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By-Product Utilization for Animal Production

Proceedings of a workshop
on applied research
held in Nairobi, Kenya,
26-30 September 1982

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BY-PRODUCT UTILIZATION FOR ANIMAL PRODUCTION

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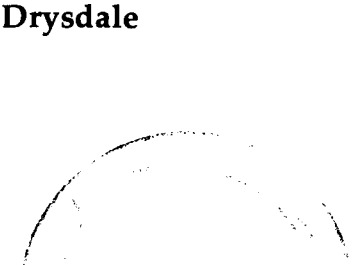

Résumé[1]

L'utilisation de sous-produits agricoles pour la production animale a fait l'objet d'un grand intérêt de la part des spécialistes de l'alimentation du bétail et à cet égard, le Centre de recherches pour le développement international (CRDI) a subventionné un certain nombre de projets de recherche sur l'alimentation du bétail faisant appel aux sous-produits agricoles et à de nouveaux aliments au cours des neuf dernières années.

Cette monographie est le compte rendu des travaux et délibérations d'un atelier tenu à Nairobi, au Kenya, du 26 au 30 septembre 1982, pour examiner les résultats de recherches prometteuses, qui semblent sur le plan technique et économique être applicables aux systèmes d'alimentation des animaux, pour discuter et recommander les méthodes de recherche appropriées à l'évaluation des sous-produits spécifiques destinés aux systèmes de production animale identifiés ainsi que la normalisation des méthodes d'analyse pour la description de la valeur alimentaire des sous-produits et des aliments nouveaux.

On y trouvera une description des résultats de recherches sur les sous-produits effectuées en Égypte, au Soudan, en Indonésie, en Tanzanie, au Pakistan et au Kenya, suivie d'un résumé des débats sur les avantages et inconvénients de l'approche et des méthodes utilisées dans les essais de composition et de rations de ces sous-produits. Y figurent également des rapports sur les essais de bilan de la valeur nutritive des aliments, l'évaluation des expériences sur les animaux, et les aspects économiques dont il est nécessaire de tenir compte en matière de recherches sur l'utilisation de sous-produits pour l'alimentation du bétail. Et en dernier lieu, cette monographie traite des essais réalisés dans des exploitations agricoles, dans les conditions réelles d'emploi.

[1] Chaque communication du présent compte rendu des travaux et délibérations est accompagnée d'un résumé en anglais, en français et en espagnol.

Resumen[1]

El empleo de subproductos agrícolas para la producción pecuaria es un tema que ha recibido la atención de los especialistas en nutrición animal. El Centro Internacional de Investigaciones para el Desarrollo (CIID) ha apoyado durante los últimos nueve años un buen número de proyectos de investigación sobre alimentación de ganado con subproductos agrícolas y otros alimentos no convencionales.

Este libro contiene los trabajos presentados en un taller celebrado en Nairobi, Kenia, del 26 al 30 de septiembre de 1982 con el objeto de revisar los avances investigativos que se consideran técnica y económicamente factibles de aplicar en sistemas de alimentación animal, de discutir y recomendar metodologías de investigación que permitan evaluar subproductos específicos con destino a sistemas definidos de producción animal, y de discutir la normalización de los métodos analíticos empleados en la descripción del valor nutritivo de los subproductos y las raciones no convencionales.

Los resultados de las investigaciones sobre subproductos en Egipto, Sudán, Indonesia, Tanzania, Paquistán y Kenia, van seguidos de un recuento de las discusiones sostenidas sobre la validez o debilidad de los enfoques investigativos aplicados en la modificación y administración de los subproductos. También se presentan los trabajos sobre medición de la calidad nutricional de los alimentos, su evaluación en pruebas de alimentación y los aspectos económicos que deben tenerse en cuenta en este tipo de investigaciones. Finalmente, se describen y discuten ensayos en finca de los subproductos como alimento animal.

[1] Cada trabajo va accompañado de un resumen en español, francés e inglés.

Contents

Discussion of the Role of Farm Systems in By-Product Research

Gordon R. Potts[1]

Several considerations of farm surveys are highlighted. An aggregate survey, using secondary data based on national production statistics, provides some indication of the potential availability and geographical distribution of by-products. A localized farm survey is used, however, to determine the actual availability of by-products to a specific animal-production system. By identifying several major characteristics of farmers in a particular animal-production system, a sample of 30 farmers is deliberately selected for the survey. The survey questionnaire should focus on the critical information needed by the researcher to implement an applied research program, including the animal enterprise, feeding system, crop production, and farm resources. Throughout the survey, collaboration between researcher and farmer should be encouraged, through the use of repeated visits, open-ended questions, and technical assistance, to obtain the maximum benefit of the farmer's specialized knowledge of by-product utilization.

Ce document met l'accent sur plusieurs points à inclure dans les enquêtes administrées dans les exploitations agricoles. Une étude globale, faite à partir de données secondaires tirées des statistiques de production nationale, fournit des indications sur l'éventuelle disponibilité de sous-produits et leur répartition géographique. Une enquête locale, au niveau des fermes est cependant en train d'être effectuée pour déterminer quels sous-produits sont réellement disponibles pour le système d'élevage en usage. Trente fermiers ont été choisis d'une manière précise pour cette étude, c'est-à-dire après avoir déterminé un certain nombre de caractéristiques propres aux exploitants agricoles d'un système de production animale particulier. Le questionnaire utilisé visera à obtenir des informations importantes, dont le chercheur a besoin pour mettre sur pied un programme de recherche appliquée ; les questions porteront sur les exploitations d'élevage, le système d'alimentation des bêtes, les types de cultures et les ressources agricoles. Tout au long de cette étude, la collaboration entre le chercheur et le fermier devrait être encouragée, par des séries de visites, des questions posées sans idées préconçues et de l'assistance technique, afin de tirer le maximum de profit des connaissances spécialisées du fermier en utilisation des sous-produits.

Se destacan varias consideraciones en relación con los estudios de fincas. Un estudio agregado, que emplea información secundaria basada en las estadísticas de producción nacional, ofrece indicios sobre la disponibilidad potencial y la distribución geográfica de los subproductos. Sin embargo, se emplea un estudio localizado de finca con el fin de determinar la disponibilidad real de los subproductos para un sistema específico de producción pecuaria. Al identificar varias de las principales características de los agricultores de un sistema particular de producción pecuaria, se selecciona deliberadamente del estudio una muestra de 30 agricultores. El cuestionario del estudio debe centrarse en la información crítica que el investigador necesita para poner en práctica un programa de investigación aplicada, incluyendo la empresa pecuaria, el sistema de alimentación, la producción de cultivos y los recursos agrícolas. A lo largo del estudio, debe estimularse la colaboración entre el investigador y los agricultores, mediante el uso de visitas repetidas, preguntas abiertas y asistencia técnica, con el fin de obtener el máximo beneficio del conocimiento especializado de agricultor sobre la utilización de los subproductos.

[1] International Development Research Centre (IDRC), Cairo, Egypt.

For a farm survey to be an appropriate tool for conditioning the scope and direction of the by-product research program, it is imperative that it be designed to provide the critical types of information required by the by-product researcher to establish research priorities. This implies that the by-product researcher and agricultural economist, who traditionally conducts the farm survey, must interact effectively to develop a questionnaire that focuses on the key issues related to utilization of by-products in an animal-feeding system. The need for more detailed and comprehensive surveys on particular areas of the animal-production system may be identified as a result of the initial farm survey, and these can be conducted as the research program proceeds. Initially, however, the farm survey should involve a relatively brief investigation of the animal-feeding system and the role of by-products in that system to provide the researcher with sufficient information to set priorities in the research program.

In this paper, for simplicity of presentation, the beneficiary of by-product research is the farmer. Other appropriate beneficiaries, however, might include feedlot and feed-mill operators.

Aggregate Survey

The survey most often encountered in by-product research consists of aggregate data that indicate the amount of by-products *potentially* available on a regional or national basis. The information is usually calculated using crop-production data in which a predetermined percentage of the crop is assumed to be crop by-product. This information, often from secondary data sources, can be supplemented by contacts with knowledgable agricultural officials and farmers to provide an indication of what geographical area or type of animal-production enterprise would benefit most from applied research oriented to by-product utilization for animal feed. A second type of by-product survey involves primary-data collection using a randomized stratified sample, representative of the total population through selection of a sufficiently large sample. This type of survey does provide some indication of the *potential* availability and geographical distribution of by-products. A greater degree of specificity is needed, however, to enable the researcher to develop an applied research program. This includes a definition of which animal-production system will use the results, what by-products are actually available to this particular animal-production system, and what resource constraints limit the utilization of by-products in animal feeds.

Localized Survey

To provide specific information for the by-product researcher, a farm survey that is focused on particular animal-production systems is suggested. This more precise focusing of research is necessary because the best type of by-products, their collection, modification, handling, and incorporation into a feeding regime will be different for different animal-production systems. To maximize the utility of the information to the researcher, while minimizing costs of data collection, in terms of time and manpower, the researcher must make conscious, deliberate choices to narrow the scope of the survey. Using available secondary information and the expertise and experience of the researcher, one or two specific animal-production systems should be identified that represent substantial numbers of farmers.

The selection of specific production systems by the researcher is based on several criteria: (1) Selected animal-production systems should represent a major proportion of animal producers in the area, e.g., in the methodology used for cropping-systems research in Asia, it is suggested (as a rule of thumb) that 3–4 identified land types (comparable to animal-production systems in this paper) represent 70–80% of the farms of the area (Zandstra et al. 1981). (2) There must be some potential for improving the animal-production system using by-products. (3) The study area must be accessible for survey purposes and, later, research activities. The differentiation of a particular animal-production system (e.g., goat's-milk production) into two or more related enterprises (e.g., by-product or grazing based) is only justified if the enterprises are sufficiently different to expect that different feeding regimes will be recommended for each enterprise.

Using these criteria and the expertise of the researchers, several major characteristics of the production systems (e.g., herd size, farm size, land quality, major cropping system) should be identified to enable the selection of farmers that are representative of each production system. The researcher then selects about 30 farmers as the sample for each animal-production system, e.g., small-farm dairy producers in Egypt may be characterized as having farms of less than 2 ha, fewer than five animals, and primarily buffalo-milk animals. To facilitate the decision-making required in this process, the researcher may visit (for less than 1 week) the target area to carry out an informal survey with colleagues or local extension staff. Through discussions and observations, the researcher gains a more precise understanding of the production systems, farmer characteristics, and possible survey questions.

Survey Questionnaire

Survey questionnaires have traditionally been used to collect data, often without careful examination of the information needed or the ultimate use of the results. The by-product researcher needs to clarify and specify the critical types of information required to make decisions about the applied research program to be implemented. This is particularly important if the by-product researcher is not directly involved in the data-collection process. To ensure that the proper data are collected, the by-product researcher must provide considerable input into the design of the questionnaire to counteract the tendency to collect too much information that cannot be analyzed easily or quickly.

The specific information required from a farm survey is a function of the animal-production systems under investigation. If purchased feeds are not important in the systems, minimize the questions on this aspect in the survey. The following represent major categories of information that can be collected using a farm-survey questionnaire.

(1) Animals on farm: types and numbers only; data on ages are not usually considered to be critical information.

(2) Feeding system: feed ingredients (forages, concentrates, protein or energy sources); quantities fed; quantities purchased; and cost of feed ingredients.

(3) Animal-production system: description of system, i.e., housing, cut and carry/grazing, management (when fed, use for labour, performance), and major diseases; priority given to animal production; cash expenditures for animal production; and farmers' objectives in animal production (cash, traction, food, herd replacement).

(4) Crop production: as it relates to by-products in terms of quantities available (by month or quarter), alternative uses, costs, and quantities purchased/sold.

(5) Farm resources: farm size and fragmentation; labour, i.e., family/hired, cost; cash availability (willingness to spend cash for animal feeding or care); technical knowledge (use of fertilizers, chemicals, and other farm innovations); and power availability, i.e., animal, mechanical, hired or owned.

(6) Open-ended questions: This category looks at questions such as: What improvements would the farmer suggest for the animal-production system and with regard to which animals? What is the farmer's response to suggested alternative solutions involving by-products? These open-ended questions provide the researcher with an important opportunity to probe the thinking of the farmers, confirm or refute hypotheses about possible by-product research, and gain the confidence of the farmers.

Farmer Participation

To realize the full potential of a farm survey, it is imperative that the farmer be regarded as a collaborator, i.e., one who has specialized knowledge of available resources and who can assist the researcher in setting research priorities. The emphasis on collaboration must permeate all aspects of farmer–researcher interaction and should begin with the survey. Collaboration is enhanced by conducting the survey over several visits. Repeat visits not only establish credibility and build rapport but also enhance the reliability of recall information because the time elapsed between visits is minimized. Later in the research process, opportunities for on-farm testing of technologies are more readily identified, using interested farmers from the survey.

The researcher, if personally involved in the survey, is in a position to identify key informants who have been particularly candid and thoughtful in responding to the survey questions. These farmers can be very helpful sources of informal, detailed information concerning the place of by-products in the animal-production system.

Collaboration between researcher and farmer, to be fully effective, implies that both individuals must benefit from the interaction. The more immediate the benefit, the greater the interest in and commitment to collaboration. The researcher immediately benefits from the survey due to the information gained. The farmer, on the other hand, often receives little direct benefit from answering the survey questions. To encourage farmer interest and participation, the researcher should attempt to provide some concrete assistance to the farming system. This may take the form of supplying a simple improvement technique, known as the best-bet idea, for the animal-production system, e.g., simple molasses supplementation may be possible. Immediate assistance to the farmer will reinforce the interest of the researcher in the total farming activity and not just the responses to survey questions.

Conclusions

The farm system can be very beneficial to the researcher in planning the activities of by-product research. To realize this benefit, the researcher must carefully specify the critical information required to set research priorities. This will tend to minimize the time spent on data collection and the cost of conducting the farm survey. Throughout, the researcher, in interacting with farmers, needs to emphasize the collaborative nature of the relationship to fully utilize the valuable knowledge of the farmers in using by-products in animal feeds.

Zandstra, H.G., Price, E.C., Litsinger, J.A., and Morris, R.A. 1981. A methodology for on-farm cropping systems research. International Rice Research Institute (IRRI), Los Baños, Philippines.