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Review Article

Role of Animal By-Products Utilization in Doubling the Farmers Income

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Abstract

Animal husbandry is the most important component of Indian agriculture supporting livelihood of more than two-thirds of the rural population especially marginal, small & landless farmers of our country. Animals provide nutrient-rich food products, draught power, dung as organic manure and domestic fuel, hides & skin, and are a regular source of cash income for rural households. The growth of livestock wealth in India at the rate of approximate 6% per annum. Animals provide nutrient-rich food products, draught power, dung as organic manure and domestic fuel, hides & skin, and are a regular source of cash income for rural households Animal Husbandry and Dairying play an important role in development of India's economy. Livestock by-products, such as processed animal proteins, animal fats, milk and egg products, and former food products represent a potentially valuable resource for feeding livestock. Proper utilization of by-product has direct impact on the economy and environmental pollution of country as well as for improvement of socio-economic condition of the farmers. Non-utilization of animal by-products in a proper way may create major aesthetic and catastrophic health problems. Judicious and efficient utilization of animal by-product has direct impact on the income generation and to reduce environmental pollution of the country as well as for the betterment of socio-economic status of the farmers. In recent years there has been tremendous work has been done for wide spread and increasing interest among the people for proper and judicious utilization of the animal byproduct of the dairy, meat and skin industry along with dung & urine for preparation of valuable product such as Panchgavya, Jeevamrit and Gau-mutra ark etc for betterment of socio-economic status of farmers as well as for healthy environmental issues.

Keywords: Byproduct; Bovine; GDP; Gaumutra Ark; Livestock; Pollution & Panchgavya.

Introduction

Animal Husbandry is an economic enterprise & considered as "Survival enterprise" for millions of people in India, especially in the Arid & Semi-Arid regions. In India, 85% livestock keepers are small & marginal farmers having less than 2 hectare of land, operating 44% of land for crop cultivation & contributing more than 69% in country milk production. Future of sustainable agriculture growth & food security in India depends on the performance of small & marginal farmers. Livestock is an engine for economic diversification and sustainable rural development.

It serves as a lifeline since it provides livelihood to two-third of rural community giving

employment to large population of unskilled youth. Livestock contributes 16 per cent to the income of small farm households as against the national average of 14 per cent for all rural households. Not only this, livestock sector provides employment to 8.8 per cent of population which largely comprises of landless and unskilled population. In the livestock sector, the dairy sub-sector has always played an important role.

This is quite evident from the words of Nanda Kumar, Chairman National Dairy Development Board (NDDB) that "Doubling farmers' income by 2022 is impossible without dairy farming which has a CAGR of 19.6 per cent. 85 per cent of the farmers in India who are marginal and small own 45 per cent of the land, but 75 per cent of the bovine. So probably for a landless person, dairying is one of the best occupations".

Moreover no one is left untouched from the commendable position of India in the world in milk production accounting for 18.5 per cent of world production (789 million tons). The monetary value of this is more than the current combined value of rice and wheat, and this was achieved without subsidy and incentives.

Dairy by-products viz. skim milk, butter milk, whey and ghee residues have a very useful value for human nutrition, which have a good medicinal values. These by-products are further used for manufacturing of different products by using different processing methods such as pasteurization, sterilization, fermentation, coagulation & drying processes.

Animal by-products (ABPs), such as processed animal proteins, animal fats, milk and egg products, and former food products represent a potentially valuable resource for feeding livestock. Thus the use of different by-product of livestock such as dairy, dung, urine and meat industries by-product & their importance should be promoted extensively by organizing regular awareness program & educating the farmers to improve their income as well as to improve socio-economic status.

The growth of a country is directly related with energy, renewable as well as non-renewable resources. Animal by-products (ABPs), such as processed animal proteins, animal fats, milk and egg products, and former food products represent a potentially valuable resource for feeding livestock.

Using animal manure as fuel offers a number of advantages for large livestock and poultry operations. Wastes are either inexpensive or cheaper than propane, electricity and most natural gas. In fact, there are costs associated with disposing of manure which can be minimized through use as a fuel. In addition, using manure as a fuel minimizes odor, run off (non-point source pollution) and other nuisances.

Dairy Industry Byproduct

A dairy by-product can be defined as a product of commercial value produced during the manufacture of a main dairy product such as paneer, cheese, chhana, butter milk and ghee. The major dairy industry by-products are skim milk, butter milk, ghee residue and whey. Utilization of dairy by-products improves plant economy, makes valuable nutrients available for humans and reduces environmental pollution originating from dairy waste. It is a true fact that proper and judicious disposal of dairy by-products is an essential parameters for profitable dairy industry as well as for betterment of farmer and environmental hygiene.

In our country, skim milk the major by-product of dairy industry is mostly utilized either for standardization purposes or preserved in spray dried form and some time it is used for economic ration formulation of calves in milk replacer. Skim milk powder is major component of milk replacer. In milk replacer the quantity of skim milk powder should not be less than 50% of the milk replacer. Due to huge demands for chhana, paneer & cheese in india, there is more production of whey, which can be judiciously used for feeding of calf or for preparation of whey beverage, plain and sweetened condensed whey, whey protein concentrate, dried whey & ricotta cheese by different processing methods. Butter milk is the major by-product obtained during the manufacture of butter from curd while ghee residues are the major by-products of ghee industry which is generally used for making toffee & sweet meat.

By-Products of Indian Dairy Industry

The dairy byproduct utilization also provides source of income by different value addition methods.

Dung & Urine

Cow dung is a very good source for maintaining the production capacity of soil and enhances the

Table 1:

Main Product	By Product	Processing method	Products Made
1. Cream	Skim milk	Pasteurization	Flavoured milk
		Sterilization	Sterilized flavoured milk
		Fermentation	Cultured Butter milk
		Fermentation and Concentration	Concentrated sour skim milk
		Concentration	Plain and Sweetened Condensed skim milk
		Drying	Dried skim milk or Skim milk powder or Non Fat Dry Milk NFDM)
2. Butter	Butter Milk	Coagulation	Cottage cheese & edible casein
		Fermentation and Concentration	Condensed butter milk
		Concentration and drying	Dried butter milk
		Coagulation	Soft cheese
3. Cheese, Paneer & Chhana	Whey	Fermentation	Whey beverage, Yeast whey
		Concentration	Plain and sweetened condensed whey, whey protein concentrate, whey paste, lactose
		Drying	Dried whey
		Coagulation	Ricotta cheese
4. Ghee	Ghee residue	Processing	Sweet meat, Toffee, Sweet paste

microbial population. Cow dung has been considered as a Gold Mine due its wide applications in the field of agriculture, energy resource, environmental protection and therapeutic applications It is also used as a co-product in agriculture, such as manure, bio-fertiliser, bio-pesticides and pest-repellent. Several Products has been launched by the manufacturing companies such as soap, toothpaste, floor cleaners, hair oil, incense, shaving cream and face wash from the cow dung to earn money.

The soap contains dried and pulverised cow dung, orange peel, lavender powder, and gooseberries, the company says. The toothpaste is made of dung, ghee, and urine. It is now readying a line of cosmetic products and medicines as well. Using animal manure as fuel can improve the financial bottom line of the farm operation. Generally, anaerobic digestion is the most flexible biomass conversion option for a farm operation. It produces biogas which has a heating value of approximately 600-800 Btu/cubic foot, 60 to 80% of the energy value of natural gas. The gas can be used to generate electricity, as a boiler or furnace fuel or to run refrigeration equipment. Biogas is one of the more important sources of energy in terms of cooking, electricity generation & mechanical energy generation. Biogas is a clean and efficient fuel. It is a mixture of methane (CH_4), carbon dioxide (CO_2), hydrogen (H_2) and hydrogen sulphide (H_2S). The chief constituent of biogas is methane (65%). The green-house gas emissions from the livestock farms can be reduced following anaerobic digestion approach of converting cattle dung into bio-energy. Thus, this process can be widely applied for the production of the biogas on a large scale. Moreover, the resulting methane can be utilized for electricity generation, lighting, heating and cooking. The cow's urine, cow's horn and a dead body of a cow can be used for preparing effective bio-fertilizer. Cow's urine have various medicinal uses for preparation of various medicines, fly & mosquito repellent etc.

Panchgavya

Maharshi Dhanvantari offered to mankind a wonder medicine "Panchgavya" (a combination of cow urine, milk, dung, ghee and curd). In Sanskrit, all these five products are individually called "Gavya" and collectively termed as "Panchgavya". An organic product has the potential to play the role of promoting growth and providing immunity in plant system. Panchagavya consists of five products viz. cow dung, cow urine, milk, curd (yogurt), and ghee. When suitably mixed and used, it has miraculous effects. Ancient Ayurvedic scriptures such as Bhela Samhita, Kashyapa Samhita, Charaka Samhita, Sushrutu Samhita, Gada Nigraha, Rasa Tantra Sara all speak highly about the divinity and significance of Panchagavya in human life. It is stated that consumption of Panchagavya results in removal of physical and mental disorders and is an

enhancer of prana, physical strength, and life span. Regular consumption results in the removal of poisons from the body, healing of food addictions, cure from side effects of alcohol, tobacco, and atmospheric pollutants, and it strengthens the immune system.

Biogas and Composting

It mainly comprises of hydro-carbon which is combustible and can produce heat and energy when burnt. Bio-gas is produced through a bio-chemical process in which certain types of bacteria convert the biological wastes into useful bio-gas. Since the useful gas originates from biological process, it has been termed as bio-gas. Dung has also been successfully used to produce bio-gas (methane) and generate electricity for consumer use. Biogas is used in cooking, for lighting in homes and streets.

It can be used for driving self-combustion engines for various uses like running a generator to produce electricity. The slurry (residue) could also be used for production of manure, which when spread on crops acts as an excellent fertilizer. Dung for Bio-gas and its slurry for manure is providing renewable cooking energy and slurry for compost. Proper manure disposal at a dairy farm has always been a concern. Small, integrated farming operations generally use the manures as fertilizers and apply the collected manure on soil surface of a crop land. There are limits to how much manure can be spread. Putting too much manure on fields can reduce yields. Additionally, spreading more manure than the requirement of crops can result in groundwater and surface water pollution.

Livestock Slaughter by-Product

Animal by-products include almost all parts of a live animal that are not part of the dressed carcass or edible part of meat. The by-products provide many of the raw materials used to make various products. Hides and skins are tanned and processed into leather for shoes, purses, clothing, car seats, and other items preparations while intestines can be used for preparations of sausage or casings.

Other animal by-products like bloods, glands and organs can be used for pharmaceutical, cosmetic, household, and industrial product manufacturing. In-edible animal byproducts include hide or skin, hair, horns, hooves, teeth, fats, bones, ligaments and cartilage, feet, glands, blood, and lungs are the primary raw materials used in the manufacture of a broad assortment of industrial, household, cosmetic, pharmaceutical, and medical suppliesas well as used for making products such as lubricants, plastics, soaps, glycerin, and gelatins (Alicia, 2012).

Meat sector in India plays an important role in providing livelihood to rural people, sustaining livestock production and contributes a valuable foreign exchange to the country. Livestock by-products include all parts of a live animal that are not part of the dressed carcass. The byproducts provide many of the raw materials used to make various products (Daniel et al., 2011). Meat sector in India plays an important role in providing livelihood to rural people in the country. Cosmetics, shoe polish and glue are common household products that are made, in part, from livestock by-products.

Gelatin is an edible by-product obtained from tissues rich in collagen such as pork skins, calf skins and bones which is extensively used in food industry, while Glue is made from skin or hides, cartilage and bones. The blood albumen, obtained from blood plasma, is used to make various types of adhesives material which are used in manufacturing of plywood and wood veneers. Animal fat has many edible and inedible applications. Rendered animal fat may be separated into glycerol and fatty acids. Glycerol is used in the production of pharmaceuticals, explosives, cosmetics, toothpastes, plastics , antifreeze and paints. Fatty acids are used in soaps, detergents, insecticides, herbicides, paints, lubricants, asphalt, car polishes and waxes, shaving cream, deodorants and perfumes.

Leather, produced from hides and skins, is used for shoes, clothing, luggage, furniture and automobile upholstery, sporting goods and many other products. Bone charcoal, derived from bones, is used to manufacture steel ball bearings. Hormones isolated from animal tissues and glands have been important for the production of pharmaceutical products. Heparin, obtained from lungs or liver, is used as an anticoagulant to prevent blood clots. Small intestines of sheep are generally used for preparation of surgical sutures.

The fats and extracted bone marrow were added into a measured quantity of water with appropriate quantity of caustic soda for soap preparation. The bone are also used for production of bone crafts i.e. ornamental items from bone.

Conclusion

The animal by-products and wastes are a good source of renewable energy for any country and plays a very significant role in development of nation, farmers & traders. In present scenario the utilization needs become significantly stronger due to competition. This is important because increasing profit and decreasing the cost is required in the future for the meat industry to remain viable. The use of different by-product of livestock such as dairy, dung & urine and meat industries by-product & their importance along with establishment of marketing strtegies should be promoted extensively by starting awareness program & educating the farmers to improve their income as well as to improve their socio-economic status.

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