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Inside...

Integrated Farming Models in Backyard Poultry Production

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Backyard Poultry farming plays an important role in Indian economy in terms of income, employment and livelihood generation, food and nutritional security, women empowerment of the rural and tribal population,and increasing soilfertility.

Backyard poultry is a low or no input activity primarily depending on scavenging on the natural feed base with minimum supplementary feeding, low cost night shelter, and moderate health care practices. There are four types of backyard production systems: 1. Traditional backyard system having less than 20 birds with little or no input; 2. Semi-intensive farming system having up to 200 birds with small amount of supplemental feed; 3. Small-scale intensive farming system having more than 200 birds and providing all inputs similar to the intensive farming and 4. Native chicken farming system having native chicken, based on market demand. Low productivity, high rate of morbidity & mortality, availability of natural food base and predations are the major constraints along with low genetic potential for growth and egg production compared to the commercial chicken strains.

In poultry farming, feed is the major expensive input, and manure/litter is a major by product that is rich in Nitrogen, Potassium and Phosphorus. About 22kg of dry droppings is generated by 1000kg live weight of poultry birds per day and 1.3 tons of litter is produced by 1000 commercial broiler chicken. On the other hand, majority agricultural fields are deficient in several essential minerals for crop production besides depleted carbon concentration in those soils. Though poultry manure is rich source of nitrogen, phosphorus and carbon, the poultry manure cannot be used directly in the fields, also it cannot be stored for longer duration due to high moisture levels (Nitrogen content losses due to proteolytic activity). So, manure should be processed as quickly as possible to conserve the nutritional value of the manure, and composting is one of the best methods. Major concern in composting the poultry manure is to maintain desired Carbon to Nitrogen ratio. Generally, carbon ration should be kept 20 or more compare to nitrogen.If poultry manure is not treated properly, it creates bad odour, leaching of toxic elements, methane emission, eutrophication of waterways, dissemination of

Highlight Points

- Backyard poultry production integrates well with crop, fisheries and other livestock. Different components supportone another and all components benefiting each other which leads to higher productivity with higher economic returns compared to any individual component.
- Under different combinations of components for integrated farming, income could be increased in the range41 to 302%, employment potential from 30% to 485% (with a mean increase of 143% over single enterprise), and also enhance the soil fertility and minimizes carbon foot print / greenhouse gas production per unit produce.
- Constraints like financial, biophysical, socio-cultural, institutional, and policy in the adoption of these practices.

pathogens, and weeds.

The backyard free-range chickens grew on scavenging conditions consumed 45 to 54 g of feed (natural food base) daily in different seasons, which is insufficient to meet the protein and energy requirements of the birds. Further the composition of the natural food base is not consistent across different regions of the country. Usually, the natural food base is deficient in energy, protein, Ca, and P rangingbetween 9 to 20, 40 to 50, 42 to 66, & 72 to 83% respectively, in different regions. The composition of natural food base depends on agro-climatic conditions, soil quality, rain fall, cropping pattern in the region, etc.

If backyard poultry farming is integrated with crop, fisheries and other livestock, where farming components support and complement to each other and the nutrient deficienciescan bemet to a larger extent. In return poultry manurefertilizesthe soil. Poultry manure contains about 3-5% nitrogen, 1.5-3.5% phosphorous and 1.5-3.0% potassium and also micro-nutrients like Zn, Mn, Fe, Cu, Cr, and Se in considerable quantities.It contains many essential nutrients that are used by plants. Poultry also eat different forms of insects whichhelp in pest control. The article deals with different merits and demerits of different models where backyard poultry rearing (BYPF) integrates with diversified agricultural, horticultural and livestock farming. Few potential integrated farming models are detailed below:

Mango/ Guava Orchid-BYPF: Each backyard chickenproduces about 45kg manure in life cycle (1-72 weeks of age) that increases the fertility of soil and the birds also help in controlling pests (pupa, larvae, maggotsand borers). By integrating with mango orchard, total income is expected to increase up to three times with an attractive Benefit Cost ratio of 4.64. Rearing Kadaknath is a good example in this farming system.

Apple Orchid- BYPF: High density apple orchid gives B:C ratio of 4:1 whereas, ifintegration with Vanaraja birds, the B:C ratio increased up to 4.4:1 and no adverse impact was observed.

Moringa-BYPE: Moringa leaves are rich in protein (20-33% DM) and essential amino acids, minerals, vitamins, and antioxidants. The birds, while grazing can take fresh moringa leaves and even dry moringa leaves powder can also be offered as a supplement along with the traditional feed. With integration of moringa,the income of backyard poultry was reported to 2.02 to 3 folds. However, if birds are provided moringa leaves along with earthworms (developed from vermicompost) the net income increased considerably.

Goats-BYPF: Backyard poultry integrate well with goat farming and fetch anadditional income up to 47% higher than that of income generated out of combined individual production.

Fish-BYPF: The adoption of integrated BYPF-fish farming fetchan additional income of Rs. 4000-5000/- and employment opportunities for 45-50 human days along with production of eggs and chicken meat for family consumption.

Fish-BYPF and Fish-Duck farming alone or in combination with other crops give significant positive results. Reports indicated about 25% higher economic returns with crop-fish-poultry integration.

There are many other types of integrated farming systems and their benefits which are given below:

Single enterprise	Integrated system	% increase in income
Rice-rice-blackgram	Rice-rice-cotton + maize + poultry/fish	107
Rice-rice-rice- pulses	Rice-rice-rice-fallow-cotton + maize + duck cum fish	75
Cashew	Rice-brinjal + Rice-cowpea + mushroom + poultry	107
Arable farming	Crops + Dairy (2cows) + 15 goats + 10 poultry + 10 duck + fish	86
Rice-wheat	Rice-wheat + fish + duck + goat	284
Rice–maize	Rice-maize + fish + duck + goat	184
Rice cropping alone	Rice – cowpea/brinjal + mushroom + poultry	282-302
Rice	Rice + Tuber crops + Fish + Poultry + Goat	149
Rice-Rice	Rice-fish-poultry	41
Agriculture alone	Agriculture + poultry	226
Rice Cropping alone	Rice - brinjal + mushroom + poultry	256
Rice-wheat	Field Crops + goat + Poultry + mushroom	131
Crop alone	Crop + goat + poultry + sheep + dairy	151

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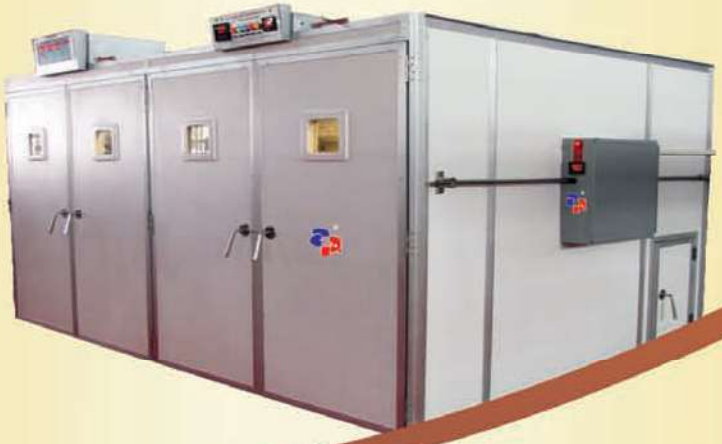

Killer Cone / Halal Cutting

De - Feathering Machine:

Chicken Portioning Machine

Feed Plant (Feed Mixer & Grinder)

Solar Incubators

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Impact of Integrated Farming System approach with poultry

There is a significant increase in income, employment, soil health, and reduction in the deleterious effects of different indicators of climate change. The abovetable depicts the increase in income due to poultry integration in different combinations.

The improvement in employment potential under this condition varied from 30% to 485% (with a mean increase of 143% over single enterprise).The integrated farming system maintains soil health and also helps in adoption of organic farming system. It encourages ecological intensification and aims to reduce the use of anthropogenic inputs with enhanced ecosystem functioning. It enables the agricultural production system to be sustainable and efficient. Due to the higher recycling potential in mixed farming, it can be less vulnerable to climate change, price fluctuations of agricultural commodities,and can reduce CH_4 emission. Long term application of poultry manure reduced erosion, increase soil organic matter, and soil water-holding capacity so as to have a sustainable option for diversifying agroecosystems, improving soil health, and improving farm economics.

Constraints in adoption of Integration:

There are many constraints in the adoption of these practices like financial, biophysical sociocultural, institutional, and policy. Policymakers should address these issues for the propagation of these models.

Backyard poultry inintegration with diversified crops/ livestock rearing enhances soil fertility, reduce the use of anthropogenic inputs and minimizes the pest losses which ultimately leads to higher productivity. It increases the availability of protein-enriched food and organically grown food crops to the family needs with minimum investment. By adopting the integrated farming system, there will be a good source of regular income, employment generation, and women empowerment,especially in integration with other commodities based on need.The interventionof Government agencies is required to make proper promotional policies related to the mixed integration models for the benefit of rural / tribal populations across the country.

Nano Zinc Prospects for Poultry

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Industry and zinc in poultry

With the rise in demand for high quality poultry feed, Poultry farmers and Feed manufactures are always on a lookout for poultry health and growth promoters. Zinc (Zn) is an important microelement in poultry nutrition. Zinc is vital for proliferation of cells and their differentiation. The importance of zinc in nutritional biology was first reported by Raulin (1869), when he observed that zinc was required for growth of Aspergillus Niger. The enzyme carbonic anhydrase was identified and purified in 1940. It contains a metalloenzyme zinc at 0.33%, which catalyses the breakdown of carbonic acid into CO_2 and H_2O. Being a component of carbonic anhydrase, zinc facilitates transport of CO_2 from tissues to lungs. Zinc is an essential component of both DNA and RNA polymerase enzymes. Zinc has been found cofactor in more than 300 metallo-enzymes which is essential for enzyme structure, bone development and growth. It is vital to the activity of a variety of hormones including glucagon, insulin, growth hormone and the sex hormones. It also plays a key role in the immune system.Consumers, producers, Poultry feed manufacturers and others related with poultry industry has developed a good attraction towards the role of zinc in poultry nutrition.

Zinc as antioxidant.

Zinc is an indispensable part of the antioxidant system in animals. Antioxidants combat 'reactive oxygen species' (ROS) and protect the body from the harmful effects of ROS, in various ways. Zn is a major part of the antioxidant enzyme superoxide dismutase (SOD), which helps defend the body against ROS by converting superoxide anions into hydrogen peroxide. Zn reduces oxidative stress by antagonism of the redox-active transition metals (inorganic copper and iron), preventing the formation of hydroxyl radicals from hydrogen peroxide (H_2O_2). Zinc interferes in the Fenton reaction, by competing with the binding sites of transition metals (iron, copper, and zinc), serving as, a donor of electrons for such reactions.

Zn appears to indirectly suppress oxidant stress by the stimulation of certain substances which have