in with the chicks themselves, but this is not confirmed.

Larger poultry farms appear to have a slight advantage over smaller farms in having lower mortality rates. Figure 15 shows that smaller farms with sales less than 23,000 birds in 2004 had mortality rates of 20.9 percent while farms with sales over 35,000 birds in 2004 had 19.2 percent, and farms with sales in between had 20.2 percent mortality. The differences are not sufficiently significant but suggest minor economies of scale advantage.

Mortality and breeds

Differences in mortality rates between breeds of chicks seem slightly more significant. Figure 16 and Table 7 compare the mortality rate among the 26 farms using Cobb (21.5 percent) while in the 24 farms using Ross, the mortality rate was 18.3 percent. Among the six farms using both breeds interchangeably an intermediate mortality of 21.3 percent was found. Given the small number of farms in each category of farms, these slight differences are not considered statistically significant. The lowest mortality rate – 11.8 percent -- was found among the three farms using Aryan chicks, and the highest mortality – 25.6 percent – was suffered by the one farm using the Hybro breed. Again, in view of the small number of observations we cannot draw firm conclusions regarding the relationship between breeds and mortality.

A more suggestive pattern is discernible in the relationship between mortality and age of the farms. In the five farms dating back before 1980 mortality reaches 30 percent and in the 16 farms built in 1986-90 the rate is 25 percent. By contrast, the 31 farms built after 1996 have average mortality rate of 19 percent. See Figure 17 and Table 8. Once again, no rigorous test has been made, but given the slight differences and the small number of observations at hand, it is unlikely that these differences in mortality are statistically significant.

Composition of poultry feed rations

Poultry farmers recognize three distinct growth stages in broilers, each with its own nutritional, health and environmental requirements. The total life cycle of a broiler ranges between 50 and 55 days. A starter stage takes day-old-chicks through the first two weeks, followed by a rapid growth stage and a finishing stage. For optimal health and growth, farmers need to adjust the feed rations to the requirements of each growth stage. For convenience we refer to rations A for starting, ration B for growth, and ration C for finishing. Figure 18 and Table 9 show how the composition of these three rations changes in terms of the quantities of different ingredients. The main ration ingredients are wheat, soybean meal, yellow maize, vegetable oil, high protein pre-mixed supplements and calcium. Only one sample farm out of 60 reported using pre-mixed ration directly; all the others mix ingredients at the farm using in-house equipment.

Wheat is the main ingredient

Wheat is by far the main ingredient in poultry feed rations. Over half of the weight in a ton of starter ration is ground wheat (523 kilos on average), and in a ton of finishing ration it contributes 647 kilos (65 percent of the weight). Farmers ordinarily have a hammer mill to grind wheat and other grains before combining it in a feed mixer with other ingredients. Wheat is the main source of energy (calories) in the chicken diet. Using wheat in chicken rations is not common practice in poultry nutrition, but in northern Iraq wheat is cheaply available, at a price far lower than the cost of alternative grains such as yellow maize. Wheat is the main agricultural product in the northern governorates and grows well under rain-fed conditions during winter. Little of the national wheat production is bought by the Iraqi Government for making flour for the food ration distribution system, as the Government prefers instead to use imported wheat from Australia or the United States. In the absence of alternative markets, its low price makes locally produced wheat well suited for poultry feed. The poor quality of wheat, however, is affected by the high incidence of smut, sunna-pest, foreign matter, and presence of extraneous seed in the grain. Poultry and animal feed are the main consumers of wheat.

Soybean meal

Soybean meal is the main source of protein in the diet. All soybean meal is reportedly imported from neighboring countries, mainly Syria and Turkey. Starter rations contain up to 30 percent soybean meal, but its content diminishes to only 21 percent (211 kilos per ton) in finishing rations. Some farmers complain about the uncertain quality of some of imported soybean meal, including the possible presence of toxic substances (like gossypol) when it has not been properly processed.

Yellow Maize

Yellow maize is used by a few poultry farmers in Suleimaniya, mainly because its cost is higher than wheat and their nutrient content are comparable. Most yellow maize in the market is imported from overseas through the seaports, probably originating from the United States. Maize is mainly used in starter rations, where it contributes on average about 7 percent of the weight, but in finishing rations it accounts for only 4 percent of overall weight.

Neither sorghum nor barley is used in poultry rations. Sorghum is simply not a known grain in the region. Barley is widely grown and available at prices lower than wheat, but it is used almost exclusively in feeding cattle and small ruminants. It was claimed by some farmers that the husk in barley is too hard and sharp and hurts the small chicks.

Vegetable cooking oil

Farmers add between 30 to 40 kilograms of vegetable oil to their poultry rations as a cheap source of energy and to improve the consistency of the ration. All the vegetable oil used in poultry is recycled from the food ration distribution system. It is cheaply available in the secondary market because many families sell part of their ration allowances for cash.

High protein supplements

Small percentages of high protein pre-mixed supplements are also added to poultry rations. These are referred commonly as "protein" because they contain high concentration of fish meal as animal protein. They are imported nearly exclusively from Holland, and come in bags ready-to-mix at either 5.0 or 2.5 percent of the ration (50 or 25 kilos per ton).

Other ingredients included in the feed ration include vitamins, veterinary supplements, trace minerals and essential amino acids. Only small amounts of these supplements are added per ton of ration. A few kilos – five or six -- of ground calcium rock (kils) are also mixed in every ton of ration.

Cost of poultry rations

Average costs of poultry feed ingredients reported by sample farms are shown in Figure 19. The highest cost item is "other" at 1,667 dinars per kilogram ($1.15 per kg. at exchange rate of $1=1,450 dinars). This refers to the expensive veterinary and nutritional supplements added in small quantities to rations. Next in terms of cost per kilo are imported high-protein supplements at 1,284 dinars/kg ($0.86/kg). By contrast, farmers report an average local market price of wheat at 219 dinars/kg ($0.15/kg). Vegetable cooking oil is available at 662 dinars/kg ($0.46/kg) and soybean meal at $0.38/kg). Yellow maize is reported available at 370 dinars/kg or $0.26/kg, which means that local wheat costs almost half as much as maize.

Except for domestic wheat, the other ingredients used in poultry feed are imported, including soybean meal, yellow maize, vegetable cooking oil, and high-protein and animal health supplements. There is some potential for Iraq to lessen its dependence on imported feeds by increasing its production of maize and soybeans.

Structure of feed ration costs

A breakdown by component of the total cost of poultry rations is presented in Figure 20 and Table 10. The highest cost component is for soybean meal, especially in starter rations where it accounts for 161 dinars per kilo of ration, compared with the cost of wheat which only amounts to 114 dinars per kilo of ration. In finishing rations (Ration C) wheat accounts for 142 dinars and soybean meal for 115 dinars per kilogram of ration. Note that these figures are per kilogram of ration, not per kilogram of ingredient. Expensive high-protein

supplements ("protein") also account for significant shares of ration cost: 83 dinars/kg of starter ration A, and 56 dinars/kg of finishing ration C. Vegetable oil contributes 18 dinars/kg of ration A and 26 dinars/kg of ration C; yellow maize costs are reversed: 27 dinars/kg of ration A and 17 dinars/kg of ration C. Despite the high price per unit of the health and mineral supplements included in the "other" category, their actual cost per kilo of ration are relatively small: 14 dinars/kg of starter ration A and 19 dinars/kg of ration C.

A wide range of ration costs are observed among the sample poultry farms in the survey. Figure 21 shows the histogram of feed ration costs and descriptive statistics for the sample. The mean cost is 393 dinars per kilogram of ration, but in reality it can range between 380 and 405 dinars per kilogram. A few farmers report ration costs above 440 dinars per kilo; a few others are below 340 dinars per kilo, but most farms are in between. The overall average ration costs 398 dinars per kilo (Figure 22), but the cost of ration A is higher – 418 dinars/kg – while for ration C it is lower – 378 dinars/kg. For comparison, the cost reported by one farm using pre-mixed ration was 450 dinars per kilogram.

Shares of weight and costs by ingredient

Figure 23 and Table 11 draw a contrast between the relative shares of weight and cost of an average feed ration for the different ingredients. Whereas wheat contributes 58 percent of the weight of the average ration, it only accounts for 32 percent of the cost. Soya beans on the other hand only provide 26 percent of the weight but accounts for 35 percent of the cost. The greatest contrasts are with "protein" that contributes 5.5 percent of the weight but 18 percent for the cost, and with "other" supplements that account for only 1 percent of the weight but 4 percent of the cost. Vegetable oil contributes 3.3 percent of weight but 5.6 percent of cost, while for maize the percentages are 5.8 for weight and 5.4 for cost.

The mean cost of feed per bird estimated for the sample is 1,914 dinars, and their distribution is depicted in the histogram in Figure 24. Most farmers have feed costs ranging from 1,600 to 2,200 dinars per bird. One exceptional farmer who suffered a high mortality in the last batch had a cost of over 3,800 dinars per bird.

Feed conversion ratios

Feed conversion ratios are among the most significant performance indicators of a poultry farm. A histogram of the feed conversion ratios – the ratio of kilograms of feed divided by kilograms of live weight of birds sold – illustrates the range exhibited by the sample farms in this survey, all the way from 1.5 to 3.0. The exceptionally high 4.2 ratio corresponds to one farm with high mortality.

Age and weight at sale

Birds are sold when they reach 2.25 kilograms at 50 to 55 days of age on average, but some farmers keep birds a few days longer and get slightly higher prices. The average reported sale price per kilogram live weight reported was 1,650 dinars.

Margins over feed costs

For every farm in the survey it was possible to estimate the margin between the price received per live weight kilogram of bird sold, and the total cost from feed and the purchase cost of chicks. These margins are shown in Figure 26 for each sample farm, and in Figure 27 as a distribution graph. The bell shape of the bar graph indicates a near normal distribution of these margins, with a mean value of 501 dinars per kilogram live weight. The confidence value for this mean can range between 400 and 600 dinars margin per kilogram live weight. Half of the farms have margins above 574 dinars per kilogram live weight, and the other half fall below that margin. This median value is equivalent to a margin over feed and chick costs of 35 percent of the price received per kilogram live weight -- 1,650 dinars.

Other variable costs

Beyond the cost of day-old-chicks and feed rations, poultry farmers incur many other costs such as labor, vaccinations, veterinary medicines, electricity and other utilities. The survey asked farmers to estimate and attribute these variable costs for the last batch of birds sold. In general these costs are highly variable and Figure 28 shows the dispersion of these estimates. The mean value of these "other variable costs" was 218 dinars per kilogram live weight, and a median value of 218 dinars. Most values have other costs between 150 and 300 dinars per kilo live weight. In Figure 29 these values of "other variable costs" are added to the prior feed and chick costs for each sample farm.

Margins over variable costs

It is possible now to compute the margin over variable cost for every farm in the sample, as the difference between the sale price received and the total variable cost per kilogram live weight. The distribution of these margins over variable cost is shown graphically in Figure 30 along with the corresponding descriptive statistics. Half of the farms have margins above 383 dinars per kilo live weight and the other half fall below that value, including farms that have negative value, i.e., that make a loss. Note that 16 percent of the farms do not have a positive margin over variable costs.

Margins and mortality

An obvious relationship exists between the margins over variable costs that farmers make and the percent mortality of the flocks. A regression analysis was made to estimate the strength of this relationship statistically. The results of this analysis are show in Table 12. A correlation coefficient of 0.48 indicate a definite association, but not as strong as expected. The regression equation is highly significant but it explains only 22 percent of the observed variation in margins over variable costs (adjusted R-square=0.22). Figure 31 shows the correspondence between the observed margins and those predicted by the regression equation (those arranged in a straight line). Clearly there is a negative relation (but a weak one): the higher the mortality, the lower the margin over variable costs and vice versa.

Margins and feed conversion and mortality

In an effort to find a better alternative explanation for the observed margins over variable costs, a regression was run between margins and two explanatory variables simultaneously, mortality and the feed conversion ratios. Table 13 shows the results for this multiple regression analysis. The multiple correlation coefficient increased to 0.77 and the adjusted R-square to 0.57, indicating that 57 percent of the variation in margins can be attributed to feed conversion and mortality. The coefficient for feed conversion is highly significant, but the coefficient for mortality has lost much of its strength. A decrease in 0.1 in the feed conversion ratio raises the margin over variable cost by 73 dinars. A reduction in mortality of 1 percent increases margins by nearly 4 dinars per kilogram live weight.

Figure 32 plots the observed margin values (vertical axis) against the predicted margins using the regression equation (those in a straight line). The degree of correspondence is much stronger: the observed values in general follow the predicted values. There remains still much variation in margins over variable costs that remains unexplained. Part of the unexplained variation might be caused by poor recollection from farmers about actual quantities of feed consumed by the last batch of birds.

This analysis indicates that accurate monitoring of feed consumption and feed conversion are critical indicators of the economic performance of poultry farms.

Annex 1

Poultry Farm Survey
Suleimaniyah
***
Scope of Work

Poultry Production in Suleimaniya
Structure and Performance

Objective

The purpose of this exercise is to provide basic current information on the poultry and feed sectors to regional and local authorities and the private business community, for use in policy formulation and making business decisions. This study in Suleimaniya is part of larger study profiling the structure of the poultry and feed sector in the three northern Governorates, as it adapted to changes brought about in the past few of years. It also evaluates the technical and economic performance of poultry production and estimates consumption requirements of poultry feeds.

Background.

Poultry meat and eggs are the main sources of animal protein for the Iraqi population. Consumption is increasing rapidly after the 2003 war as a result of higher incomes in the major urban centers and the liberalization of international trade. National poultry production was badly affected by the disruption in the supply of inputs, and many poultry farms closed at least temporarily. Egg production has recovered rapidly in response to increased domestic demand; recovery in production of broilers has been slower in the face of competition from imported frozen chicken meat from Europe and South America.

The poultry sector in the northern governorates (Erbil, Dohuk, and Suleimaniya), is highly oriented towards broiler production, has been less affected by the influx of imported frozen chicken meat. On the other hand, supplies of the imported yellow maize, the main ingredient in the feed ration for poultry, does not reach these northern governorates. Poultry producers reportedly turned instead to wheat and barley as the main feed grains in poultry rations. This switch can occur partly because the Ministry of Trade/Baghdad imports wheat and flour for the food ration program (PDS), freeing up local stocks for poultry feed. Poultry feed is the single greatest source of demand for domestic non-Grade 1 wheat.

In order to verify and understand these developments, policy makers in trade and agriculture need access to empirical information about what is happening at the farm level. ARDI proposes to carry out a rapid survey of the poultry and feed sectors in Suleimaniya in order to fulfill this gap in actual information, and to provide the foundation for wiser decisions by the appropriate Ministries and government agencies.

Methodology

Three distinct types of poultry exist in the northern Governorates: Commercial poultry (broiler) farms; traditional household poultry raising in every village; and three company farms in egg production, one in each governorate.

The survey will not attempt a complete coverage of commercial poultry producers in the governorate. We shall select a representative sample from the 400 producers estimated to exist, ranging in size from 10,000 to 60,000 birds. Most of these operations were created originally by the previous government in response to the economic and trade sanctions, but they are now considered private commercial concerns.

The three egg producing companies will be interviewed as a separate sample.

The survey will attempt to collect basic information on the structure and performance of backyard poultry raising, even though it constitutes a traditional activity among rural families mostly for household consumption, but also for local marketing.

A complete coverage would require more than the two months previewed for the study; a statistically representative sample will be selected instead to accelerate the completion of the study and to reduce data collection costs.

Activities

- Obtain a list of the poultry projects from the Ministry of Agriculture offices in Suleimaniya, together with their location and approximate size of operation.

- Obtain a list of villages in each district in the governorate, and select a representative number of villages in each district. In each village select a sample of farmers to interview.

- Design appropriate questionnaires to capture the necessary information from each enterprise regarding production, technology, inputs, costs, and revenues.

- Train a team of enumerators to interview managers of poultry operations and households. As much as possible, these enumerators will come from the Statistics Units and district offices of the Ministry of Agriculture, but can be supplemented with outside enumerators if the situation requires it.

- Draft a calendar of interviews and assign each enumerator a list of poultry farms to visit. Transport to the farms will be arranged using hired vehicles.

- Data collection will proceed for a period of four weeks between December and January.

- Data entry and preliminary analysis will be done concurrently with data collection and then continue as needed to developed final tabulations and results. The staff of the Statistics Unit will be engaged in the analysis and generation of results.

- Report writing will be the responsibility of the principal researchers

Personnel

This will be a joint effort of the Ministry of Agriculture of the Suleimaniya Governorates and the ARDI project. The principal researchers from ARDI will be Dr. Edgar Ariza-Nino, agricultural economist, and Mr. Habib Farancy, statistician. The Statistics Units within the Planning Departments of the Ministries of Agriculture will be principally responsible for carrying out data collection, data entry, and data processing, under the supervision of its Director. Mr. Habib will be the principal advisor on statistical procedures.

Outputs

The principal deliverable output will be an overall report of approximately 50 pages summarizing the main findings from the survey. A preliminary outline of the report is attached, but adjustments will be made as better information becomes available.

Printed hard copies of the report will be made available in sufficient numbers to make it accessible to at least 500 users, including those poultry operators that participated in the study.

At least one seminar will be held to present the final results to officials and private sector participants.

Copies of the survey data and of the printed report will also be available in CDs, and through the Internet in websites for ARDI and the Ministry of Agriculture.

A significant output of this exercise is to strengthening the capability of the Statistics Unit at the Ministry of Agriculture to conduct similar studies in the future.

Timetable

Two months of intensive work are allocated for this survey, starting December 1, 2004. A draft of the final report is due on January 30, 2005.

Annex 2

Letter of Agreement

Ministry of Agriculture, Suleimaniya
and
Development Alternatives Inc.

LETTER OF AGREEMENT

013

between

Ministry of Agriculture – Suleimaniya

and

Development Alternatives, Inc.

This is an agreement between the **Ministry of Agriculture – Suleimaniya** (hereafter referred to as the "**MOA**"), and Development Alternatives, Inc., (hereafter referred to as the "**DAI or ARDI**").

This agreement (hereafter referred to as the "**Agreement**") encompasses all terms and conditions in support of the MOA and ARDI joint program for **Poultry Production in Suleimaniya – Structure and Performance** (hereafter referred to as the "**Program**"), in accordance with the program description which is incorporated by reference and attached as Annex 1. The purpose of this agreement is to define ARDI and MOA roles in support of the Program. The purpose of the Program is to provide basic current information on the poultry and feed sectors to regional and local authorities and the private business community, for use in policy formulation and making business decisions. This study is part of regional survey profiling the structure of the poultry and feed sectors in the three northern Governorates as it adapted to changes brought about in the past few of years. It also evaluates the technical and economic performance of poultry production and estimates consumption requirements of poultry feeds.

The survey of poultry farms described in the project will be implemented with the cooperation of the Department of Statistics in the Planning Division of the Ministry of Agriculture – Suleimaniya and the participation of staff from other local branches of the Ministry throughout the governorate.

TERMS OF THE AGREEMENT

This Agreement is issued under USAID Prime Contract No. RAN-C-04-00002-00. In the event of a conflict between the terms and conditions of this Agreement and any form, letter or document, then this Agreement shall govern.

The MOA, in conjunction with ARDI, will implement the Program in accordance with Annexes 1 & 2. The ARDI project will support the program by providing technical and financial assistance to the Program. This Agreement includes a procurement process to fund line items under the Program budget. ARDI will fund the items listed in Annex 2. The program design is hereby incorporated by reference (Annex 1) and is considered to be part of this agreement.

This agreement shall be in effect from December 11, 2004 through February 17, 2005 and may be extended as agreed upon by both parties.

DAI AGREES:

1. To provide technical and financial assistance (listed in Annex 2) required for implementing the program. The procurement will be carried out by ARDI procurement staff members in accordance with ARDI procurement regulations. ARDI's contribution is limited to the items identified and listed in the budget incorporated by reference and included in Annex 2.

2. The ceiling price of this agreement is $ 9,985 USD.

THE MOA AGREES:

1. To carry out the Program in accordance with Annexes 1 & 2 of this agreement.

2. To assign the necessary staff to participate in the program as indicated in Annex 1.

3. To fund its portion of expenses in order to successfully carry out this program as detailed in the Program plan that is incorporated by reference and included as Annex 1.

EXECUTED ON THE 11ᵗʰ of December, 2004

For the Ministry of Agriculture   **For DAI:**

Name: _____   Name: Jane Gleason, Ph.D.

Title: _____   Title: Chief of Party_____

Signature: _____   Signature: _____

Date: _____   Date: _____

Annex 3

Poultry Farm Survey
Suleimaniya

Questionnaire (English)

	المحافظة
	القضاء
	الناحية
	القرية
	اسم الحقل

اخرى	الجمعيات	شركة	شراكة	فردي	نوع الحقل
	لا	نعم	هل انت مالك المزرعة		اسم المستجيب
اخرى	القرابة	المدير	المؤجر	المالك	العلاقة باصاحب الحقل

حقول الدواجن	
	سنة بناء الحقل
	سنة بدء العمل
	عدد قاعات الدواجن في الحقل
	المساحة الكلية لقاعات الدواجن في الحقل (م٢)
	سعة الدواجن من الافراخ
	عدد الدجاج المباع في سنة ٢٠٠٤
	عدد الوجبات المباعة في سنة ٢٠٠٤
لماذا: لا نعم	هل هناك توقفت الانتاج في السنة
	اذا كان نعم، في اي شهر؟
	المسافة الى مركز السوق(كم)
	مساحة البنايات الاخرى، المخزن،المكتب،بناية العمال...(م٢)
	مساحة الاراضي الزراعية في الحقل (دونم)
	مصدر شراء الفراخ بعمر يوم واحد
	اسم الشركة المجهزة
	نوع عرق الفراخ بعمر يوم واحد
	سعر الفرخة الواحدة (د.ع)
	لماذا تفضل هذا العرق من الفراخ

الملاحظات	سيء	متوسط	جيد	حالات الانتاج
				توفير افراخ بعمر يوم واحد
				توفير العلف
				توفير الادوية
				توفير الاجهزة
				توفير تسويق
				معدل الوفيات
				اخرى

اخرى	شبكات العامة	تانكرات	قناة/نهر	بئر	نوع مصادر المياه
اخرى	بيع الي المزارعين		نشرها في اللحقل		رمي فضلات الدجاج(النفايات)
اخرى	المولدة	تانكر ماء	شاحنة	بيك اب — تراكتور	هل الحقل لديه

نوع و مصدر العلف المستخدمة في سنة ٢٠٠٤

كلاهما	شراء من الخارج	خلطها في الحقل	منشأ العلف

المصدر	سعر الشراء	ثلاثة	اثنان	واحد	نوعية الوجبات
(المزرعة ، السوق ، المشروع ، الشركة)	كغم/د.ع	كيلو غرام لكل طن من النسبة			المكونات
					حنطة
					شعير
					ذرة الصفراء
					فول الصويا
					بروتين
					دهن او زيت
					كالسيوم
		1000كغم=	1000كغم=	1000كغم=	الوزن الكلي

الدجاج الحي المباع		الدفعة الثالثة	الدفعة الثانية	الدفعة الاولى	الوجبات الاخيرة المباعة
سعر بيع كيلو غرام واحد من الدجاج الحي (د.ع)					عدد افراخ بعمر يوم واحد
عدد الدجاج المباع					عدد الطيور المتبقية في النهاية
عمر الدجاج المباع					عدد الوجبات اليومية
معدل وزن الدجاج المباع					معدل وزن الدجاجة الواحدة في النهاية
كمية العلف المستخدم					كمية العلف المستخدم

أين تبيع الدجاج الحى	في الحقل	سوق المدينة	السوق المحلي	اخرى
من المشتري	مقاول واحد	مجموعة من المتعهدين	مستهلكون	اخرى

كم عدد العمال الذين يعتنون (يهتمون) با الدجاج ؟	
كلفة اجرة العمال شهرياً؟	
أسم اللقاح	Newcastle; CRD; IB; IBD; Fowl pox; Gomboro; Coccidiosis;
كلفة اللقاح (د.ع)	
كلفة الادوية (د.ع)	
كلفة الكهرباء (د.ع)	
كلفة المياه (د.ع)	
كلفة الوقود (د.ع)	
كلفة النقل (د.ع)	
تكاليف أخرى (د.ع)	
ملاحظات أضافية :	

اسـم العـــــداد		التوقيع:	التاريخ :
اسـم العـــــداد		التوقيع:	التاريخ :
اسـم المـــراقب		التوقيع:	التاريخ :

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Annex 4

Poultry farm survey, 2004

Questionnaire (English)

Poultry Farm Survey - 2004				1
Governorate				2
District				3
Sub-District				4
Village				5
Farm Name				6
Type of farm	____individual; _____partnership; _____company; _____coop. society; …………..:other			7
Respondent name:	……………………………………………… Are you the owner of the chickens? ____ Yes; _____No			8
Relation to Farm Owner	_____ owner; _____ renter; _____ manager; _____ relative; ………………:other			9

Chicken houses `10`

		11
Year first built		11
Year started operation		12
Number of chicken houses in the farm		13
Total area of chicken houses in the farm?	square meters	14
Total bird capacity of all the houses		15
Total number of birds sold in 2004?		16
Number of batches sold in 2004:		17
Is production suspended part of the year?	_____ Yes; ___No ; Why?	18
If Yes, in which months?	____J; ____F; ____M; ____A; ____M, ____J; ____J; ____A; ____S; ____O; ____N; ___D	19
Distance to central market in Governorate?	kilometers	20
Other built area for storage, workers, offices?	square meters	21
Land area of farm	donums	22
Where do you purchase day-old-chicks?		23
Name of supply company?		24
Name of breed or race of day-old-chicks?		25
What is the price per chick?	.... (specify currency)	26
Why do you prefer this breed of chicks?		27

Production situation	Good	Medium	Bad	Comment	28
Availability fo day old chicks?					29
Availability of feed					30
Availability of medicines					31
Availability of equipment					32
Availability of market outlets					33
Mortality rate					34
Other:……………………					35

		36
Source of water?	_____ own well; _____ canal/river; _____ tanker truck; _____public utility; ……………..:other	36
Disposal of chicken litter (waste)?	_____ spread on fields; _____ sold to farmers; ………………………:other	37
Does the farm have?	_____hammer mill? _____feed mixer? _____egg incubator? _____ automatic feeders?	38
Does the farm have?	_____ tractor?; _____ pick-up?; _____ truck?; _____ water tower?; ____ generator?; …………:other?	39

27

Type and sources of feed used in 2004					41
Where is feed made?	_____ Mixed on-farm; _____ purchased outside; _____ both				42
Ration types:>>>	_____ One	____Two	____Three	Purchase price	Source	43
Ingredients	kilograms per ton of ration			per kilo, ton, bag?	(Farm, market, Project, Company?)	44
wheat ____				_____-ID /_____		45
barley ____				_____-ID /_____		46
maize ____				_____-ID /_____		47
soya ____				_____-ID /_____		48
protein ____				_____-ID /_____		49
oil ____				_____-ID /_____		50
Calcium ____				_____-ID /_____		51
Other: …….……..…___				_____-ID /_____		52
Other: ………….……___				_____-ID /_____		53
Other: ……………….___				_____-ID /____		54
Total weight	=1000 kg?	=1000 kg?	=1000 kg?			55

Last batch sold	Ration One	Ration Two	Ration Three	**Sale of live birds:**	56
Number day-old-chicks				Price of birds sold, per kg?	ID per …………..	57
Birds remaining at end				Number of birds sold?		58
number of feed days				Age of birds sold? days,		59
Kilos per bird at end				Weight per bird sold, kg?		60
Total feed used, kg				Total feed used, kg?		61
Where do you sell live birds?	____ on farm?; _____ local market?; _____ Suleimaniya market?; ….. ………………………out Gov					62
Who are the buyers?	_____ contractor?; _____few traders?; _____consumers?; ………….………..:other?					63
How many workers do you have looking after the broilers?						64
Cost of laborers working on broiler production?						65
Name of vaccines	___Newcastle; _____CRD; ____ IB; ____ IBD; _____ Fowl pox; _____Gombora; ____Coccidiosis					66
Cost of vaccines	ID per…………………………………………………………..					67
Cost of other medicines	ID per…………………………………………………………..					68
Cost of electricity	ID per…………………………………………………………..					69
Cost of water	ID per…………………………………………………………..					70
Cost of fuel	ID per…………………………………………………………..					71
Cost of transport	ID per…………………………………………………………..					72
Other costs	ID per…………………………………………………………..					73

Additional Comments:……… | 74
…… | 75
…… | 76
…… | 77

Enumerator Name		Signature:	Date	78
Enumerator Name		Signature	Date	79
Monitor Name		Signature	Date	80

Annex 5

Poultry farm survey, 2004

Sampling and data handling procedures

Sampling and Data Handling Procedures

This report is one part of a larger study of the poultry sector in the three northern governorates in Iraq. Parallel studies are made for Dohuk and Arbil. Two distinct technologies are distinguished in each governorate, a modern sector raising improved chicken breeds under confinement, and a traditional village poultry sector where local birds are allowed to range freely around the family compound or village grounds.

This report covers only the modern commercial poultry sector in Suleimaniya.

Sample Selection

A representative sample of poultry farms in Suleimaniya was selected out from the database of farms kept by the Ministry of Agriculture.

In order to operate a commercial poultry farm, farmers are required to get a license from the Ministry of Agriculture. Registered farms are assigned to a veterinarian who is responsible for doing periodic health inspections of the farm. Farms are required to post in a visible place on the premises a large sign with the particulars of the license, including capacity authorized, and dates when licensed was issued and will expire. A database of poultry farms is kept by the Department of Veterinary and Animal Resources in each governorate.

A stratified sample of poultry farms was obtained by first sorting farms according to registered installed capacity into five strata ranging from small farms with capacity for less than 10,000 bids at a time to a few farms with installations able to hold over 50,000 birds at a time. Within each segment or strata, a simple random sample was extracted using random numbers generated in Excel to select farmers in the list.

One out of four farms in each stratum list was selected for interviewing in each Governorate. No attempt was made to ensure proportional representation according to the districts where farms were located. A separate list of alternate sample farms was also prepared ahead of time for each stratum in case for some reason it was not possible to interview a person knowledgeable about the farm.

A total of 62 poultry farms were thus selected in Suleimaniya, out of a list of over 240 farms registered in Suleimaniya.

Enumerators

Four teams of enumerators were selected and assigned by the Ministry of Agriculture in Suleimaniya to carry out the farm interviews in this survey. Mr. Ibrahim Kheder, Director General of the Planning Department in the Ministry was principally responsible for selecting the interview teams. To ensure proper combination of technical expertise in animal husbandry and knowledge of local agriculture and farmers, each team comprised a staff member from the Department of Veterinary and Animal Resources and a member from the Planning Department. One monitor was assigned to coordinate all team field activities. Team members came mainly from the district offices of the Ministry of

Agriculture. Each team was assigned two farms to interview per pay in their districts or nearby.

Rental vehicles were assigned to take each team to their corresponding sample farms. A widespread shortage of fuel occurred in the region at the time when field interviews were taking place (late December 2004 and early January 2005), and required that rental rates be adjusted accordingly.

Questionnaire design

A copy of the questionnaire used to capture essential information on each farm is attached in the Annex section of the report, both in English and Arabic. The questionnaire was reviewed in detail with the enumerators during a one-day training session with all the teams held at the Extension Service training facilities in Suleimaniya. Several modifications were made in the original questionnaire after the training session and incorporated into the final version. A few days after the start of the field survey a review session was held to bring up problems encountered by enumerators during the initial interviews with farmers, and to ensure that data collected by all teams was clearly understood and that measurement units were fully compatible.

Major emphasis was placed in obtaining good data on the composition of poultry rations used by farmers in Suleimaniya. Farmers can have as many as three different rations for distinct stages in the growth curve, and the nutrient content and composition of ingredients differ accordingly. The price of each ingredient was recorded, and whether it was purchased in the market or produced in the farm.

In order to evaluate the productivity and economic performance of poultry farms, farmers were asked to recall the number of birds as well as the number of days in each ration and the weight at the end of each stage – starter, growth, and finishing. This information was only requested for the last batch or flock of birds sold. Estimates of the quantity of each feed ration consumed by the last batch were also recorded.

Revenue from the sale of the last batch was estimated from data on the number of birds sold, their average weight, and the average price per kilogram of live weight.

In addition to feed costs, the questionnaire includes questions regarding the cost of day-old-chicks, the cost of vaccines and veterinary medicines, labor and other direct costs incurred for the last batch of birds sold. At the time of the survey in winter, maintaining proper temperature in the coops required major effort and cost. Many farmers prefer to suspend operations during the coldest months and wait for spring instead. The questionnaire requested information on which months the farm was not in production, both winter and summer.

Data processing

Questionnaire data was entered into an Access database designed by the staff of the Statistics Unit of the Ministry of Agriculture, Arbil. Each questionnaire was carefully reviewed by the supervisor before entering data into the database. An iterative process of debugging and cleaning was needed to ensure that only clean data is included in the

analysis. When it was not possible to resolve questionable data, those observations were not taken into account in the analysis.

Poultry Farm Survey 2005

Suleimaniyah

Volume II: Figures and Tables

Prepared by
Edgar Ariza-Nino
Habib Franci Qiji

May 2005

Volume II: List of Tables and Annexes

List of Tables

List of Figures

Figure 1. Suleimaniya poultry farm survey, 2004. Farm size distribution

Descriptive Statistics	
Mean	13,006
Standard Error	632
Median	10,090
Mode	4,000
Standard Deviation	9,873
Sample Variance	97,481,705
Kurtosis	19.35
Skewness	3.48
Range	90,000
Minimum	1,000
Maximum	91,000
Sum	3,173,354
Count	244

number of farms

farm size - (birds it can house at a time)

Respondent	Number	Private	Partnership	Coop. Society
		شخصي	مشترك	جمعية التعاونية
Owner	**29**	29		
Renter	**11**	10		1
Manager	**3**	2	1	
Relative	**7**	7		
Other	**11**	11		
Unknown	**1**	1		
Total	**62**	**60**	**1**	**1**

Table 1. Farm ownership and Respondent in sample farms

Group	Built capacity	Farms	Private شخصي	Partnership مشترك	Coop. Society جمعية التعاونية
1	<10,000	31	29	1	1
2	10,001-20,000	20	20		
3	20,001-30,000	8	8		
4	30,001-50,000	2	2		
5	> 50,000	1	1		
	Totals	**62**	**60**	**1**	**1**

Table 2. Farm ownership and built capacity of sample farms

Table 3. Respondent and built capacity of sample farms							
Group	Built capacity	Farms	Owner المالك	Renter المؤجر	Manager المدير	Relative القرابة	Other اخرى
1	<10,000	**31**	18	4	2	2	5
2	10,001-20,000	**20**	5	5	1	4	5
3	20,001-30,000	**8**	3	2		1	2
4	30,001-50,000	**2**	2				
5	> 50,000	**1**	1				
	Totals	62	29	11	3	7	12

Figure 2. Suleimaniya poultry farm survey, 2004. Year when sample farms were built

5
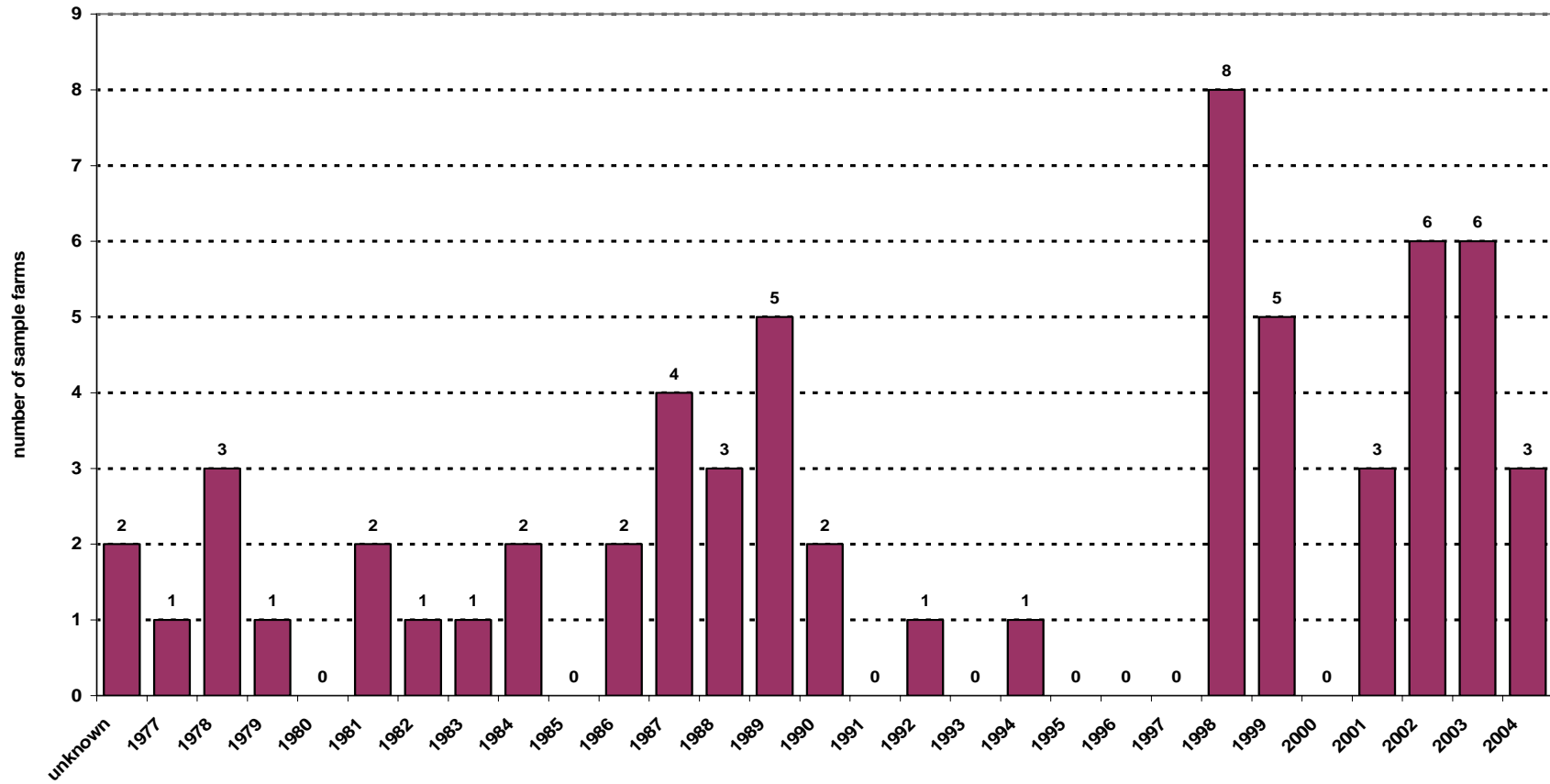
period	year built		year began work	
	number	percent	number	percent
<=1980	5	8.1%	3	4.8%
1981-1985	6	9.7%	2	3.2%
1986-1990	16	25.8%	12	19.4%
1991-1995	2	3.2%	4	6.5%
1996-2000	13	21.0%	19	30.6%
2001-2005	18	29.0%	20	32.3%
Unknown	2	3.2%	2	3.2%
Total	62	100.0%	62	100.0%

Table 4. Years when sample farms were built and started operation

Figure 3. Suleimaniya poultry farm survey, 2004. Years when sample farms were built and started operation
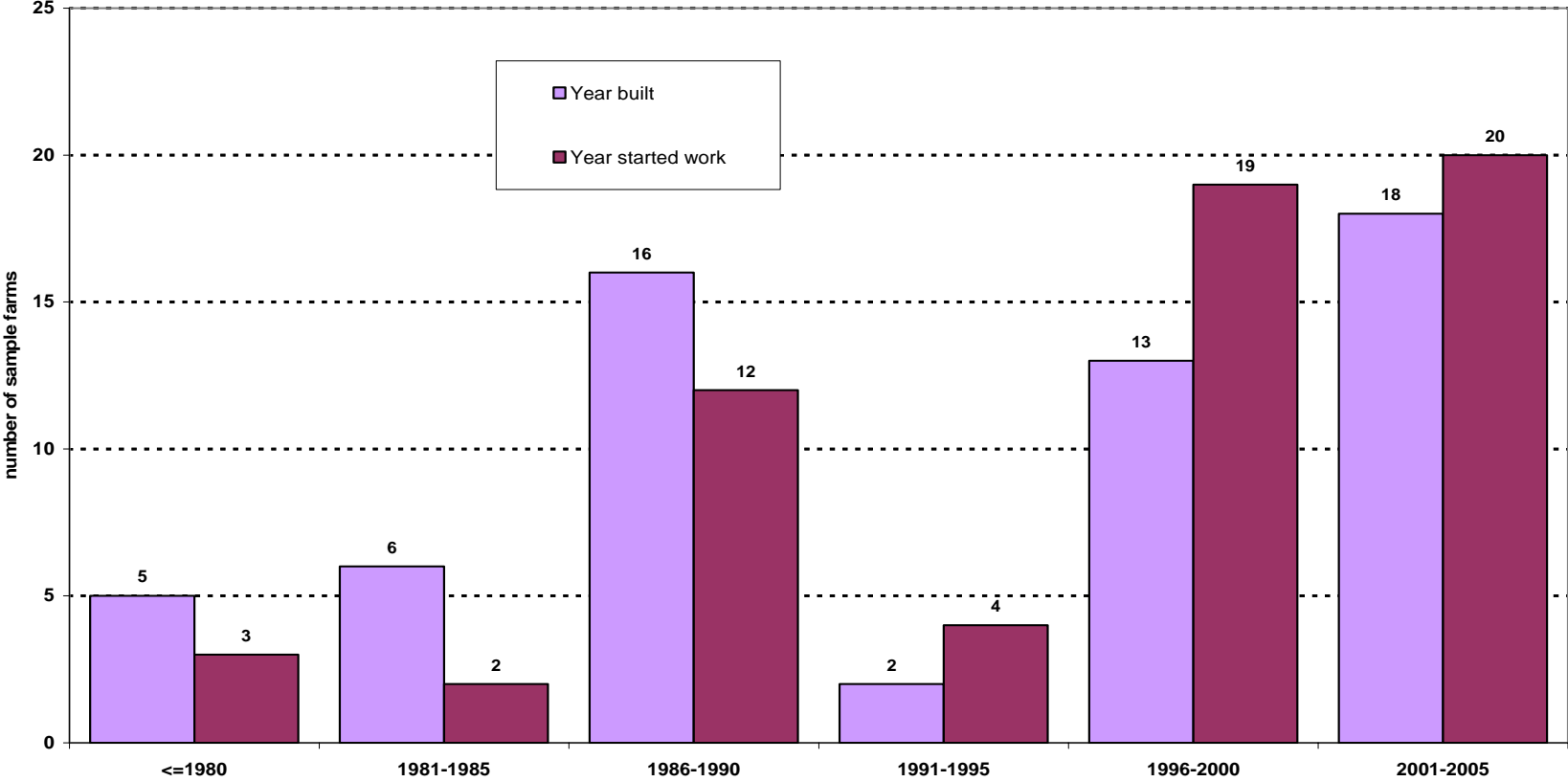
Figure 4. Suleimaniya poultry farm survey, 2004. Distribution of sample farms by size

Descriptive Statistics	
Mean	64,827
Standard Error	5,617
Median	51,000
Mode	49,000
Standard Deviation	44,230
Sample Variance	1,956,332,753
Kurtosis	6.58
Skewness	2.07
Range	269,250
Minimum	0
Maximum	269,250
Sum	4,019,295
Count	62

production capacity in thousand birds per year

number of sample farms
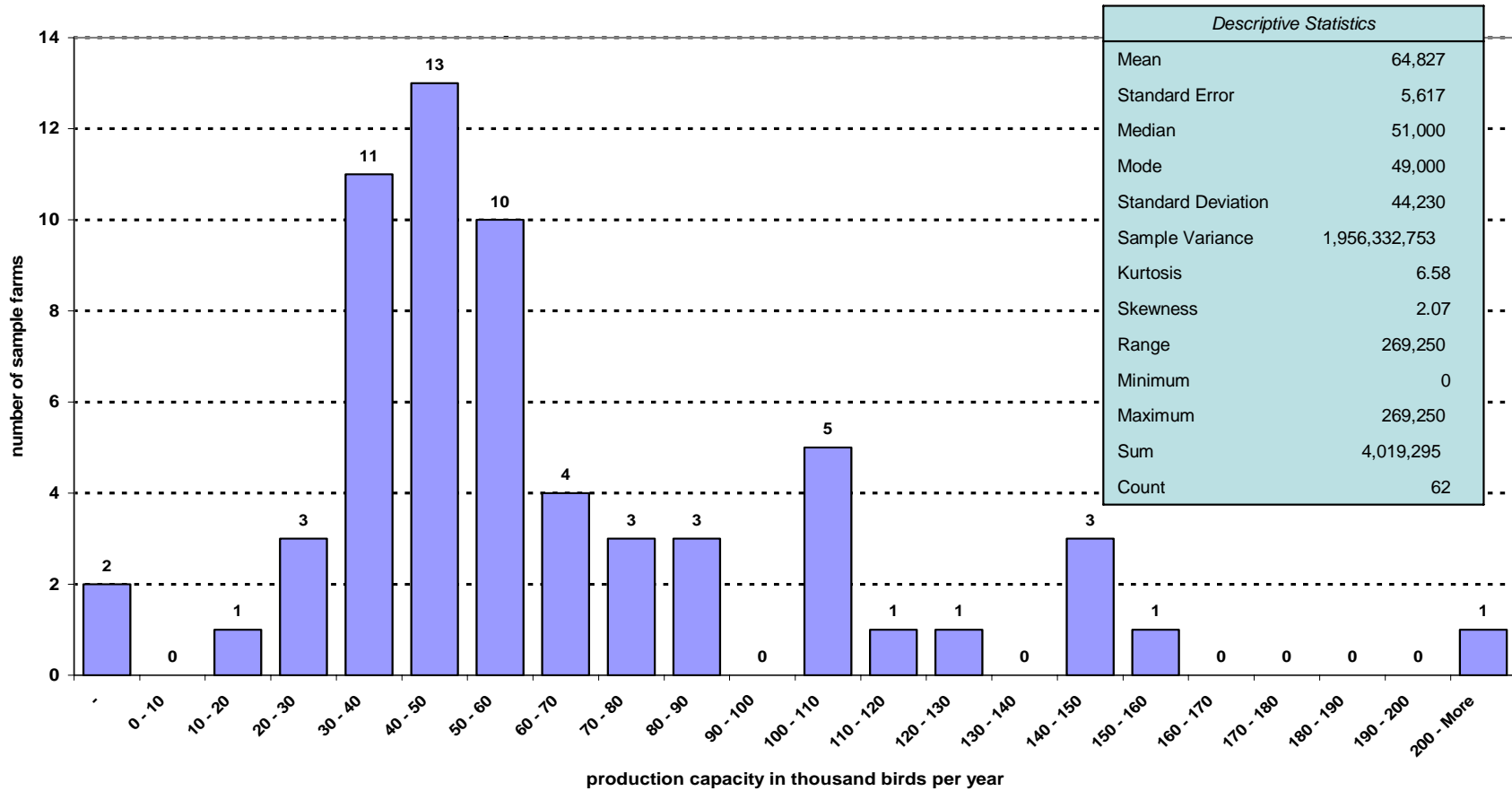
Figure 5. Suleimaniya poultry farm survey, 2004.
Installed production capacity in sample farms

number of birds

Farm	Capacity
1	33,500
3	32,500
6	41,000
2	37,500
4	49,000
5	39,000
7	26,000
8	21,500
9	40,250
10	43,000
11	49,000
12	105,000
13	48,000
14	36,000
15	32,750
16	41,250
17	49,350
18	21,500
19	50,000
20	30,500
21	46,000
22	39,000
23	39,750
24	42,500
25	36,500
26	48,200
27	41,750
28	20,000
29	34,000
30	-
31	-
33	62,500
34	72,500
35	53,750
32	79,120
36	58,000
37	50,750
38	51,250
39	52,500
40	82,500
41	78,500
42	63,000
43	68,750
44	57,500
45	58,500
46	64,250
47	60,000
48	88,875
49	58,500
50	55,000
51	90,000
52	110,000
53	120,000
54	125,000
55	145,875
56	105,000
57	144,500
58	109,000
59	101,625
60	150,000
61	159,000
62	269,250

Legend: Production Capacity

9

Figure 6. Suleimaniya poultry farm survey, 2004.
Bird sales by sample farms in 2004

number of birds

Farm	Sales in 2004
1	3,700
3	11,000
6	21,000
2	27,000
4	35,000
5	20,000
7	4,350
8	15,000
9	35,000
10	5,750
11	38,500
12	30,000
13	23,000
14	17,000
15	22,500
16	28,000
17	24,000
18	15,000
19	6,000
20	21,000
21	26,000
22	7,000
23	7,000
24	28,000
25	6,000
26	32,000
27	25,000
28	14,000
29	11,000
30	-
31	-
33	22,000
34	40,000
35	33,000
32	43,500
36	40,000
37	36,000
38	38,000
39	24,000
40	54,000
41	41,000
42	29,000
43	21,500
44	22,500
45	27,000
46	45,000
47	34,000
48	28,000
49	32,000
50	36,000
51	54,000
52	28,500
53	80,000
54	14,000
55	82,000
56	80,000
57	60,000
58	41,000
59	73,000
60	80,000
61	63,000
62	36,350

Sales in 2004

10

Figure 7. Suleimaniya poultry farm survey, 2004. Distribution of sample farm sales

Descriptive Statistics	
Mean	30,599
Standard Error	2,564
Median	28,000
Mode	28,000
Standard Deviation	20,187
Sample Variance	407,528,483
Kurtosis	0.75
Skewness	0.95
Range	82,000
Minimum	-
Maximum	82,000
Sum	1,897,150
Count	62

2004 sales, thousand birds

11
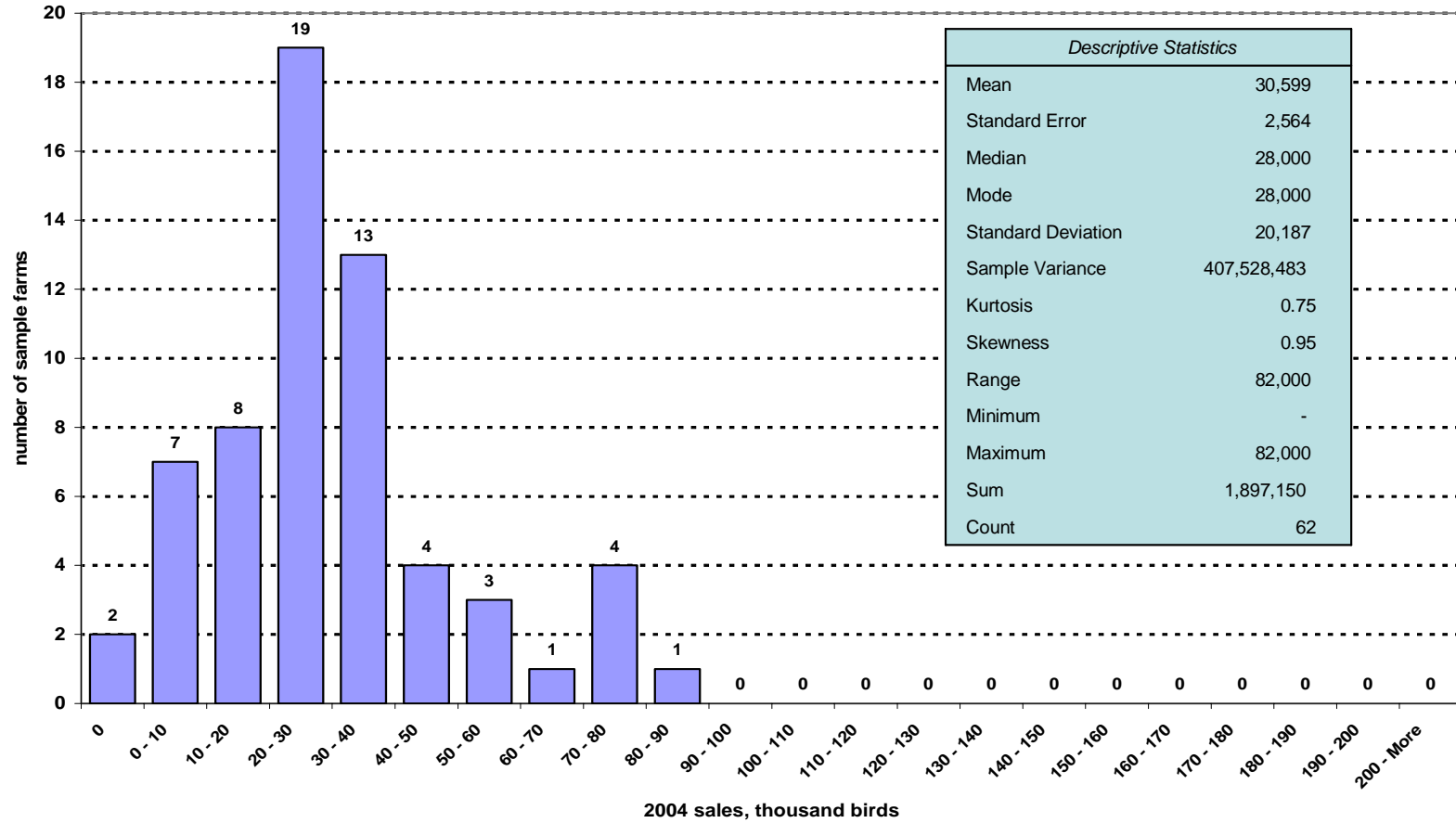
Figure 8. Suleimaniya poultry farm survey, 2004. Percent capacity utilization by sample farms

12
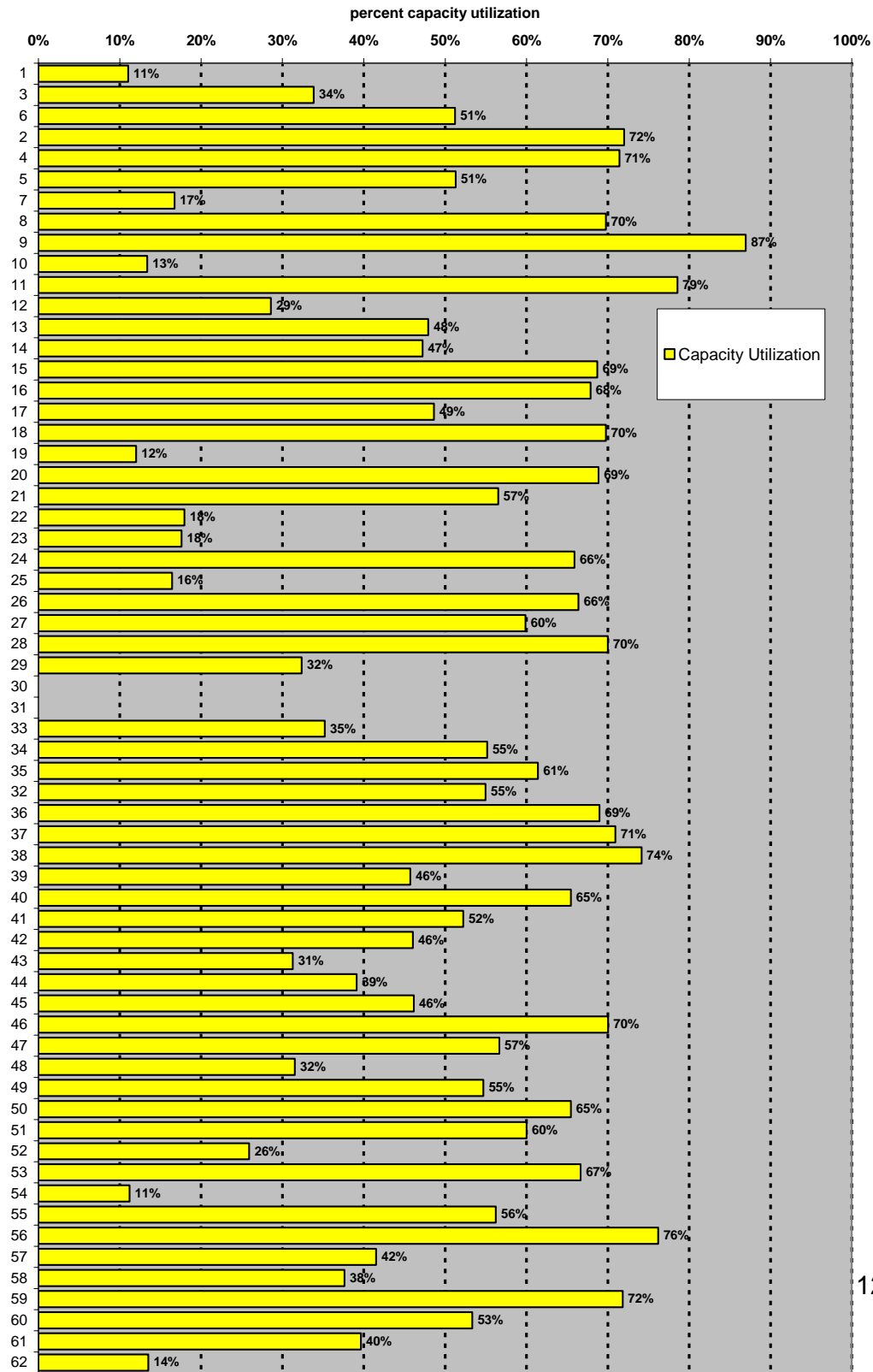
Figure 9. Suleimaniya poultry farm survey, 2004. Distribution of capacity utilization by sample farms

Descriptive Statistics	
Mean	48.35
Standard Error	2.79
Median	52.78
Mode	69.77
Standard Deviation	21.96
Sample Variance	482.26
Kurtosis	(0.71)
Skewness	(0.55)
Range	86.96
Minimum	0.00
Maximum	86.96
Sum	2,997.54
Count	62.00
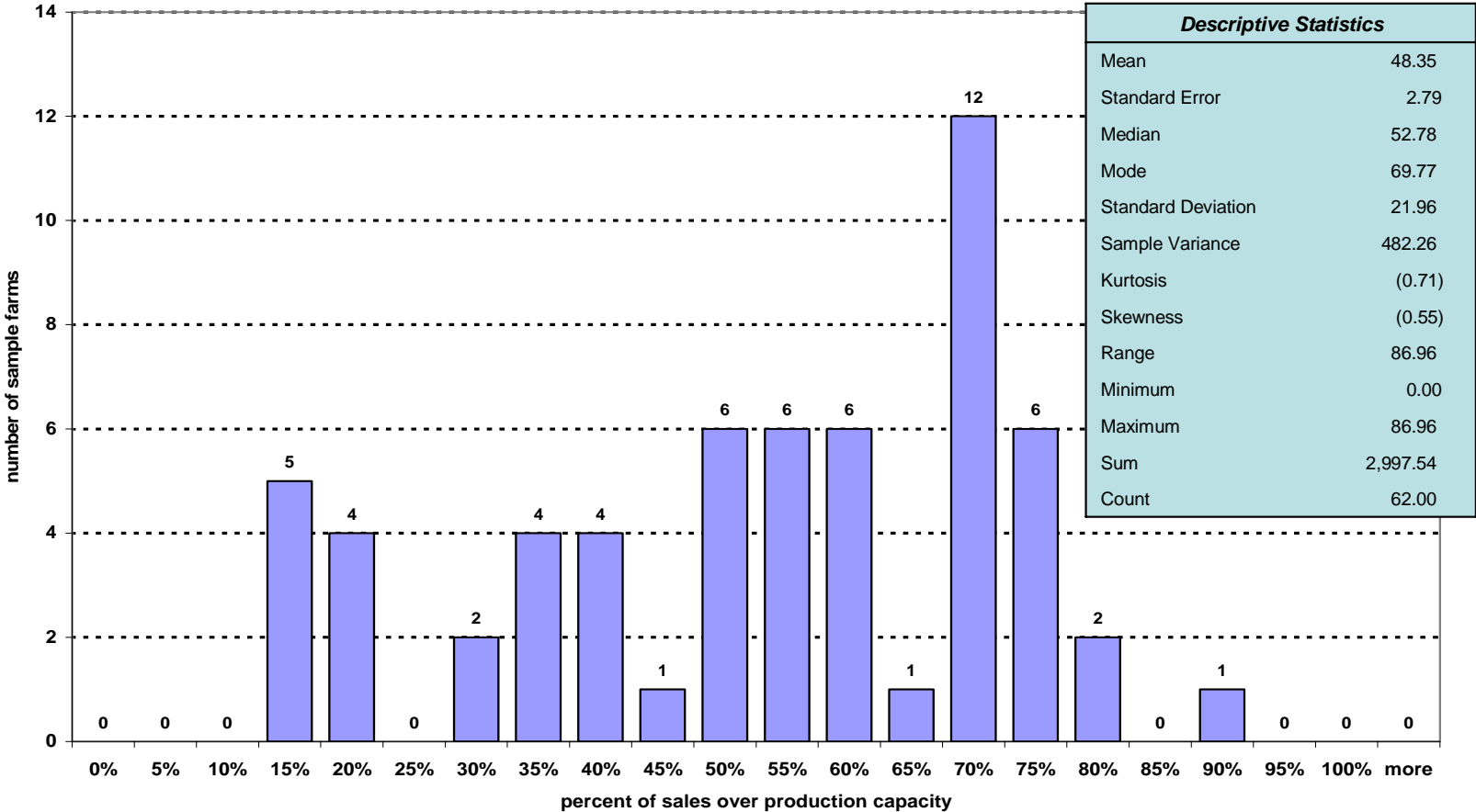
Figure 10. Suleimaniya poultry farm survey, 2004. Number of batches produced in sample farms in 2004.
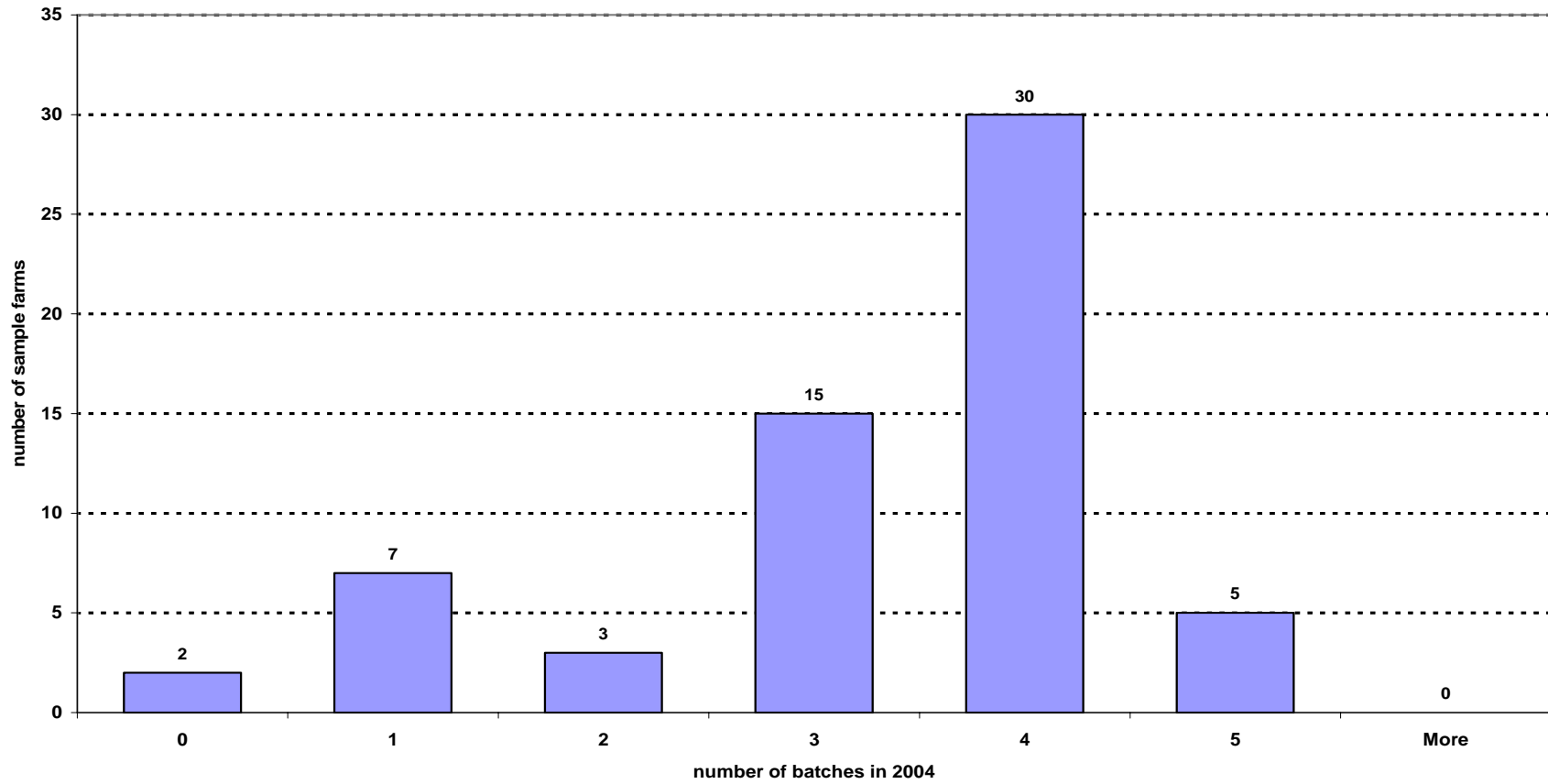
Figure 11. Suleimaniya poultry farm survey, 2004. Months when sample farms stop operations

15
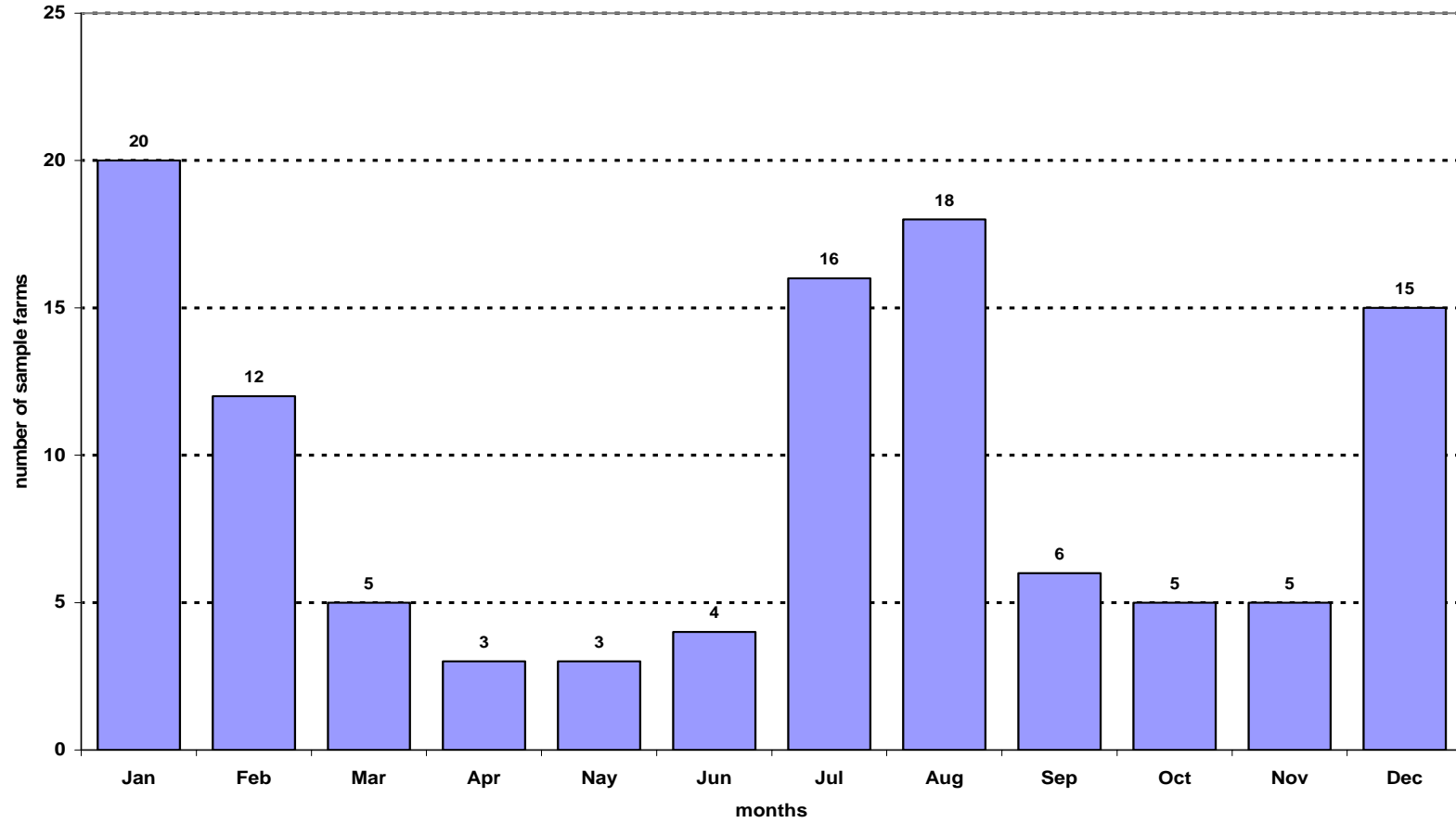
Figure 12. Suleimaniya poultry farm survey, 2004. Mortality rates among sample farms

Descriptive Statistics	
Mean	18.71
Standard Error	1.42
Median	16.74
Mode	10.00
Standard Deviation	11.21
Sample Variance	125.59
Kurtosis	0.07
Skewness	0.81
Range	45.45
Minimum	-
Maximum	45.45
Sum	1,160.29
Count	62.00
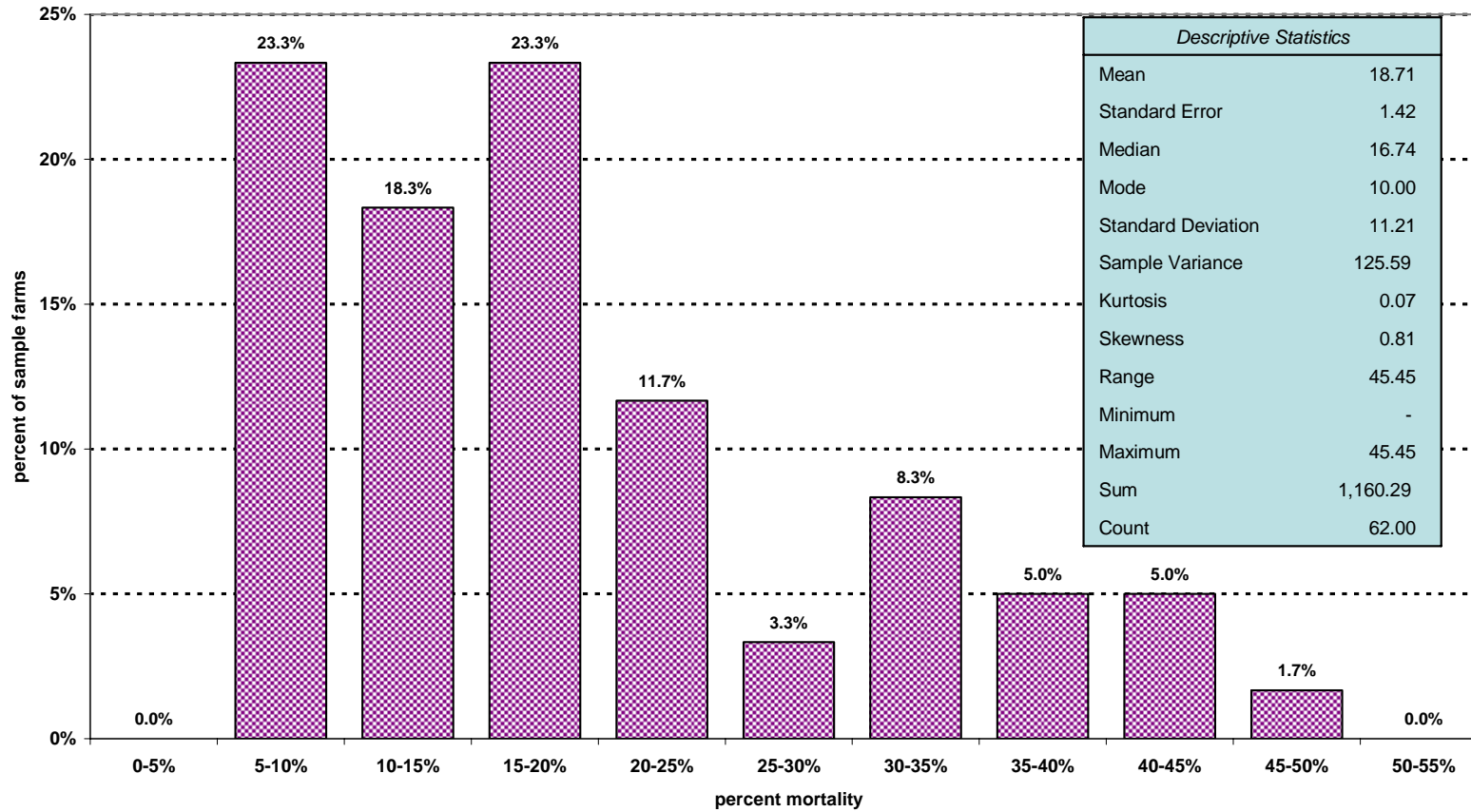
Table 5. Percent of sample farms that vaccinate or treat against certain diseases					
Disease	Yes	No	Unknown	Total	% Yes
Newcastle	51	9	2	62	85%
CRD	1	59	2	62	2%
IB	40	20	2	62	67%
IBD	2	58	2	62	3%
Fowl pox	60	0	2	62	100%
Gomboro	50	10	2	62	83%
Coccidiosis	1	59	2	62	2%

Figure 13. Suleimaniya poultry farm survey, 2004. Percent of sample farms that vaccinate or treat against certain diseases
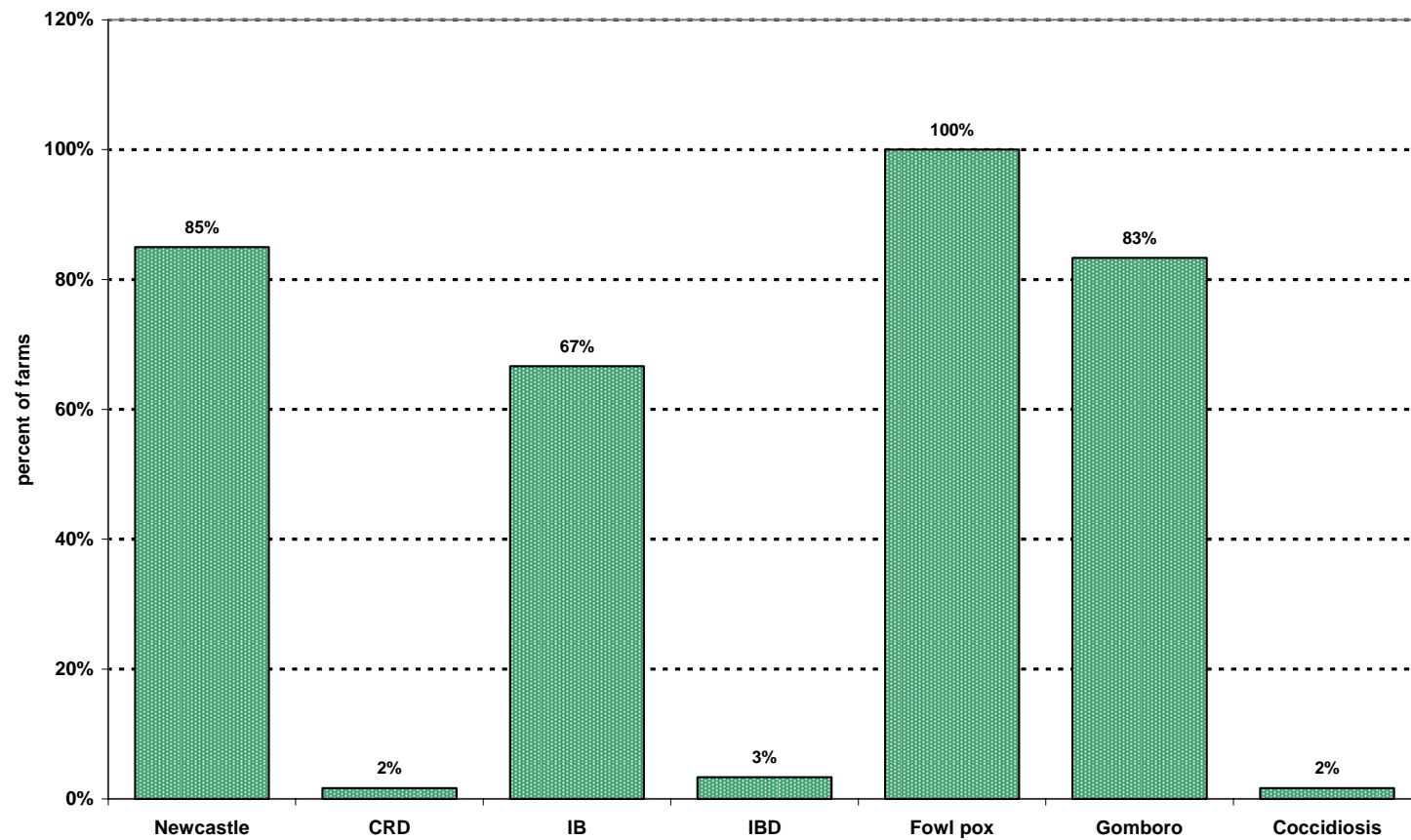
Table 6. Breed of day-old-chicks used by sample poultry farms				
Sample Farms	Percent	نوع عرق الفراخ بعمر يوم واحد	Breed of chicks	Avg. price ID/chick
26	42%	كوب	Cobb	469
20	32%	روز	Ross	473
10	16%	روز + كوب	Cobb+Ross	465
3	5%	اريان	Aryan	450
1	2%	هايبرو	Hybro	500
2	3%	blank	unknown	-
62	100%		Total Sample	469

Table 14. Suleimaniya poultry farm survey, 2004. Breeds used by sample farms.
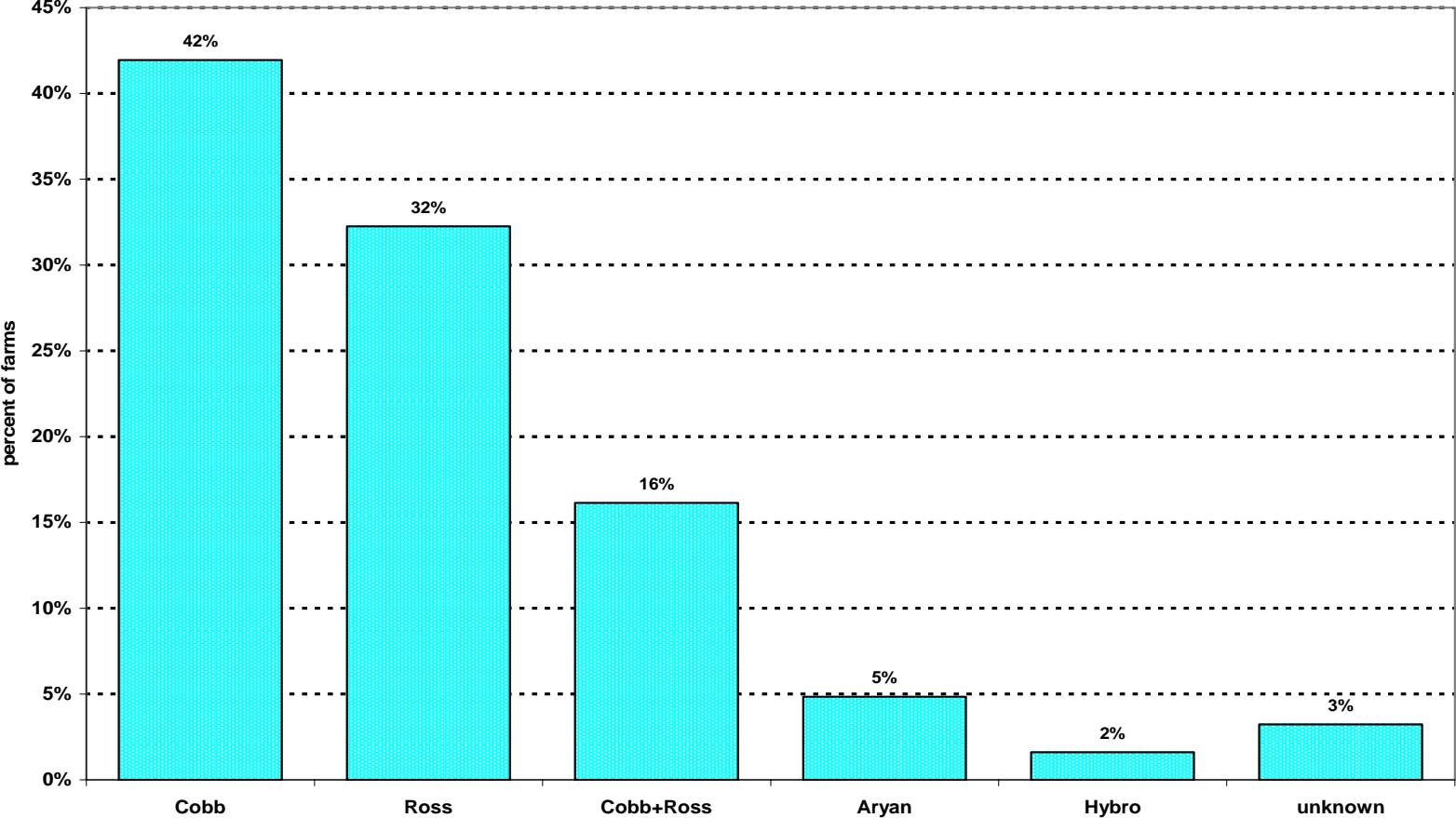
Figure 15. Suleimaniya poultry farm survey, 2004. Mortality rates by sales volume category among sample farms
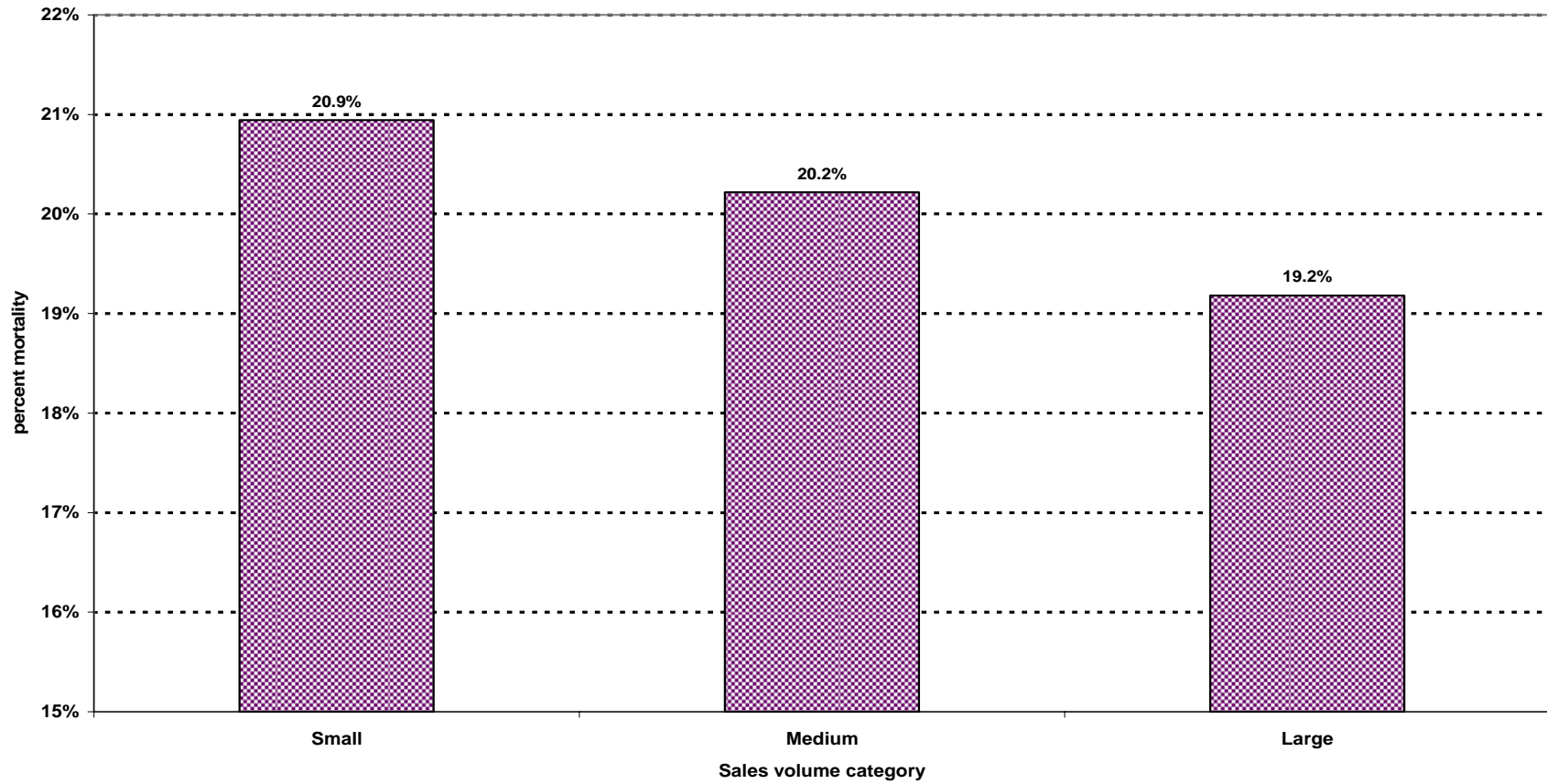
Table 7. Mortality rates by breed of chicks among sample farms				
Breed	Sample farms	Chicks bought	Birds sold	Percent mortality
Cobb	26	286,535	225,000	21.5
Ross	24	227,826	186,050	18.3
Cobb-Ross	6	63,100	49,650	21.3
Aryan	3	27,200	24,000	11.8
Hybro	1	8,200	6,100	25.6
Unknown	2		-	
Total	62	612,861	490,800	19.9

Figure 16. Suleimaniya poultry farm survey, 2004. Mortality rates by breed of chicks among sample farms
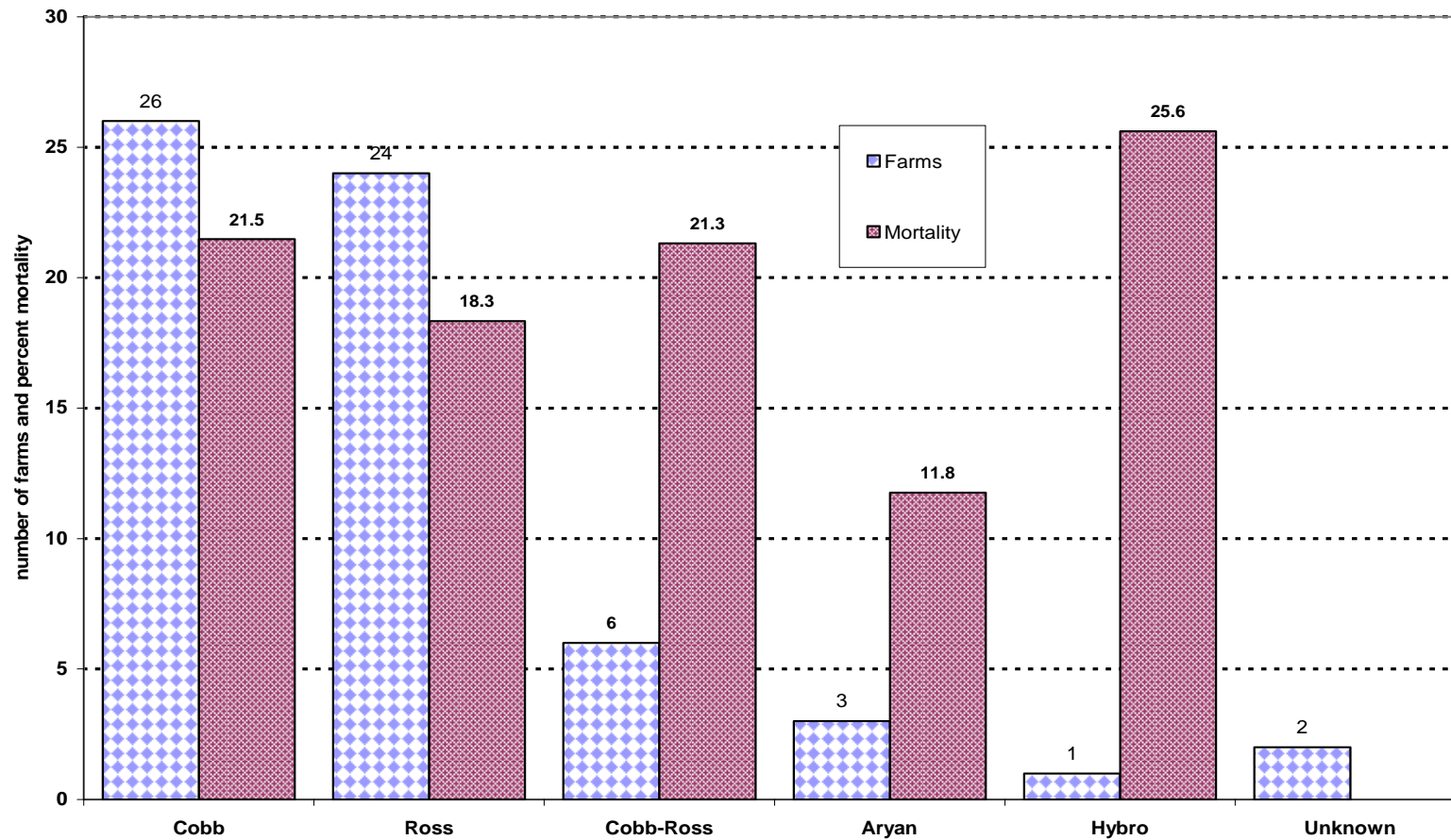
Table 8. Chicken mortality rates by year when sample farm was built					
Category	Year built	Number of farms	Chicks bought	Birds Sold	Percent Mortality
1	<= 1980	5	44,600	31,250	29.9
2	1981-85	6	89,100	79,400	10.9
3	1986-90	16	169,912	128,100	24.6
4	1991-95	2	18,500	16,000	13.5
5	1996-00	13	139,015	114,050	18.0
6	2001-05	18	151,734	122,000	19.6
0	unknown	2	-	-	
	Total	62	612,861	490,800	19.9

Figure 17. Suleimaniya poultry farm survey, 2004. Mortality rates by year when farm was built

Legend:
- number of sample Farms
- percent chicken mortality

year farm built	number of sample Farms	percent chicken mortality
<= 1980	5	30
1981-85	6	11
1986-90	16	25
1991-95	2	14
1996-00	13	18
2001-05	18	20

y-axis: number of farms and percent mortality

x-axis: year farm built
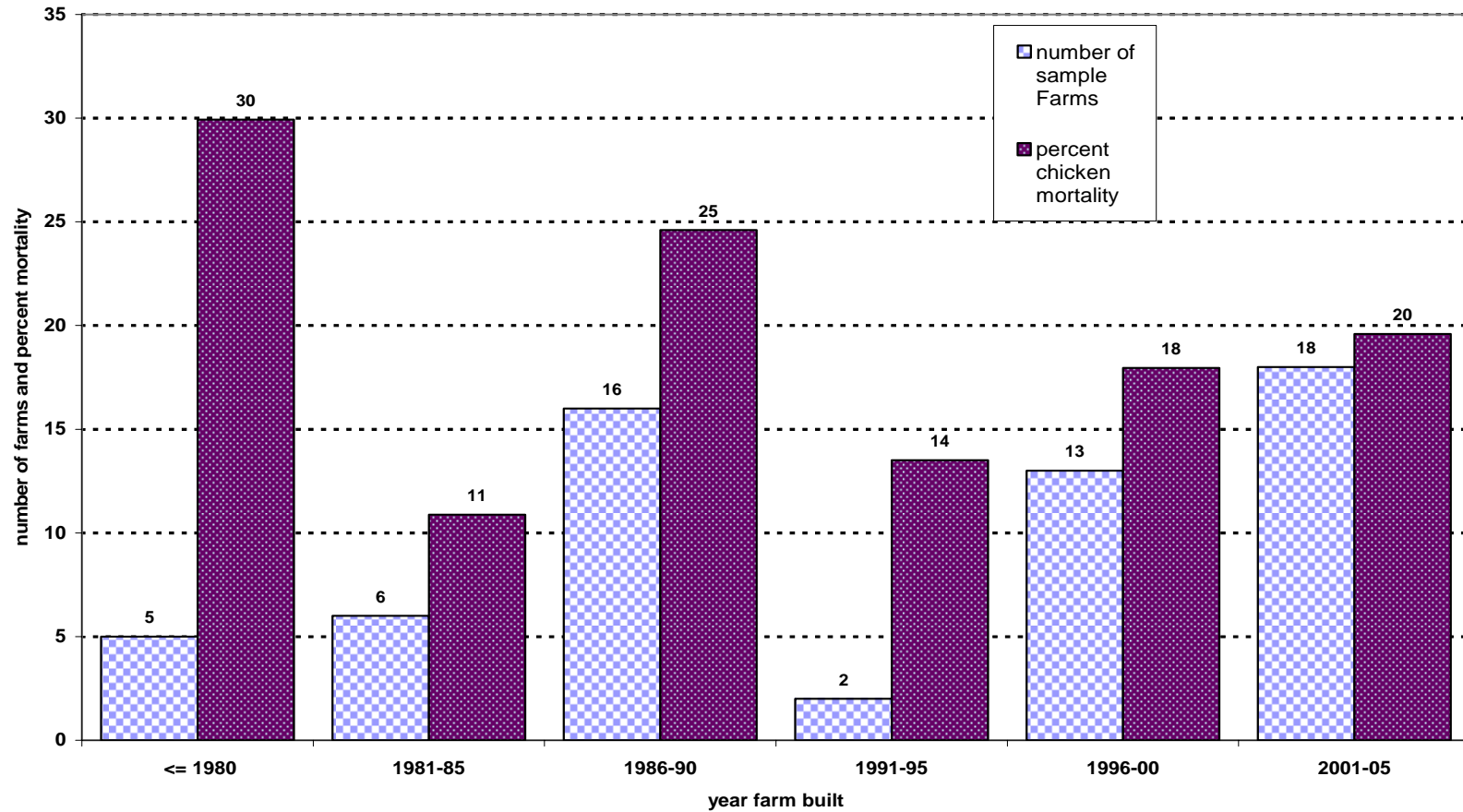
Table 9. Composition of feed rations at sample farms (kilograms per ton of ration)			
Feed	Ration A (start)	Ration B (grow)	Ration C (finish)	Average Price ID/kg
Other	9	9	11	1,819
Protein	65	57	43	1,331
Wheat	523	581	647	219
Veg. Oil	28	34	39	686
Maize, yellow	73	56	44	367
Soybean meal	298	258	211	543
Calcium	6	6	5	49
Total	**1,000**	**1,000**	**1,000**	
Premixed ration	(one farm only, one ration)			450

Figure 18. Suleimaniya poultry farm survey, 2004. Composition of poultry rations in sample farms. 2004

Note: One farm reports using premixed rations. All other sample farms do mixing of rations at the farm.

Legend:
- Ration A (start)
- Ration B (grow)
- Ration C (finish)

y-axis: kilograms per ton of ration (0 to 700)

Component	Ration A (start)	Ration B (grow)	Ration C (finish)
Other	9	9	11
Protein	65	57	43
Wheat	523	581	647
Veg. Oil	28	34	39
Maize, yellow	73	56	44
Soybean meal	298	258	211
Calcium	6	6	5
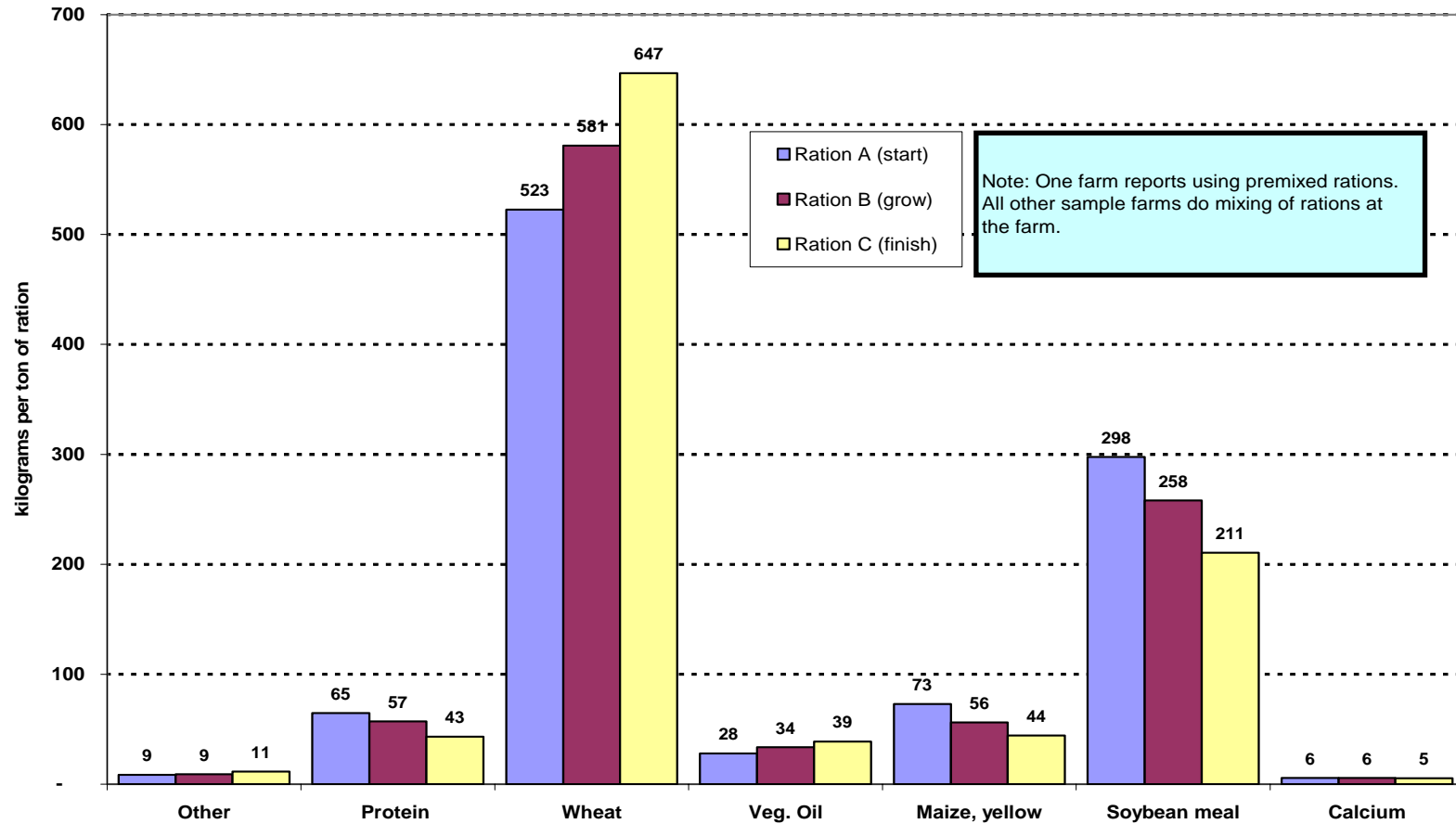
Figure 19. Suleimaniya poulry farm survey, 2004. Average cost per kilogram of feed ingredient used in sample farms
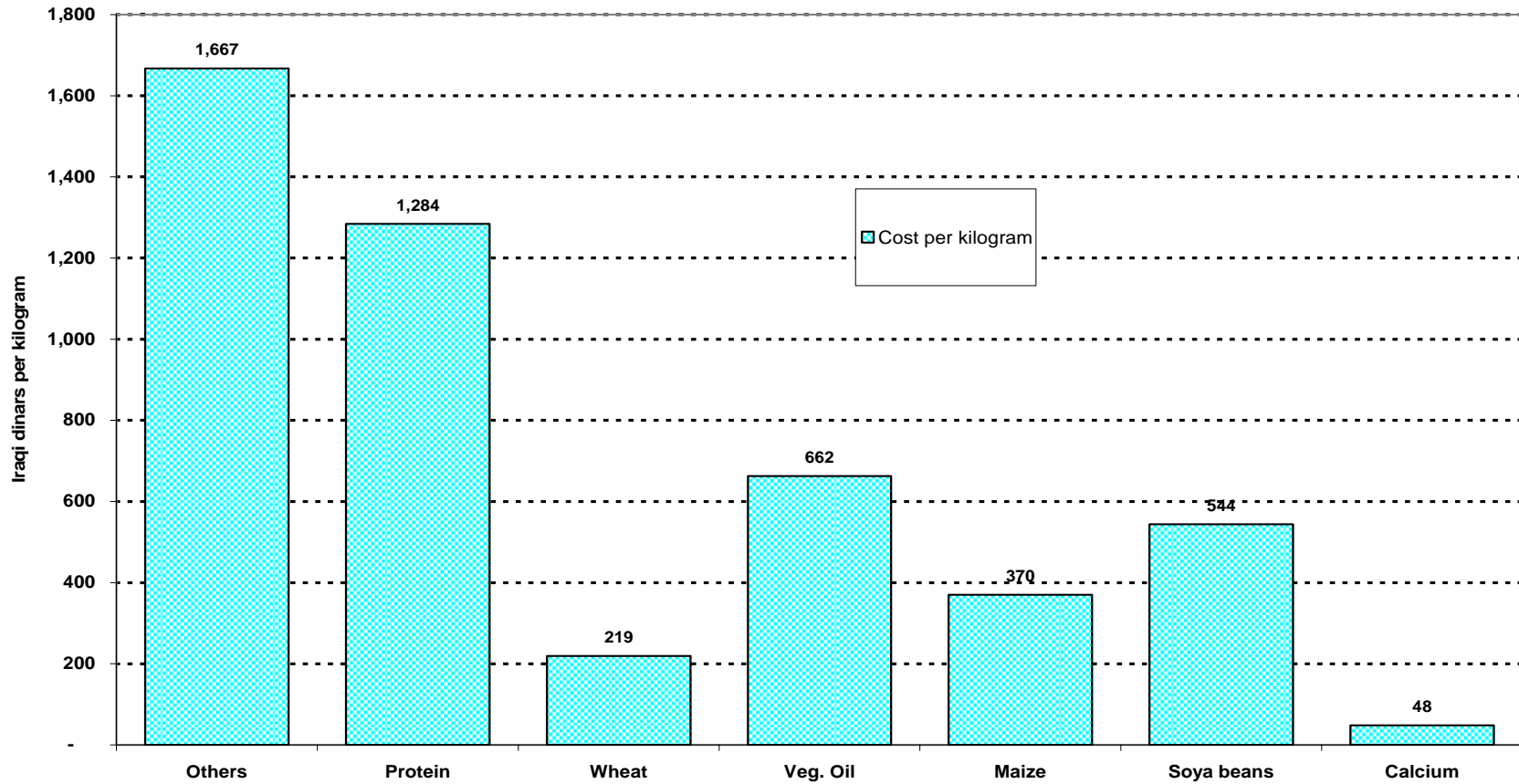
Table 10. Cost of ingredients in feed rations used in sample farms				
Feed	Ration A	Ration B	Ration C	Feed
	Iraqi dinars per kilogram of feed ration			
Others	14.2	15.2	18.8	اخرى
Protein	82.6	72.9	56.3	بروتين
Wheat	114.4	127.2	141.6	حنطة
Veg. Oil	18.3	22.0	26.0	دهن او زيت
Maize	26.6	20.9	16.6	ذرة صفراء
Soya bean	161.4	140.4	115.0	فول الصويا
Calcium	0.3	0.3	0.3	كلس
Total	**418**	**399**	**375**	
Note: cost of premixed ration: 450 ID per kilogram				

Figure 20. Suleimaniya poultry farm survey, 2004. Cost of ingredients in poultry feed rations (dinars per kiloram of ration)
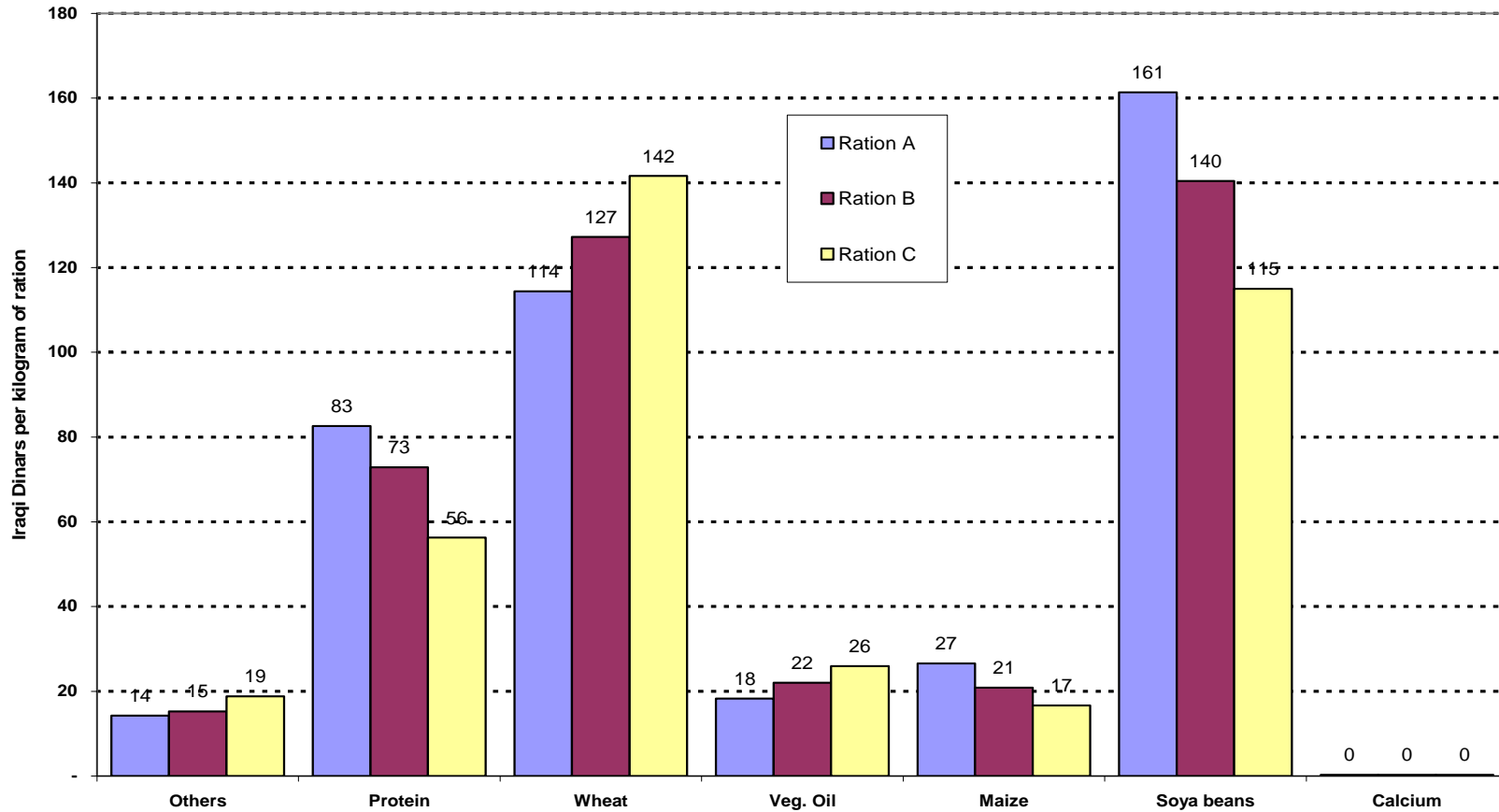
Figure 21. Distribution of cost of feed rations among sample farms

Descriptive Statistics	
Mean	392.8
Standard Error	6.3
Median	384.1
Mode	#N/A
Standard Deviation	48.9
Sample Variance	2,391.7
Kurtosis	(0.62)
Skewness	0.44
Range	189.7
Minimum	314.5
Maximum	504.2
Sum	23,568.8
Count	60
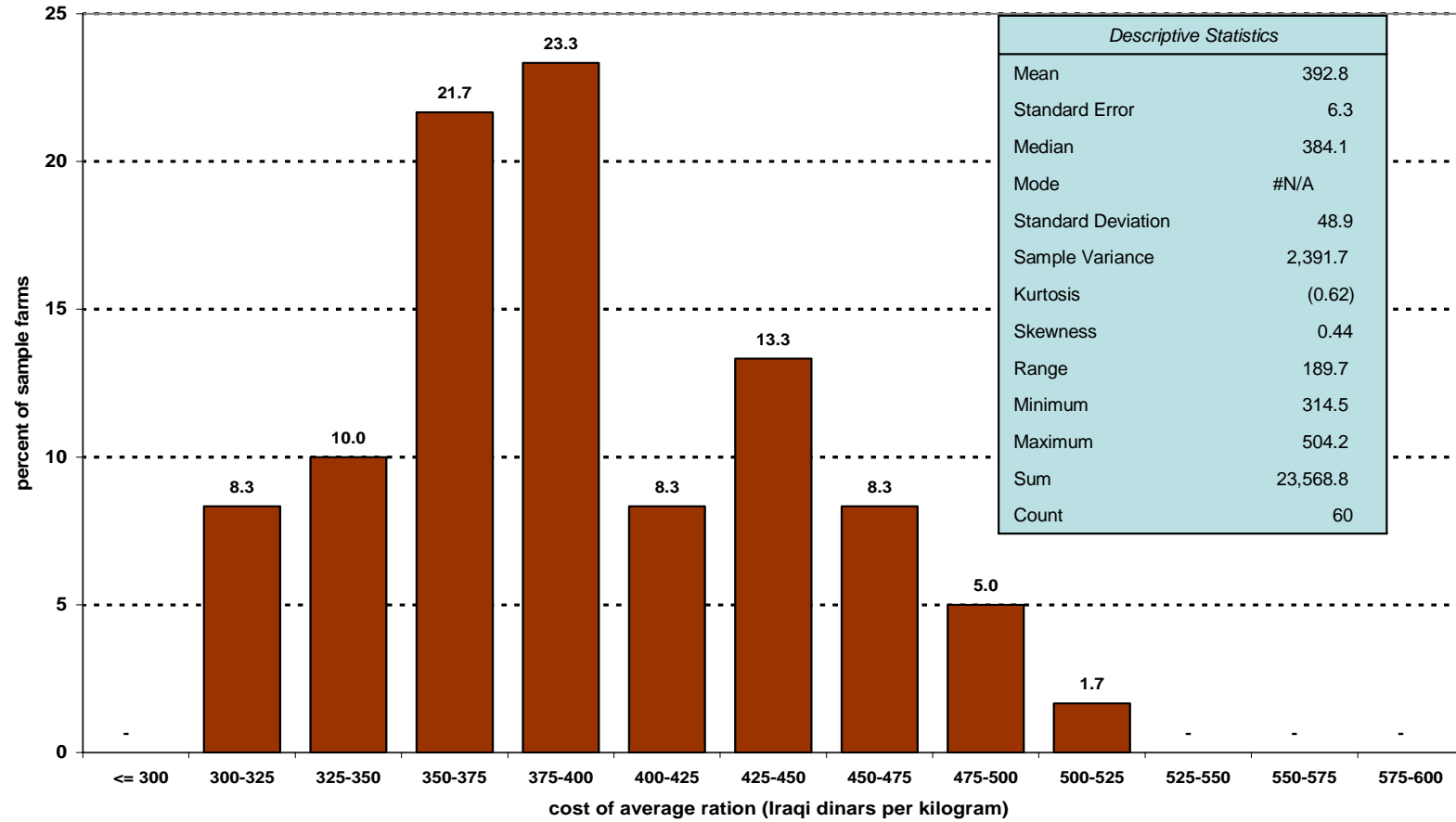
Figure 22. Average cost per kilogram of poultry feed rations

Bar chart showing Iraqi dinars per kilogram of ration:
- Ration A: 418
- Ration B: 400
- Ration C: 376
- Avg. A-B-C: 398
- Premixed: 450
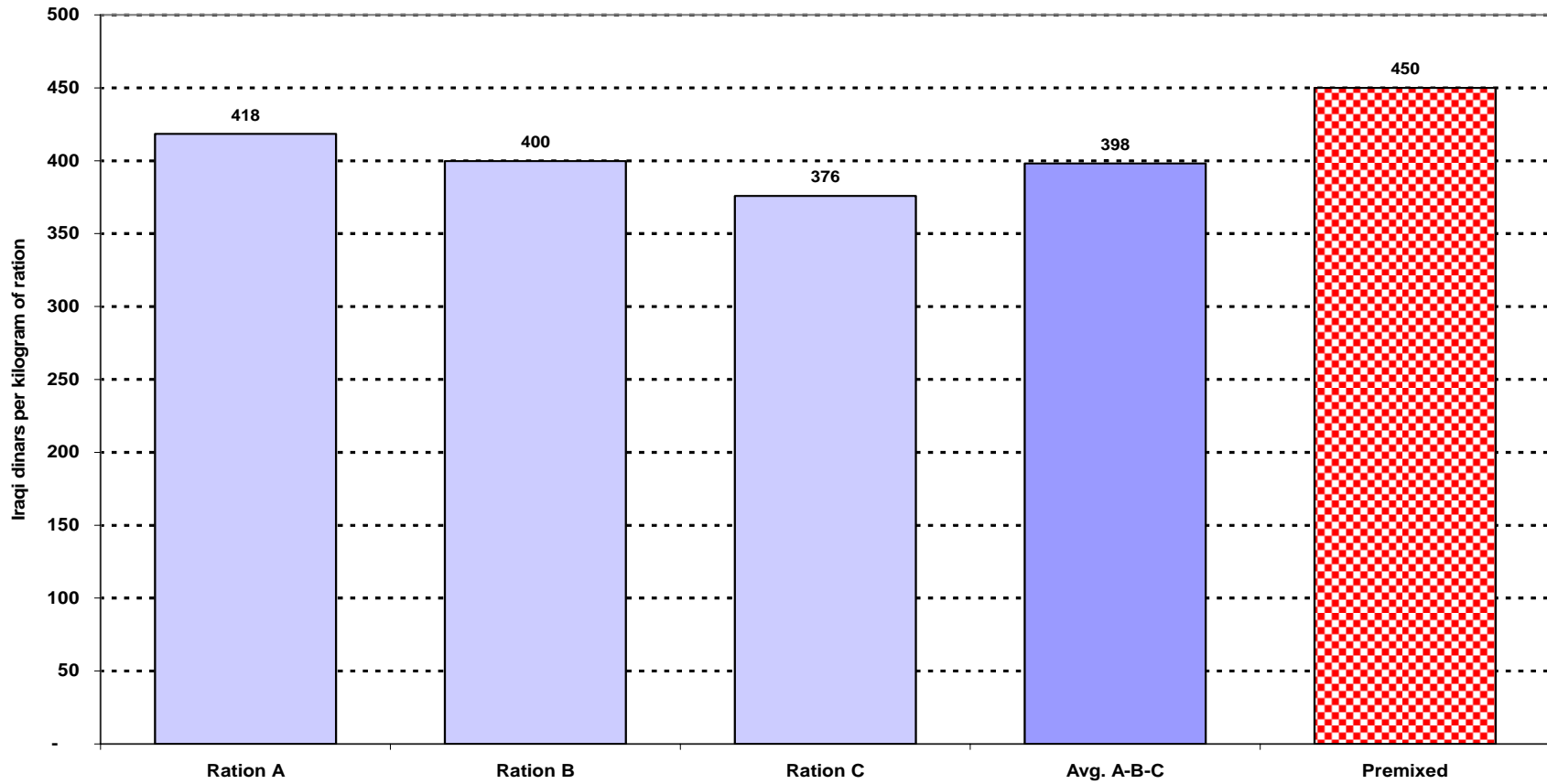
Table 11. Percent shares of weight and cost of ingredients in feed rations of sample farms

Feed Ingredient	Percent of Weight	Percent of Cost
Others	1.0%	4.0%
Protein	5.5%	17.8%
Wheat	58.3%	32.1%
Veg. Oil	3.3%	5.6%
Maize	5.8%	5.4%
Soya beans	25.6%	35.0%
Calcium	0.6%	0.1%
Ration	**100.0%**	**100.0%**

33

Figure 23. Percent of weight and cost of feed ingredients in average ration used in sample farms

34
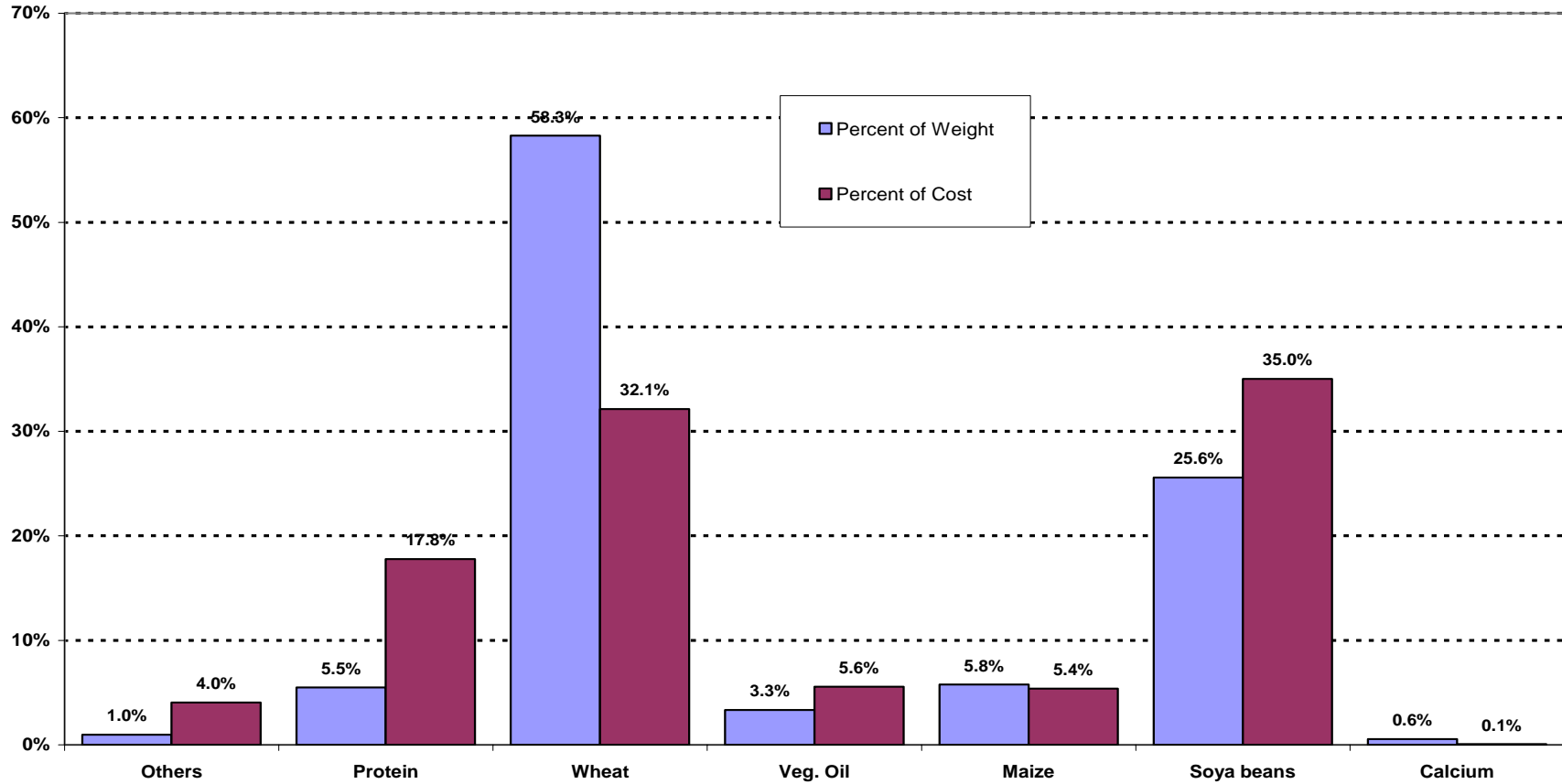
Table 24. Feed costs per bird sold by sample farms

Descriptive Statistics	
(Excluding outlier farm)	
Mean	1,914
Standard Error	41.5
Median	1,880
Mode	#N/A
Standard Deviation	319
Sample Variance	101,794
Kurtosis	(0.39)
Skewness	0.43
Range	1,322
Minimum	1,353
Maximum	2,676
Sum	112,906
Count	59
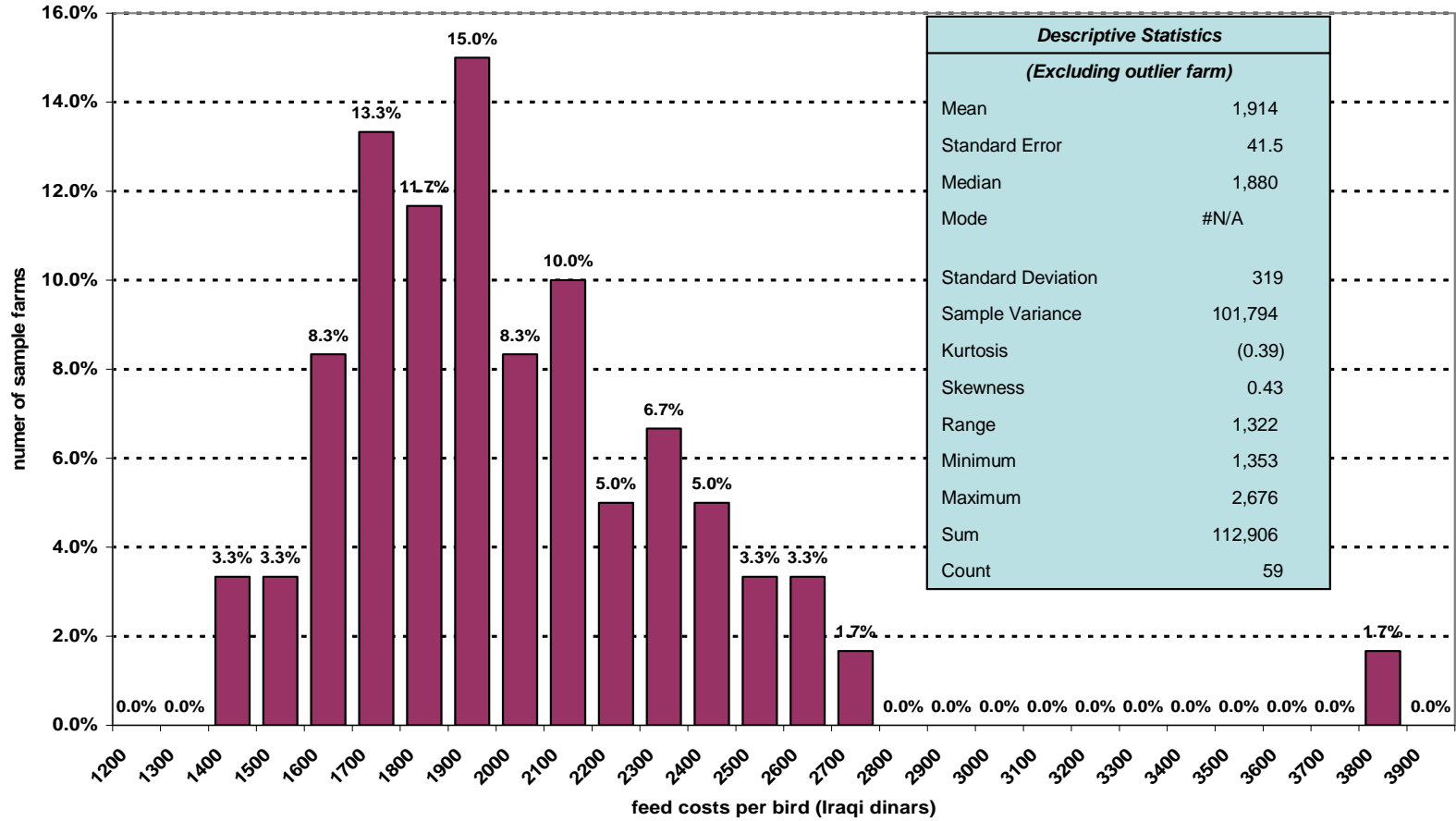
Figure 25. Feed conversion ratios among sample farms

Descriptive Statistics	
Mean	2.299
Standard Error	0.056
Median	2.279
Mode	2.381
Standard Deviation	0.432
Sample Variance	0.187
Kurtosis	4.992
Skewness	1.586
Range	2.563
Minimum	1.597
Maximum	4.160
Sum	137.947
Count	60
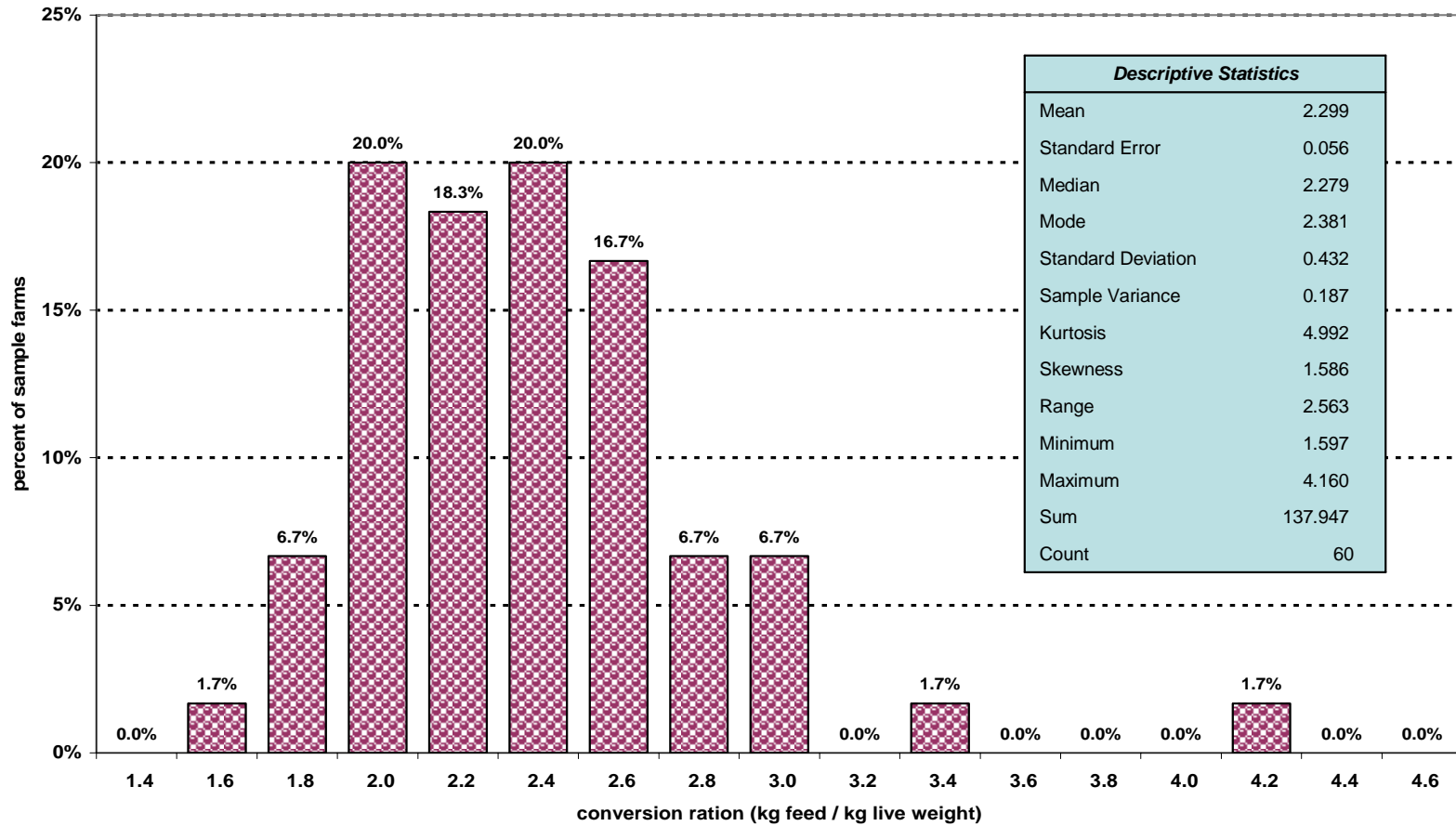
Figure 26. Costs of chicks and feed by kilo liveweight sold by sample poultry farms.

Figure 27. Margin over feed and chick costs among sample farms

Descriptive Statistics	
Mean	501.1
Standard Error	51.2
Median	574
Mode	#N/A
Standard Deviation	397
Sample Variance	157,409
Kurtosis	12.6
Skewness	(2.6)
Range	2,876
Minimum	(1,596)
Maximum	1,280
Sum	30,067
Count	60
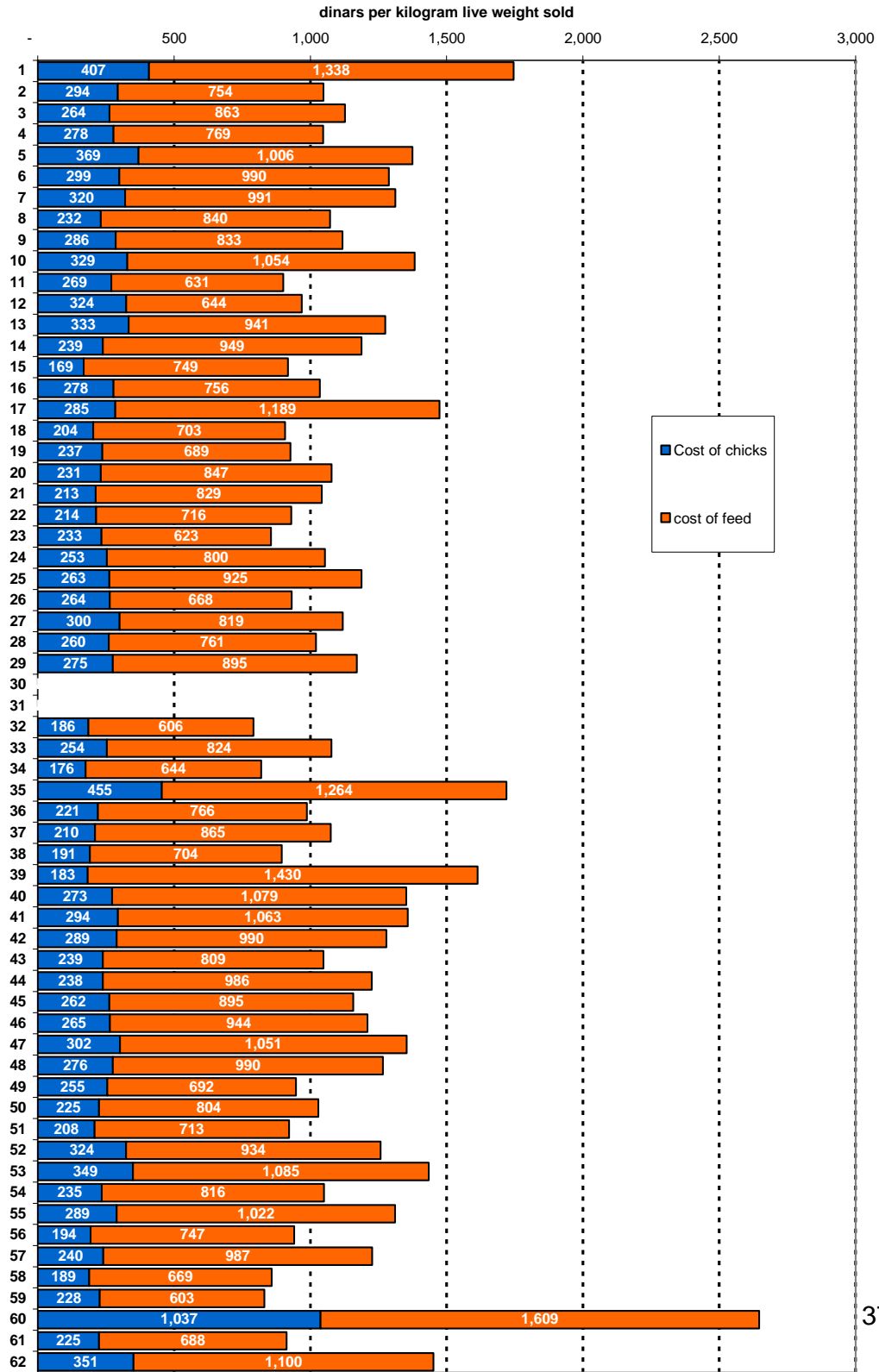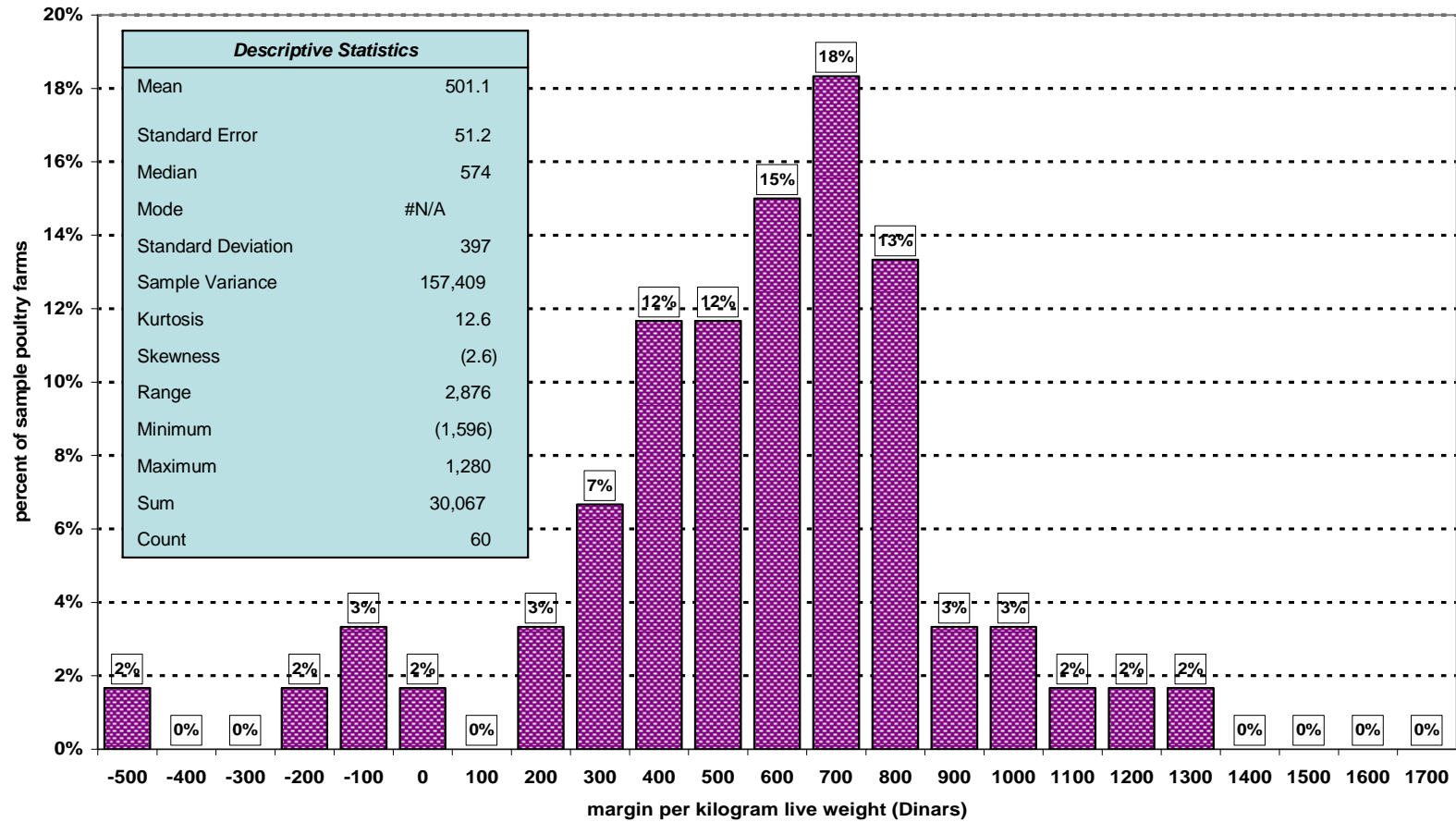
Figure 28. Distribution of "other variable costs" among sample farms

Descriptive Statistics	
Mean	218
Standard Error	11
Median	199
Mode	#N/A
Standard Deviation	83
Sample Variance	6,881
Kurtosis	(0.56)
Skewness	0.53
Range	324
Minimum	84
Maximum	408
Sum	13,109
Count	60

percent of sample farms

other variable costs (dinars per kilogram live weight)
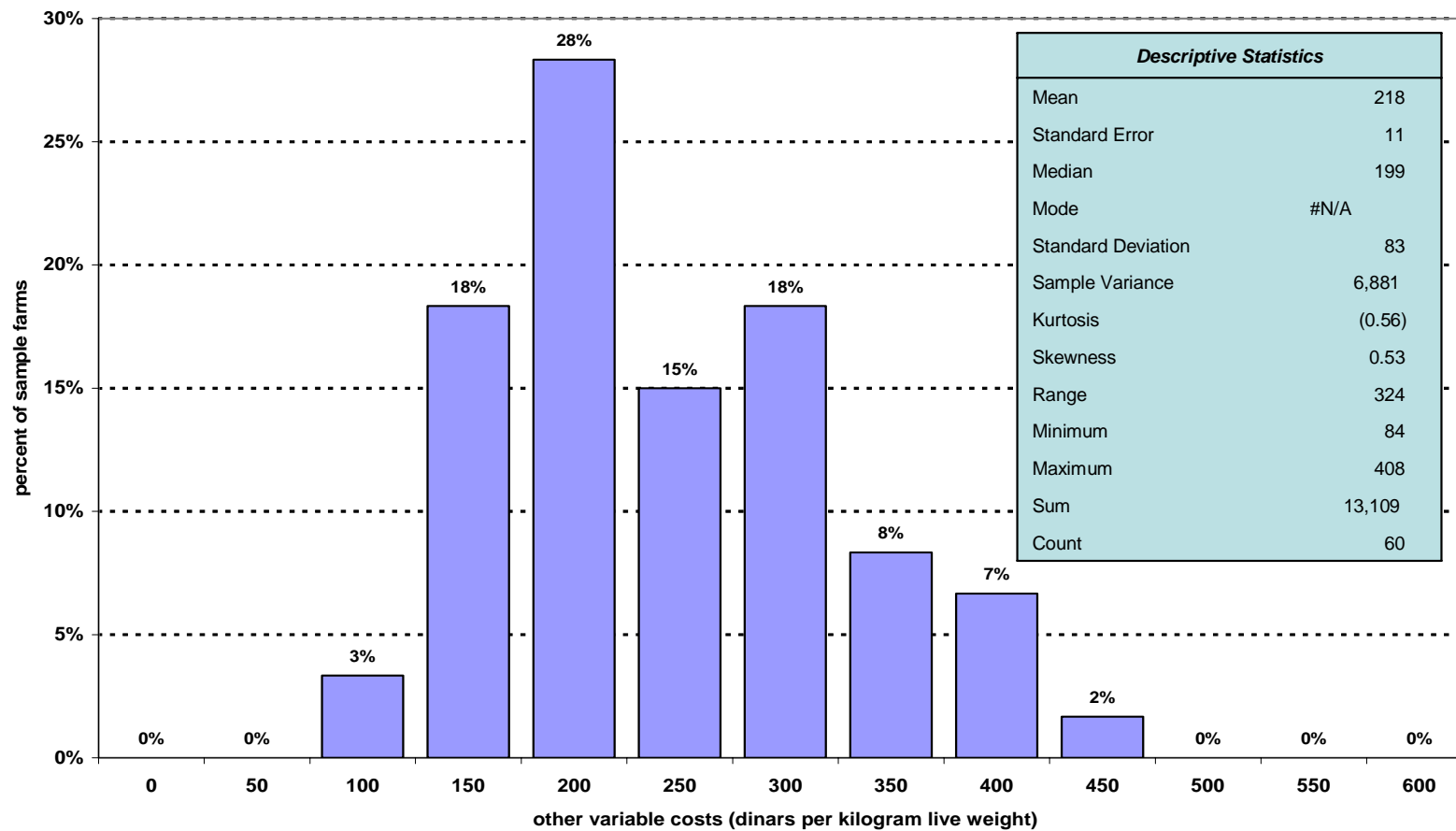
Figure 29. Structure of variable costs among sample farms

costs per kilogram of live weight (dinars)

Farm	Cost of Chicks	Cost of Feed	Other variable costs
1	407	1,338	160
2	294	754	279
3	264	863	291
4	278	769	231
5	369	1,006	252
6	299	990	279
7	320	991	296
8	232	840	169
9	286	833	120
10	329	1,054	400
11	269	631	293
12	324	644	201
13	333	941	233
14	239	949	320
15	169	749	221
16	278	756	276
17	285	1,189	312
18	204	703	139
19	237	689	124
20	231	847	172
21	213	829	162
22	214	716	198
23	233	623	174
24	253	800	124
25	263	925	171
26	264	668	153
27	300	819	217
28	260	761	394
29	275	895	142
30			
31			
32	186	606	84
33	254	824	191
34	176	644	148
35	455	1,264	408
36	221	766	237
37	210	865	334
38	191	704	202
39	183	1,430	278
40	273	1,079	251
41	294	1,063	367
42	289	990	226
43	239	809	179
44	238	986	311
45	262	895	153
46	265	944	341
47	302	1,051	178
48	276	990	196
49	255	692	164
50	225	804	114
51	208	713	118
52	324	934	283
53	349	1,085	192
54	235	816	109
55	289	1,022	194
56	194	747	155
57	240	987	204
58	189	669	95
59	228	603	291
60	1,037	1,609	353
61	225	688	148
62	351	1,100	104

40

Figure 30. Margin over variable costs among sample farms

Descriptive Statistics	
Mean	283
Standard Error	57
Median	383
Mode	#N/A
Standard Deviation	441
Sample Variance	194,240
Kurtosis	10.4
Skewness	(2.3)
Range	3,081
Minimum	(1,949)
Maximum	1,133
Sum	16,957
Count	60

y-axis: percent of sample farms

x-axis: margin over variable costs (chicks, feed, other) in dinars per kilogram live weight

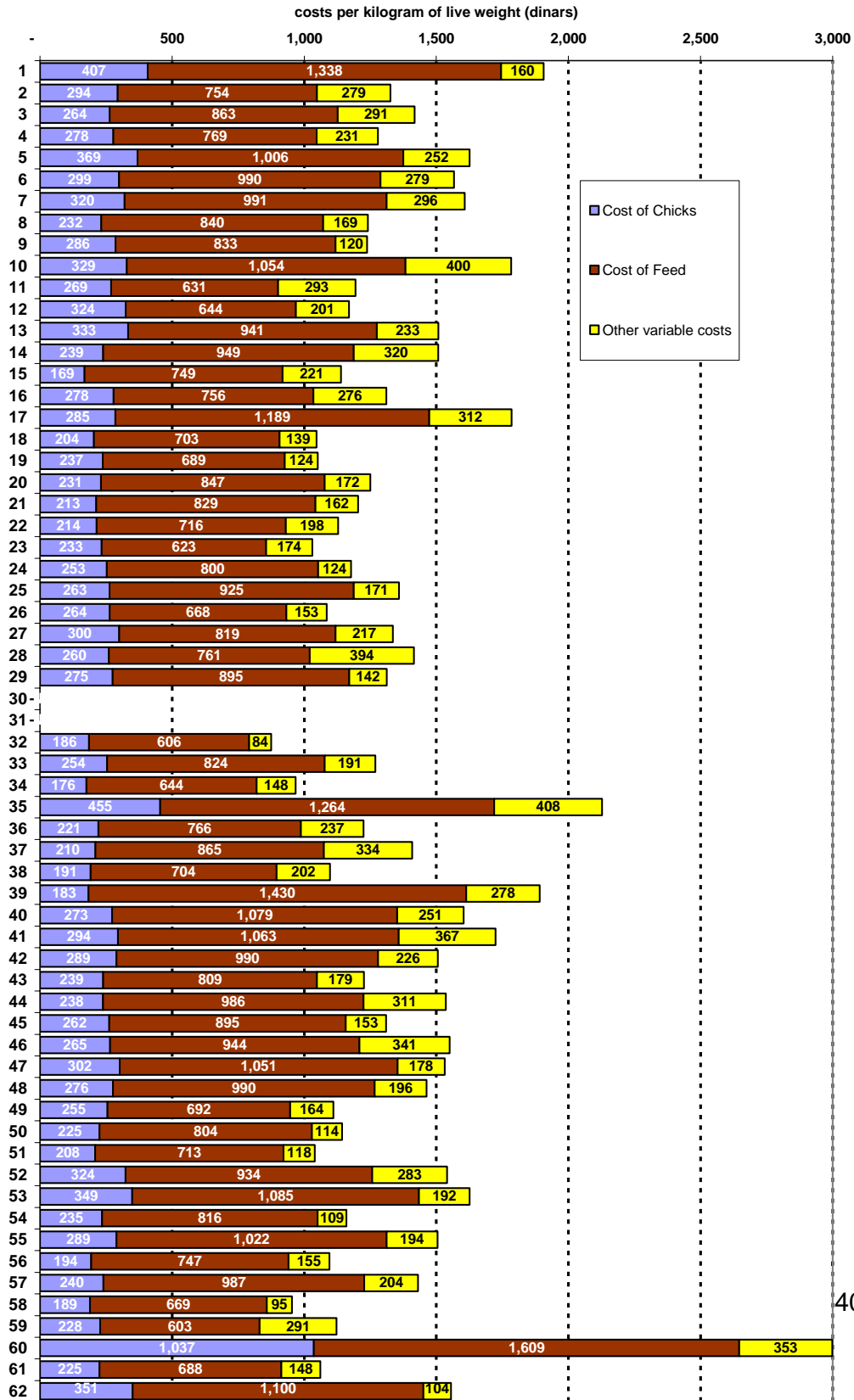Legend: Margin over variable costs

Table 12. Regression of margins over variable costs on percent mortality among sample farms

Regression Statistics

Multiple R	0.48
R Square	0.23
Adjusted R Square	0.22
Standard Error	390.45
Observations	60

ANOVA

	df	SS	MS	F	Significance F
Regression	1	2,617,847	2,617,847	17.17	0.0001
Residual	58	8,842,295	152,453		
Total	59	11460142.34			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	658.29	103.73	6.35	0.00	450.66	865.93
Percent mortality	(19.43)	4.69	(4.14)	0.00	(28.81)	(10.04)

Figure 31. Mortality and margin over variable costs among sample farms

Legend:
- ◆ Predicted margin
- ■ Actual margin

y-axis: margin over variable costs, dinars per kilogram live weight

x-axis: mortality rate, percent

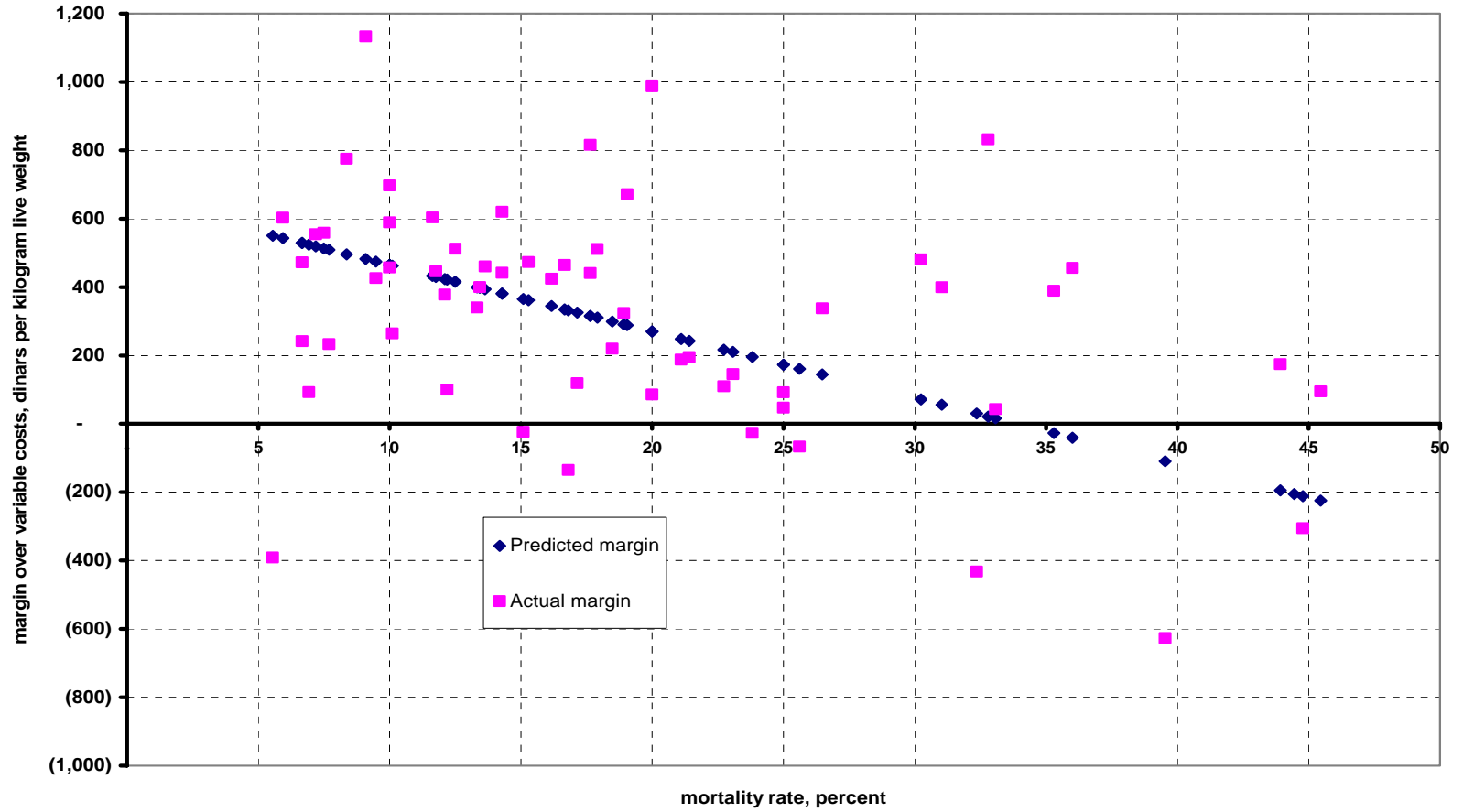## TABLE 13. Regression of margins over variable costs on mortality and feed conversion among sample farms

Regression Statistics	
Multiple R	0.77
R Square	0.59
Adjusted R Square	0.57
Standard Error	288.67
Observations	60

ANOVA

	df	SS	MS	F	Significance F
Regression	2	6,710,234	3,355,117	40.26	1.25491E-11
Residual	57	4,749,909	83,332		
Total	59	11,460,142			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	2,024	209	9.66	0.000	1,605	2,444
Percent mortality	(3.6)	4.1	(0.88)	0.382	(11.9)	4.6
Conversion ratio	(727)	104	(7.01)	0.000	(935)	(519)

Figure 32. Plot of predicted and actual margins over variable costs among sample farms

predicted margins, dinars per kilogram live weight