FEEDING OF RUMINANTS ON FIBROUS CROP RESIDUES

INTRODUCTORY COMMENTS

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Increasing human populations require increased food production (WCED, 1987; Alexandratos, 1988). Crop land is used more intensively, stubble grazing and room for pasture land diminishes while waste land is eroding, i.e. possibilities of free grazing diminish (Jodha 1986). Crop residues will play an increasingly important role in the feeding of livestock (Singh and Rangnekar, 1986; Devendra, 1993). Increased and sustained crop production requires new approaches (Conway and Barbier, 1990) and whereas in the past livestock supported crop production by draught and dung production, the roles are slowly reversing and livestock depends increasingly on cropping. In short: systems of farming are changing fast. Feeding of livestock cannot be seen in isolation from the entire farm enterprise. Planting of fodder or feeding of straws affects the economics of crop production. A better understanding of the farm as a system is required, including issues of crop production and soil fertility. New or old methods of feeding that are useful in one farming system might not apply in other systems, hence the importance of "farming systems" work done in the project.

Farming systems work is the topic of the first session. The term "farming systems" covers many approaches and often leads to misunderstanding and confusion. The farming system work in the BIOCON project includes mainly farm level aspects of:

- identification of target groups/ recommendation domains/ agro economic zones that might benefit from available/ transferable technologies;
- traditional criteria to judge effectiveness of transferable technologies such as individual productivity of the cow, fodder yield, are complemented with more recent criteria (the effect of an intervention on total farm income, social position of the farmer and gender issues);
- design of new farming systems as required for extension and development;
- on-farm testing of lab results;
- participatory research and survey techniques (RRA, sondeo).

Farming systems work provides the basis of all further work on crop residues.

Predicting the effect of, or understanding the need for new technologies in animal nutrition requires a systematic approach but also knowledge of its fundamental principles. Systems work forces the nutritionists in the lab to produce up to date information on parameters such as feed intake, digestibility, substitution rates, associative effects and nutrient

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requirements. The use of nutrient requirements do not necessarily imply their application for maximum production per animal (Jackson 1981). It is increasingly agreed that the requirements for the whole range of animal production needs to be quantified. The second session gives a summary of historic and current developments in terms of nutrient requirements and evaluation.

The low nutritive quality of crop residues can be overcome in a number of ways, such as by treatments, supplementation or their combination.

Biological treatment with fungi is discussed in the third session. One new approach conceived in the project is the so called "Karnal process". However, biological treatment is not ready for field application and its understanding requires cooperation with microbiologists, plant physiologists and biochemists to solve or study inherent problems of this treatment, such as organic matter losses, disappointing increases of digestibility, difficult process control and potential toxicity problems.

Chemical and physical treatment is by and large beyond the on-station experimental stage except for work on some straws such as of sorghum, maize and fingermillet. The emphasis in the laboratories should be on determination of parameters of nutritive value, intake and substitution rates, in order to predict the economics of feeding treated or untreated straw in different farming systems. As discussed in the fourth session, much information is now available on economics and field application of these treatments, especially the urea/ ammonia treatment of rice and wheat straw.

Variability of straw quality and quantity caused by varietal or management aspects is discussed in the fifth session. Issues arising include the repeatability and magnitude of the variation, the choice between grain or straw production, or particularly between quantity or quality of straw. The BIOCON project was fortunate in this respect to have the collaboration of the AICRP's agronomists/breeders on sorghum and fingermillet. The exchange between crop and animal scientists has proven useful.

The subject of extension, with an increasing recognition of the importance of gender issues is covered in the final session. Quite often the scientist tends to come up with solutions (transferable technologies) for which the farmer (husband, wife or children) have no use, i.e. much time is wasted on ill conceived extension programs. Relatively easy progress such as was made during the green revolution, is difficult in highly variable systems with limited solutions. A proper understanding of the needs and problems of the diverse farming community is a pre-requisite for extension. In that sense it is important to note that modern concepts stress the two way traffic of extension, not only from the lab to the land, but also from the

land to the lab. Researchers require input and feedback from the field, since many research topics are irrelevant for the field situation. They may be biologically sound but their economic or practical application is often very limited.

CONCLUSIONS

The improved use of crop residues for animal feed involves cooperation from many disciplines in research and extension. Quite some work is already done and needs to be applied where possible. Extension services at state level or from NGO's require the information of the research institutions of which in India the ICAR is the apex.

The task for the ICAR is to increase the interaction between field and research to face and predict both short term and long term issues. The next phase of BIOCON is aimed at strengthening this approach and the purpose of this workshop is to inform and to open doors to others, besides being a get together of the project workers themselves. The large area of work covered under the project thus far could not have been possible without the many scientists and other staff in participating centers of the project.

REFERENCES

Alexandratos, N., 1988. World Agriculture: Toward 2000. An FAO study. Belhaven Press, 25 Floral Street, London WC2E 9DS, UK. ISBN 1 85293 057 8, 338 pp.

Conway, G.R., Barbier, E.B., 1990. After the Green Revolution, sustainable agriculture for development. Earthscan publications, London, UK.

Devendra, C., 1993. Fibrous crop residues: strategies for the efficient use and development of feeding systems. These proceedings.

Jackson, M.G., 1981 . Who needs feeding standards? Anim. Feed Sci. Technol. 6 : 101-104

Jodha, N.S., 1986. Common property resources and rural poor in dry regions of India. Economic and political weekly XXI (27) : 1169-1181.

Singh, K., Rangnekar, D.V., 1986. Fibrous crop residues as animal feeds in India, pp. 111-116. In: M.N.M. Ibrahim and J.B. Schiere (eds.): Rice straw and related feeds in ruminant rations. Proceedings of an international workshop held on 24-28 March 1986 in Kandy, Sri Lanka. SUP Publication No. 2, ISBN 90-9001270-2.

WCED, 1987. Our Common Future. World Commission on Environment and Development. Oxford University press, Oxford/New York. ISBN 0-19-282080-X