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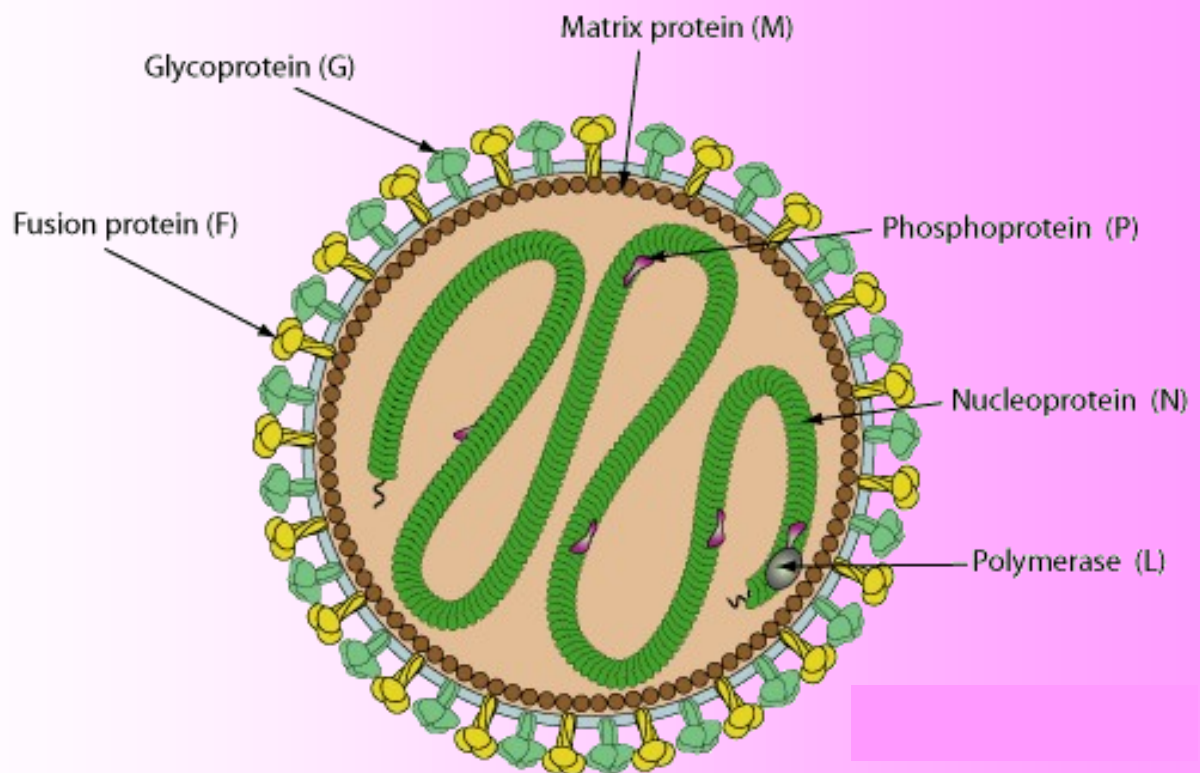
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Non Conventional Feed Resources for Poultry Industry: Needs, Benefits, Constraints and Its Prospects

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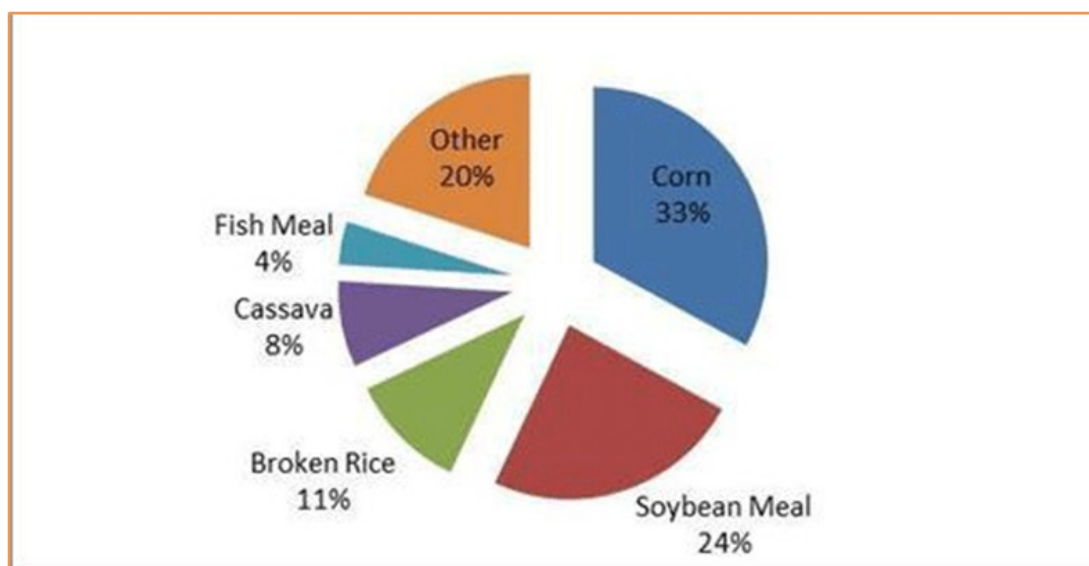
The poultry industry is an important aspect of the livestock subsector in India with a potential to solve the problem of malnutrition, unemployment and augmenting rural economy. As feed constitutes 60-70 % of the total cost of production. This high feed cost may lead to a decrease in animal production (Ibeawuchi, et al 2000) which contributes to low protein intake. This vicious cycle of low productivity and intake of animal protein has been maintained and sustained by the scarcity of feeding stuff especially cereals occasioned by the fact that the available conventional sources such as maize are shared by humans. A major gap exists between the demand and supply of conventional feed resources for feeding livestock in the world. In order to manage this problem of demand and supply, it is essential to increase the availability of conventional feed resources for the different livestock production and management systems. But most poultry feeds have very similar characteristics being low in fiber and essentially cereal based,

as such often comprise between 50 and 75% of the diet. Cereal grains such as maize, grain sorghum, wheat, and barley contribute most of the carbohydrates to poultry diets. It is therefore clear that feeding of poultry presents a challenge to farmers. This is because poultry shares the same similarity with humans in terms of its nutrient requirements and the fact that cereal grains such as maize used in formulating poultry rations are equally consumed by humans. Also, the production level of these very important cereal grains has not been adequate to meet the growing needs of the poultry industry. So its need to improve the scientific knowledge for utilizing low cost locally available agro-industrial by-products in poultry feed in order to reduce the feed cost.

Attempts to utilize locally available cheap by-products may benefit the end users in reducing the feed cost which in turn can reduce the total cost of production of meat and egg and making them easily available at a cheaper cost in rural India. The tradi-

tional sources of vitamins and proteins used in poultry rations such as fish meal, meat and bone meal, soybean meal, groundnut cake, etc. are becoming expensive in developed countries. The availability of such feed ingredients is not adequate because of the spiraling cost of raw materials and ever-increasing competition with human beings for the same food items. Hence, the search for alternative feed sources has become inevitable to reduce feed cost. One method is to ex-

Processing technologies that are economic and practical are urgently required. Some of the materials like sal seed meal, neem seed cake, mahua seed cake, and galas seed cake are available in large quantities but due to the presence of potentially toxic substances, have limited value in animal feeds. Many of the forest tree seeds contain 15-35 percent oil and are used for the extraction of oil, after which the cake is valuable as animal feeds. Animal organic wastes such as dung



Source: USDA, 2014 <http://www.thecropsite.com/reports/?id=3568>

exploit the use of non-conventional feed resources (NCFR) in livestock production systems (Ben Salem et al, 2004).

Non-conventional feed resources (NCFR)

Most of NCFR feed resources are low in energy, protein, minerals and contain high amounts of anti-nutritional components (Ben Salem et al, 2004). The major constraints to the use of NCFR are a collection, storage, dehydration (due to high moisture content) and detoxification processes.

and poultry excreta are also potentially available as a part of animal feeds.

Non-conventional feed resources (NCFR) generally refer to all those feeds that have not been traditionally used for feeding livestock and are not commercially used in the production of livestock feeds. Several known examples include palm leaf meals, palm press fiber, cassava foliage, spent brewer's grains, sugar cane bagasse, rubber seed meal and some aquatic

plants (Chadhokar, 1984). The term NCFR has been frequently used to describe sources such as oil palm by-products, single-cell proteins and feed materials derived from agro-industrial by-products of plant and animal origin, poor-quality cellulosic roughages from farm residues and other agro-industrial by-products such as slaughter-house by-products and those from the processing of sugar, cereal grains, citrus fruits and vegetables from the processing of food for human consumption also comes under category of NCFR.

Need for Non-conventional feed resources

Serious shortages in animal feed of the conventional type.

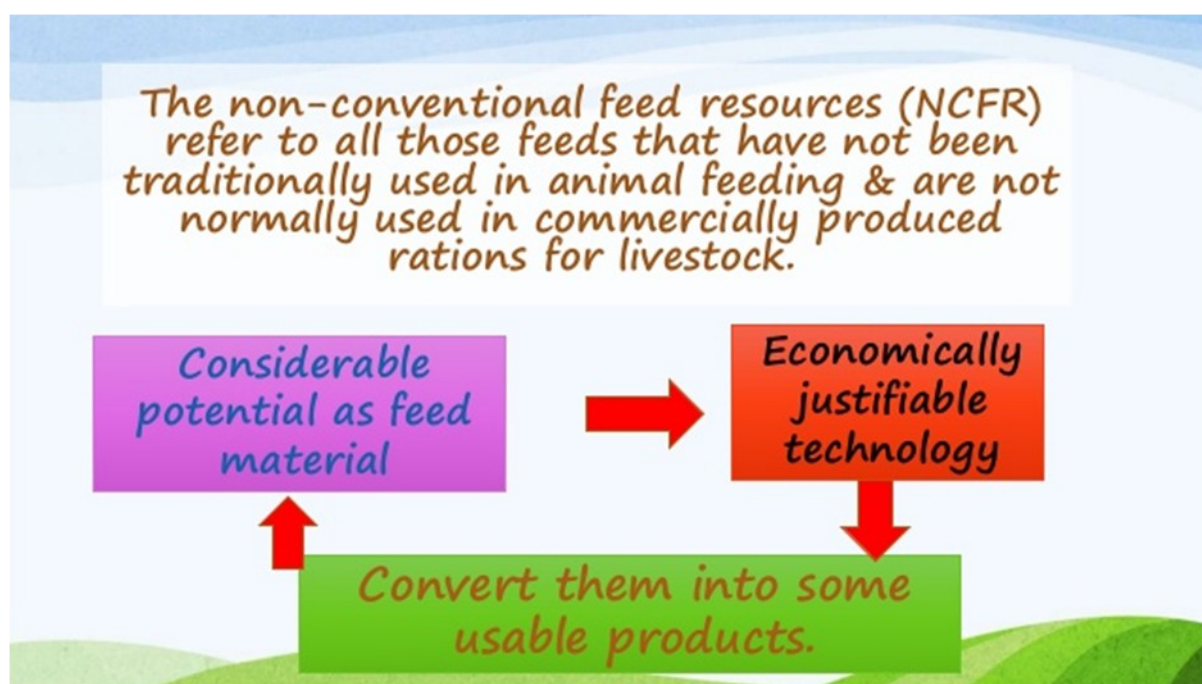
- With an increasing demand for livestock products as a result of rapid growth in the world economies and shrinking land area, future hopes of feeding the animals

and safeguarding their food security will depend on the better utilization of unconventional feed resources which do not compete with human food.

- Non-conventional feeds could partly fill the gap in the feed supply, decrease competition for food between humans and animals, reduce feed cost, and contribute to self-sufficiency in nutrients from locally available feed sources.

Characteristics of nonconventional feeds

1. They are mainly organic and can be in a solid, slurry or liquid form.
2. Their economic value is less than that the cost of collection and transportation for use thus referred to as wastes.
3. Some feeds contain toxic factors and have a deleterious effect on

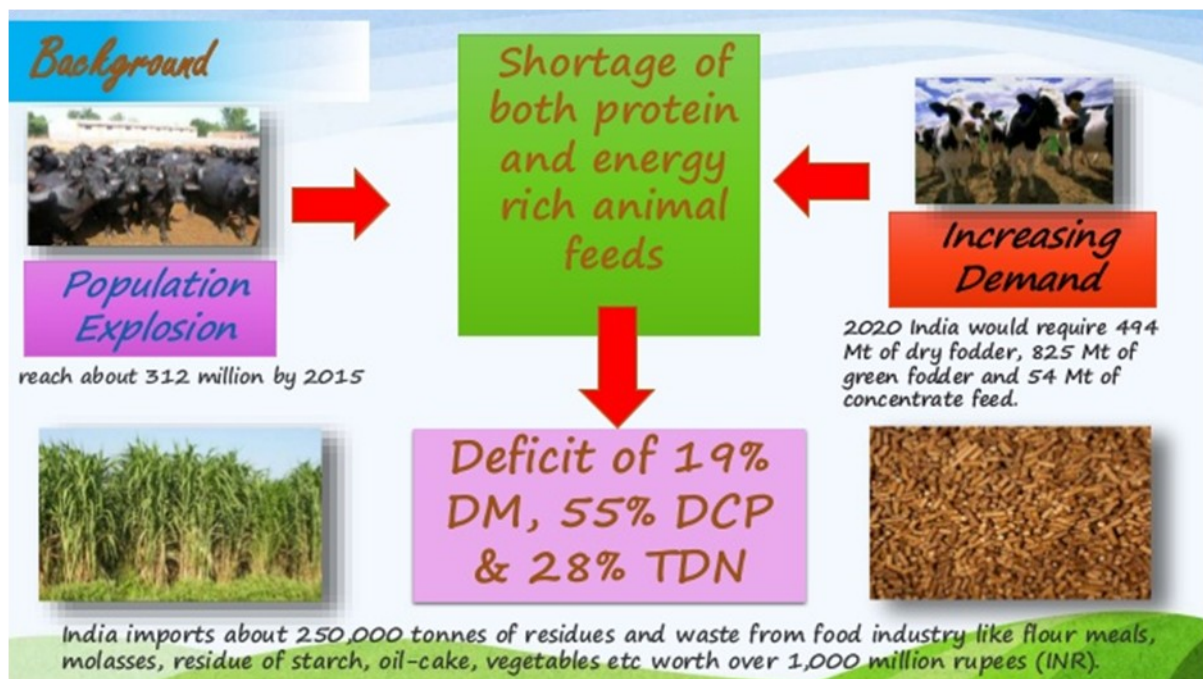


Source: <https://www.slideshare.net/PardhuKushi/new-trends-in-feeding->

animals. For example Castor bean meal, neem seed cake.

4. These are by-products of food production systems that have not been used, recycled or salvaged.
5. They have considerable potential as feed materials. In the case of feeds, their value can be increased if processing techniques

posed upon effluent discharge (Devendra, 1985) Most non-conventional resources are usually regarded as waste so, they can be used to supplement the existing limited feed resources. Recycling, reprocessing and utilization of all or a portion of the wastes, offers the possibility of returning these materials to beneficial use as



Source: <https://www.slideshare.net/PardhuKushi/new-trends-in-feeding->

are employed.

Generation of NCFR

The generation of non-conventional feed resources is essentially from agriculture and various agro-based industries and is a function of many factors. Such factors include the quantity and quality of the materials produced which is dependent on the prevailing agro-climatic conditions and cropping patterns, the type of raw materials, the production process, the production rate, the type of inputs used, the regulations affecting product quality use and the constraints im-

posed to the traditional methods of disposal and relocation of the same residues. The demonstration of potential value can thus make any of these waste products new feeds of value and importance.

Processing of NCFR to complete feeds and Total mixed ration

- Before feeding Nonconventional feedstuffs they must be well processed- (chaffing, grinding (8 mm) and pelleting) and mixed into a uniform blend that discourages selection.
- For this, the concept of “complete

ration” is identified in which large numbers of Unconventional feeds are used to prepare proper nutrient ration to the animal.

Expander extruder method is of importance in processing of such feeds.

1. Expanding-application of moisture, pressure, temperature to gelatinize the starch portion.
2. Extruding-pressing the feeds through constrictions under pressure.

Benefits of the feed from waste

New, local industry will benefit

from recycling waste by-products and the benefits from it lead to the following features.

1. Environmental sanitation

The sanitary disposal of offal, such as the by-products of the slaughterhouse, presents great difficulties. Not only does this offal attract vermin and present danger of spreading disease, but it also tends to decompose, rapidly forming an ideal substrate for microorganisms and leads to objectionable odors. Burning or burying of inedible offal, or its use as fertilizer

Classification of Nonconventional feeds

Energy Sources	Protein sources	
<i>Cereals</i>	<i>Vegetable protein</i>	<i>Animal protein</i>
Barley	Mustard cake	Blood meal
Sorghum	Soybean meal	Liver residue meal
Small millets	Sesame meal	Silkworm pupae meal
<i>Cereals and by-products</i>	Cluster meal	Hatchery by-product meal
Rice by-products	Sunflower seed meal	Hydrolyzed Feather meal
Broken rice	Safflower meal	Poultry by-product meal
Rice Husk	Kapok seed meal	Meat and meat cum bone meal
<i>Roots and tubers</i>	Maize gluten meal & feed	Animal waste
Cassava root meal	Penicillin mycelium waste	Dried poultry waste
Sweet potato tuber meal	Linseed meal	<i>Miscellaneous</i>
<i>Fruits and by-products</i>	Copra meal	Brewers dried grain
Banana fruit	Palm kernel meal	Single cell protein
Tomato waste	Castor seed meal	
Dried citrus pulp	Rubber seed meal	
Jack seed meal	Karanja meal	
Mango seed kernel	Mauha seed meal	
<i>Miscellaneous</i>		
Sago meal		
Molasses		
Sal seed oil residue		
Fats and oils		
Oil palm		
Palm press fiber		
Palm oil mill effluent		

leads to a total loss of potential by-products and, unless properly carried out, it may also lead to spread in disease (El Boushy, 1990). The effluents from slaughterhouses and from the processing of potatoes, citrus, grapes, and wine, were purified, it would be possible to reuse wastewater and produce a sludge that could be used in a dry form for livestock and poultry feeding purposes. The sludge could also be activated by means of micro-organisms that use the organic material as a substrate to provide a higher nutritional value in comparison with the original sludge.

2. Livestock health and productive agriculture

Offals can be used either to manufacture fertilizers or livestock feedstuffs depending on the speed with which they are handled and the freshness of the raw materials.

3. Price structure

The use of by-products and recycling waste will influence the price of meat and eggs and the price paid in foreign currency (owing to the imports of fish meal or soybean products used as feedstuffs from Benefits of feed from waste abroad) to the producer of livestock. Depending on local circumstances, the return derived from the use of by-products (animal, vegetable and fruit wastes) may be used to decrease the prices of meat and eggs to the consumer or to give the livestock producers more gain for their product and by-products.

4. Creation of new employment

There is no doubt that the disposal of waste (inedible offal, fruit, and vegetables, tannery or municipal refuse) needs little or no manpower in developing market economies. The conversion of offal, however, into valuable by-products creates new employment and skills at the place of production.

5. Educating imports of feedstuffs (foreign currency) by upgrading local waste

If a local industry such as the poultry industry is able to transfer all the offals by rendering and produce poultry offal meal (blood, feet, heads, intestines, and feathers), a product will be created with high nutritive value. This application may lower the present imports of feedstuffs, fertilizers, cereals and soya, animal products and total agricultural products that require foreign currency.

Constraints in the utilization of NCFR

1. Limited knowledge of the chemical composition and feeding values of Nonconventional feeds.
2. Most of NCFR contains Anti-Nutritional factors thus not suitable for use in animal feed, And little knowledge about their characterization, quantification in ingredient, and their long-range effects on animal health and productivity.
3. Nonavailability of NCFR in large quantities. Production is scattered in definite areas.
4. Availability is restricted to the

- particular season in a year. And no storage facility.
5. Lack of managerial and technical skills utilizes the feed in situ.
 6. Processing difficulties: Difficulties in the collection, handling, transportation, and processing of these feeds.

Limiting factors for the use of non-conventional feed

Nutritional aspects

1. Variability in nutrient level and quality (soil, climate [temperature, rain], variety, harvest method, processing).
2. Presence of naturally occurring anti-nutritional and/or toxic factors (alkaloids, non-starch polysaccharides, glycosides, tartrates, heavy metals).
3. Presence of pathogenic microorganisms (Salmonellae; present if waste is not processed/ sterilized properly).
4. Need for supplementation (minerals, most limiting essential amino acids).

Technical aspects

1. Seasonal and unreliable supply (need for storage) (wine, apple, dates; duration of transport) Bulkiness, wetness and/or powdery texture (need for pelleting) (Brewers' spent grains; poultry manure, sludge; potato starch).
2. Processing requirements (drying, detoxification) (availability of machinery; knowledge of processing; energy source).
3. Lack of research and develop-

ment efforts (feed industries) (cooperation developed/ developing countries; transfer of knowledge) (Modified after Ravindran and Blair, 1991).

Prospectus of NCFR

Nutritional composition

1. Use of enzymes to improve their nutritional quality
2. Most of the ANF present below the thresh hold levels
3. Abundant sunshine could facilitate prompt drying – in turn, ANF can keep below the thresh hold levels.
4. Organization of orientation program to create awareness about novel feed stuffs for production that will fast track animal agriculture in a challenging economy
5. Increased local production of alternative nutrient sources from unconventional feed ingredients to eradicate competition for feed and food stuff between the poultry industry and human population

Conclusion:

Shortage of feedstuffs in the future is an alarming issue at present trends in the poultry industry. A distinctive gap exists between the requirements and supplies of nutrients, the nonconventional feeds could partly fill this gap. Presently these by-products are not exploited to the full extent for inclusion in the poultry feed. Seasonal availability, high cost of handling and transportation from the production site to the farm, presence of anti-

nutritional factors. It is essential to increase feeds by growing more fodders, propagating agro and social forestry, improving the nutritive value of crop residues and utilizing other NCFRs. Crop residues, AIBPs and browse foliage are certain an increasingly important role as feeds in the future, as human and livestock populations expand. The maximum and minimum level of incorporation of feed could be suggested. Identifying the incriminating factors and easy way to eliminate them could be taken care of. Supplementation of critical micronutrient which is unavailable. Biotechnology innovations & processing techniques could be done. Adoption of alternative feed resources in poultry nutrition will be a sure way to achieve the strategic plans on suitable animal production for national food security and poverty alleviation.

REFERENCES

- Ben Salem, H., Nefzaoui, A., Ben Salem, L. and Tisserand, J.L. (2000). Deactivation of condensed tannins in *Acacia cyanophylla* Lindl. Foliage by polyethylene glycol in feed blocks. Effects on feed intake, diet digestibility, nitrogen balance, microbial synthesis and growth by sheep. *Livestock Production Science.*, 64: 51-60.
- Chadhokar, P.A. (1984). Non-conventional feed resources for livestock in soil and water conservation program. Community Forestry and Soil Conservation Development Department, Ministry of Agric. FAO. Adis-Ababa, Ethiopia.
- Ibeawuchi, I.I., and Ofoh, M.C., 2000. The productivity of maize/cassava/food legume mixtures in Southeastern Nigeria. *J. Agric. Rural Dev*, 1, pp.1-9.
- Ravindran, V. and Blair, R., 1991. Feed resources for poultry production in Asia and the Pacific region. I. Energy sources. *World's Poultry Science Journal*, 47(3), pp.213-231.