

Increasing Livestock Productivity through Nutrition, Management and Extension Education in Developing Countries

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Introduction

My interest in international work began in 2002 when I was invited by the Inter-American Institute for Cooperation on Agriculture (IICA) to provide some voluntary assistance to dairy producers in the Caribbean. Since then, I have completed 10 international assignments within the last 11 years. I carried out the last 3 as a faculty member of UF/IFAS. The work in Ghana and Liberia was carried out using University and County time as professional development. The rest was accomplished using my annual leave. All the assignments involved approximately 48 weeks of preparing, working and reporting on all the projects. These assignments were funded mainly by the United States Agency for International Development (USAID) through Agricultural Cooperative Development International/Volunteer Overseas Cooperative Assistance (ACDI/VOCA) and Winrock International. Some other work that was done in the Caribbean is reported in a letter of support by Tom Beach, International Program Coordinator, Agriculture Institute of Canada. I am an Animal Nutritionist by training, and have worked on assignments that matched my expertise, which are agricultural extension and livestock production. The following is the narrative description for the assignments that I completed.

Mali August 2013

There are about 8 million head of beef cattle in Mali, and many of the farms are characterized by small operations with the age of first calving of 48 months which is too long compared to an acceptable length of 36 months. There is a dry season (December to May) and a rainy season (June to November). During the dry season forage growth is limited. It is not practice to feed grains to beef cattle in the area. Most of the grains are sold or used for human consumption. Cattle survive on corn stover, sweet potato vines and other crop residues that are available during the dry season. These ingredients do not have enough nutrients to meet the nutritional requirements for cattle. Consequently, cattle lose weight with a simultaneous decline in reproduction performance. This is reflected in long calving intervals ranging from 18-20 months. The combination of age of calving and long calving intervals reduces the productivity of most breeding cows that produce 3 calves per cow rather than 6 calves in their lifetime. The objective of this assignment was that 32 cattle producers would gain knowledge in feeding, mineral nutrition, body condition scoring, keeping of breeding records, reproductive management and balancing simple rations. They will be evaluated after 6 months according to ACDI/VOCA guidelines. The producers were asked at the end of 7 days of training what changes they would make on their farms. The responses were selecting heifers and cows that have good mothering ability and bulls with superior traits as well as providing water at all times for their animals. They planned to body condition score their animals and provide supplemental feeding. When these production practices are implemented on the farms, producers are expected to see a gradual increase in the number of calves produced from 3 calves to 6 calves per life of a cow thereby increasing profitability at the farms.

Liberia September 2012

Training was provided to 121 swine producers in Margibi County (located about 2 hours of driving from Monrovia, the capital of Liberia). Generally, producers do not feed grains to their pigs because they are not readily available in the country. Wheat bran is available from a flour mill in Monrovia, but its usage as a feed ingredient is limited to areas around Monrovia due to the high cost of transporting it to the county. There are no feed mills in Liberia,

hence there is hardly any balanced swine feed on the market. Producers only feed ingredients which are available locally. Some of the local ingredients are cassava (yucca) and cassava meal, sweet potato leaves, coconut meal and palm cake. The objectives of this assignment were 1) swine producers would increase their knowledge of swine production and management by 90% and 2) to gain knowledge in balancing simple rations by 80% using Pearson's Square. An evaluation was conducted after 8 days of training. All the producers reported a gain in knowledge by 80% and they intended to apply what they have learnt at their farms. The impact expected is an increase in productivity on the farms. This has the potential to transform them into operations that are likely to be more economically sustainable.

Ghana July 2011

Alhassan Farm had set up the first feed mill in Northern Ghana. However, the farm was challenged with the lack of knowledge and experience in feed formulation. Technical support was therefore urgently needed to help kick start this operation. The objectives of this assignment were 1) to review and fine tune the existing feed formulations for guinea fowl rations and to develop some new formulations for poultry, and 2) the staff would gain knowledge in using the formulation spread sheets. After 10 days of activities and meetings with industry representatives, the following was the outcome: 1) nine rations were formulated; 2) the host, his family and 9 project staff learned how to use the formulation spread sheets; 3) a feed production manual was prepared containing information on feed processing, the control of moisture, temperature and the prevention of mould growth on feed ingredients and feeds. Based on the discussion I had with the Secretary of the Guinea Fowl Association, improvement in feeding and controlling worm infestation in the guinea fowl industry would reduce mortality in guinea fowl chicks known as kleets. There are over 12,000 guinea fowl producers in Northern Ghana and raising them is done mostly by women. Improvement in productivity within the industry would lead to more financial returns to the farmers, thereby reducing poverty as well as strengthening the grain and oil seed industry in Northern Ghana by adding value to the grains.

Kenya May 2010

According to the Association of Kenyan Feed Manufacturers (AKEFEMA) and Kenyan Bureau of Standards, there are an increasing number of small feed millers who need training in the manufacturing of good quality feeds. Poultry producers who bought poor quality feeds often suffered financial losses and were not very happy. Apart from that, there are several feed ingredients indigenous to Kenya that do not fit the names of conventional feed ingredients. There was a need to develop standards by which these ingredients could be identified by their chemical analyses. The objectives of this assignment were 1) to develop a database on the nutrient contents of locally available feed ingredients, 2) to develop the appropriate ration formulations for poultry and 3) to increase the knowledge of stakeholders to use the formulation spread sheets. I consulted with AKEFEMA members before the start of the assignment to determine what needed to be done. Arising out of the consultation and discussions is that the information on the nutritive values of local feed ingredients in Kenya is available. However, this information resides with research institutions, universities, analytical laboratories and private agricultural companies. During the assignment, we as a team consisting of Winrock Project Manager, AKEFEMA Program Officer and I visited 2 universities, 3 analytical laboratories and 3 feed mills to collect the data. The information on the nutritive value of the ingredients was summarized in a table that was presented to the stakeholders. Their input was sought to improve it. The following were the outcome: 1) a database on the nutrient contents of locally

available feed ingredients was developed; 2) 4 feed formulation spread sheets were developed based on local feed ingredients for broiler starter, broiler finisher, layers, and dairy; 3) thirty-one feed millers and animal nutritionists learned how to use the excel spread sheets and to produce quality feeds. This assignment would have an impact on improving the feed quality in Kenya. The feed formulations that were developed would be used by compounders to balance the nutrients in the feeds for poultry, thereby producing better quality feeds using some local ingredients. Furthermore, poultry producers are expected to benefit because good quality feeds would enable their businesses to be more profitable and financially sustainable.

Bolivia March 2008

Punata is a province in Bolivia with approximately 280 dairy producers. They are members of a milk cooperative that owns the local milk processing plant. The current milk production yield in 2008 was 1.5 liters per cow per day. Producers of the dairy cooperative would like to improve that yield to 2.0 – 2.5 liters per cow per day. They are aware that in order to obtain higher levels of productivity from their cattle, the problems in management, animal health and animal nutrition must be addressed. Previously, the cooperative received the assistance of an animal health specialist, but they found it is necessary to complement this with technical assistance in the production of dairy cattle feed and training of dairy producers. The objective of this assignment was that producers and technicians would gain knowledge on feeding, dairy management and balancing concentrate rations by 80%. After 10 days of meetings, farm visits, training and demonstration on making a feed concentrate ration, the following were the outcome: 1) two technicians learned to use the 5 spreadsheets developed to formulate rations for dairy; 2) Sixty-seven dairy farmers gained knowledge to manage and feed their animals properly by 60%. Based on the questions asked at the training sessions and the enthusiasm to learn as displayed by the attendees, it is reasonable to assume that the 67 producers who attended the training were better prepared to manage and feed their animals properly. The impact would be increased milk production.

Uganda September 2007

Kumi Development Organization (KUDO) is a community support development entity founded in 2004 by a group of 34 people. Most of them grow grains and raise livestock. KUDO has been involved in commercial milling of grains for the rural communities in Kumi. The high demand for poultry feeds as a fast-growing enterprise motivated KUDO to start production of poultry feeds. However, the biggest challenge this organization faced was the lack of knowledge to formulate feeds. KUDO approached ACDI/VOCA for technical assistance in the production of poultry feeds. The objectives of this assignment were 1) to formulate feeds for poultry and 2) to increase the members' knowledge of feed production. After a period of consultation and training, the following were the outcome: 1) four ration formulations were developed for poultry using Excel spread sheets; 2) a computer analyst and a veterinarian learned how to use the spread sheets to balance rations; 3) thirty members of KUDO learned to balance simple rations using Pearson's Square and to make feeds which include ingredients selection, feed quality, processing and storage. The impact is that the farming community of Kumi would benefit when value is added to locally produced grains. Value addition would create employment. It would reduce poverty by increasing income at the farm level.

Egypt February 2007

One of the critical constraints to dairy and beef production in Egypt is the limitation on feed production due to competition from more profitable food crops. Milk production is seasonal, with 80% being produced between the months of February and May which is about the same time as the Berseen (clover) season. The unavailability of forage throughout the year results in lactation lengths of approximately 205 days per year instead of 300 days. I was invited by a dairy association through ACDI/VOCA to make some recommendations on supplementing feed rations beyond the Berseen season. The objectives of this assignment were 1) to review existing alternative feeds and the feasibility of incorporating them into dairy rations and 2) to formulate dairy rations based on nutritive value of agro-industrial by-products. Several activities related to planning and consultations were carried out, along with meetings and visits. Visits were made to a mango and a tomato processing plant as well as a plant that processes 110 tons of oranges daily. Based on the activities, the following were the outcome: 1) six formulation spread sheets were developed to include some alternative feed ingredients and 2) some recommendations on the ensiling of orange pulp, tomato pumice and field peas by producers were provided to the host. When the formulations are put to use and the recommendations on ensiling some of the agro-industrial by-products are implemented, then the lactation lengths of dairy animal would be extended, thereby increasing milk production.

Azerbaijan March & November 2006

USAID had supplied feed manufacturing equipment to 3 feed millers who formulated poultry feeds. The outbreak of avian influenza at the beginning of 2006 crippled the poultry industry. As a consequence, there was an urgent need for the feed millers to produce feeds for other livestock feed. The millers requested the assistance of an animal nutritionist to develop concentrate rations for beef cattle. I arrived in Azerbaijan in March 2006 to fulfill this need. The objectives of the assignment were 1) to develop the formulations for beef concentrate rations and 2) 3 feed millers would learn to use the spread sheets. In November 2006, I was asked to return to Azerbaijan at the request of one of the hosts. His sales of beef cattle concentrate were very successful. He wanted a formulation for dairy cattle as well as some training for some of his clients who were cattle and dairy producers. The outcome for these assignments were 1) 19 people were trained on how to feed dairy animals properly and 4 feed formulations were developed for beef and dairy. The impact was that the 3 feed millers were able to keep their businesses open. The host to whom I returned to help in November has since expanded his business beyond the tonnage of feed he produced for poultry.

Conclusion

I benefited a lot from these volunteer assignments. They increased my knowledge in the use of alternative feed ingredients in formulating rations for livestock. I was able to observe signs of mineral deficiencies that are difficult to see or absent in well fed livestock in North America. I learned that providing knowledge through adult education can bring about both positive change and financial benefits to farmers and feed manufacturers by changing their feed production practices. I heard from some participants at the training sessions that they intended to make the positive changes in feeding their animals because selling their animal is an important source of income. As an extension agent, my ability to work with people of different cultures is important. These assignments have increased my confidence and ability to work in different cultural settings. The experience and knowledge I gained from these assignments would be of benefit to IFAS Northeast Florida Livestock Agent Group as I continue to work with my colleagues as a lead on animal nutrition.