



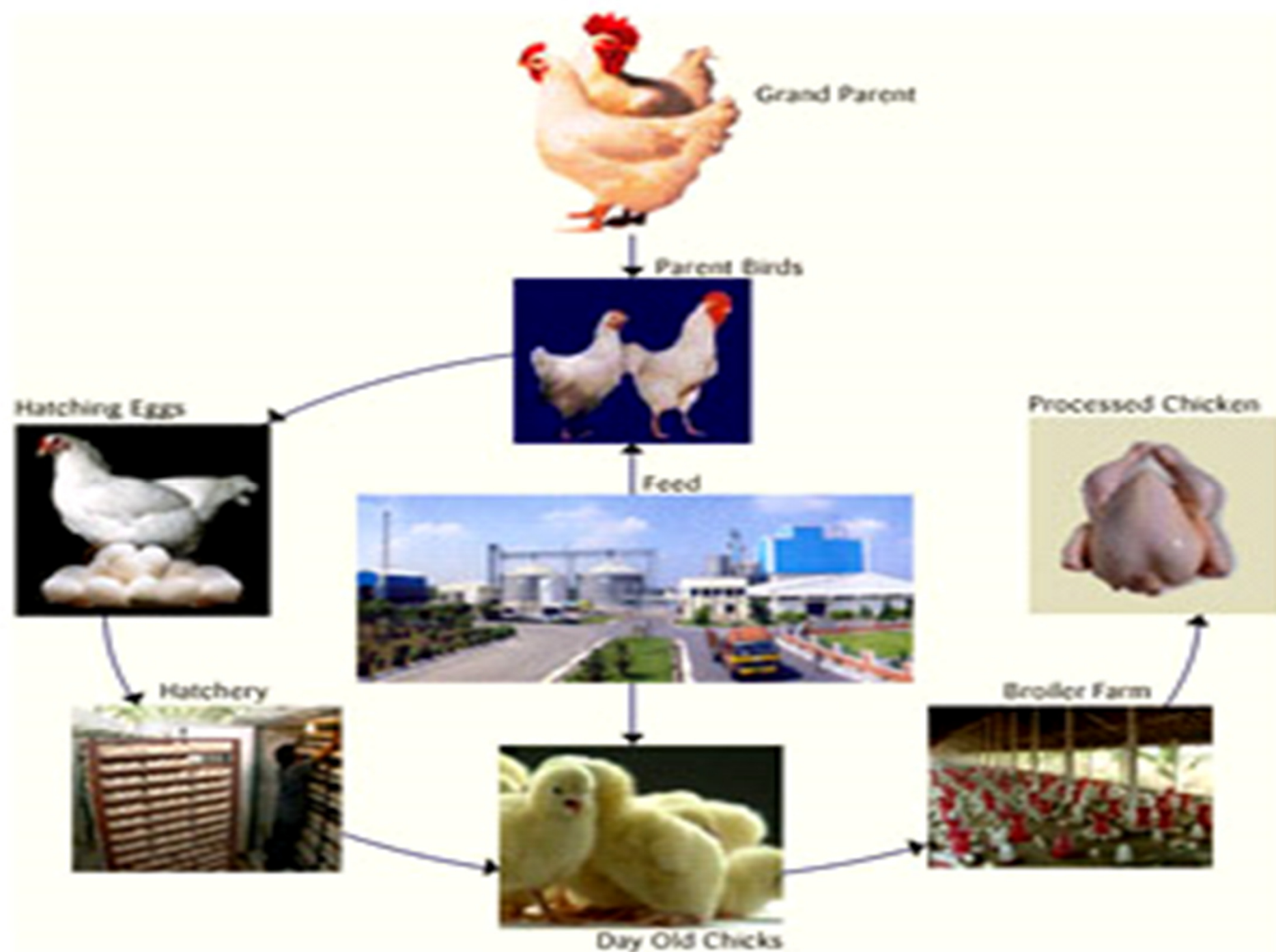
NOVEL FEED RESOURCES FOR POULTRY INDUSTRY: POTENTIALS, PROBLEMS & PROSPECTS



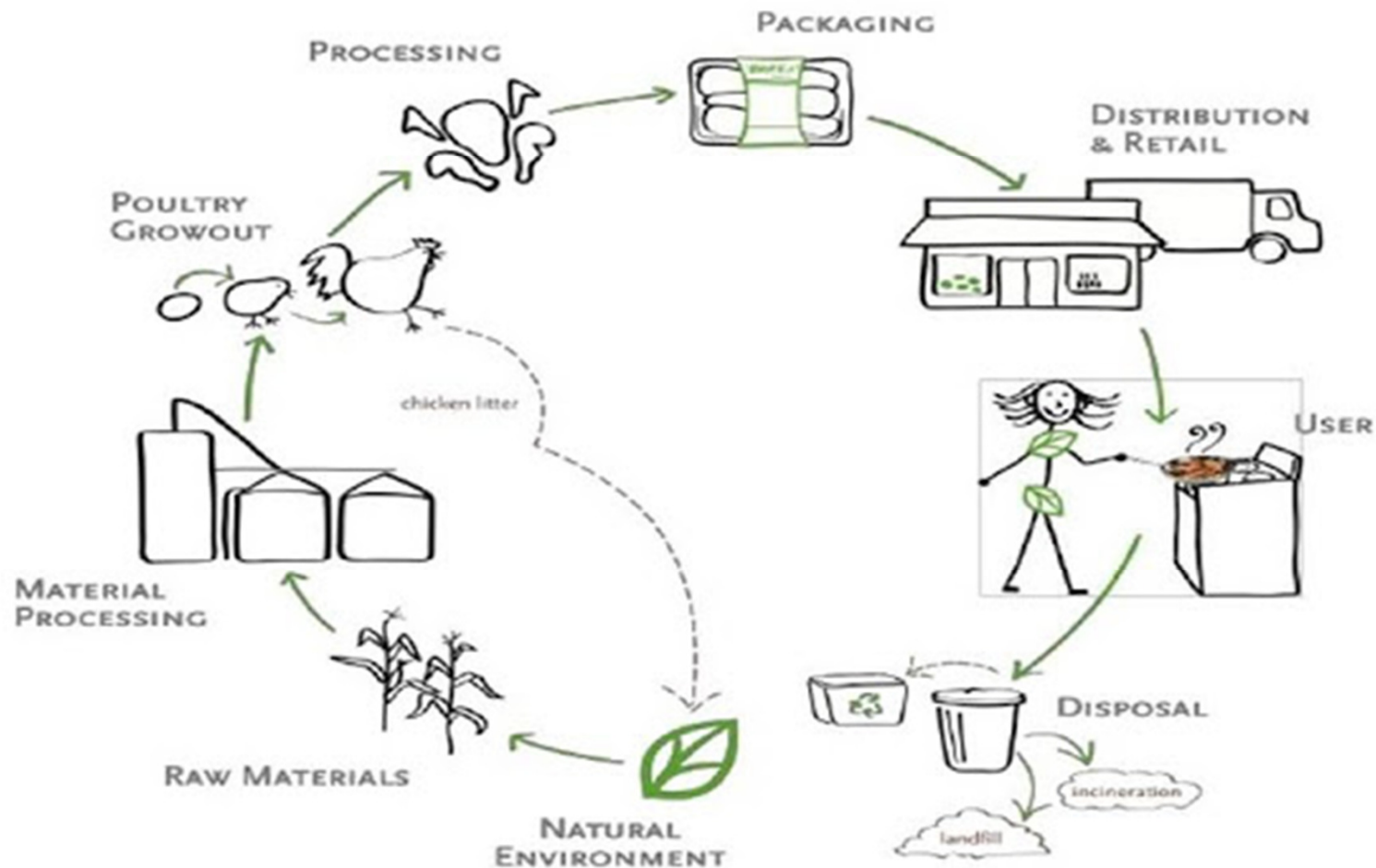
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Introduction

- Poultry industry is an important aspect of the livestock subsector in India with a potential to solve the problem of mal nutrition, unemployment and augmenting rural economy.
- Feed- major input (65-80% cost of production)
- Good productivity depends mainly on quality of feed.

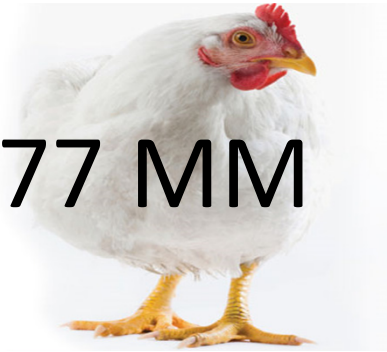


Life Cycle Analysis of Poultry Business



(*BAHS 2010*)

617.77 MM



27.6 MM



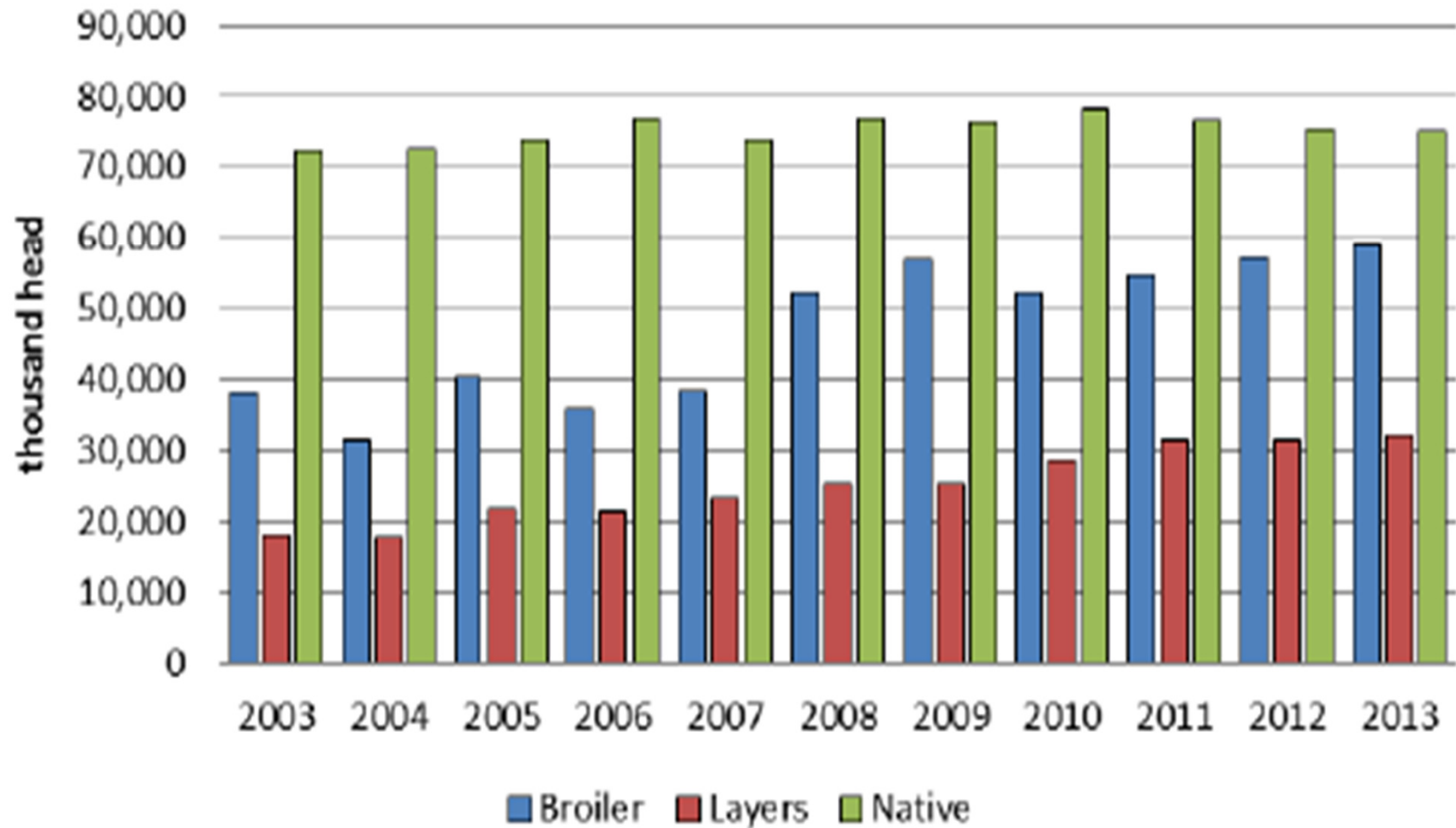
3.5 MM

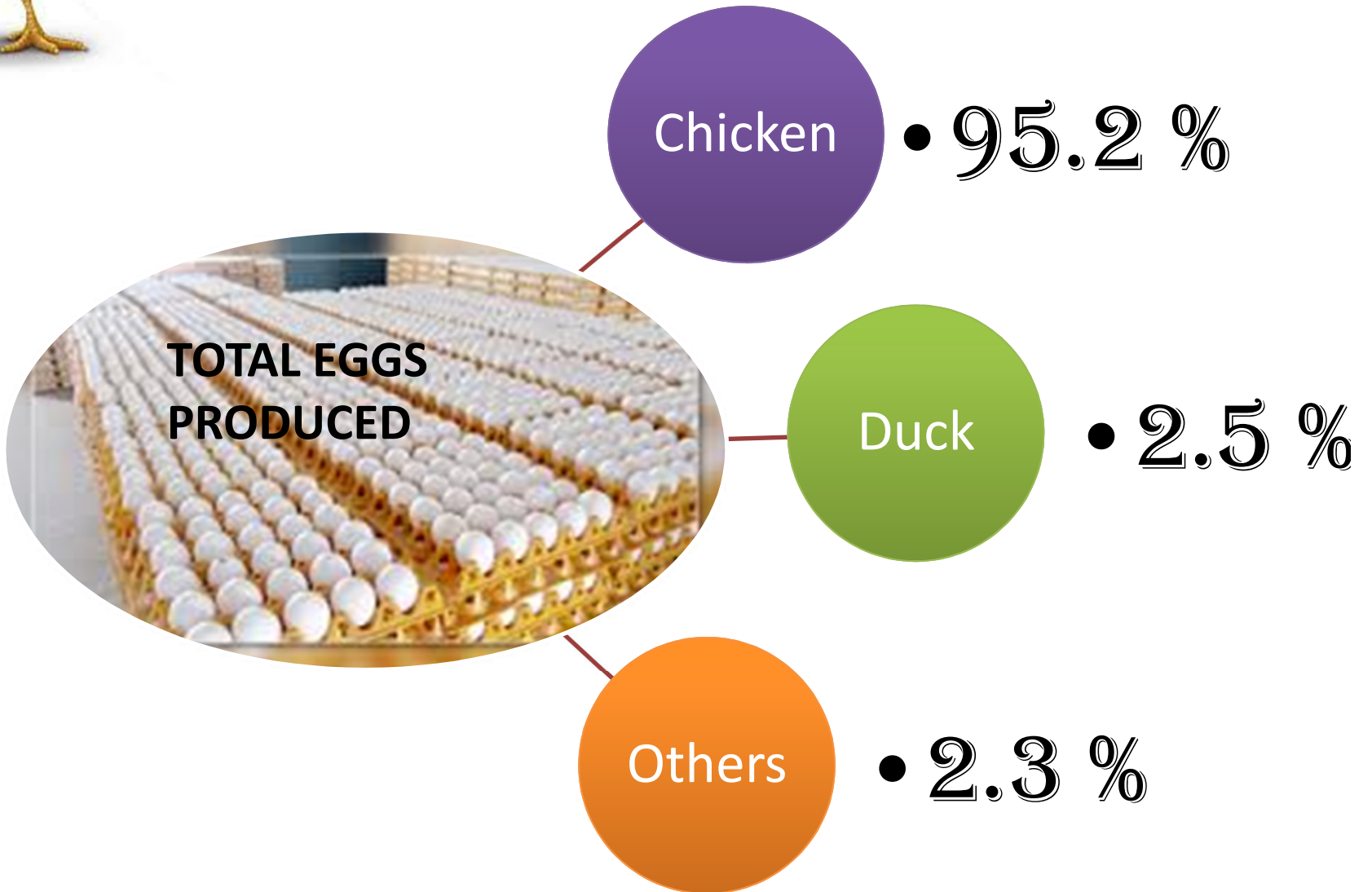


**TOTAL
POPULATION**

648.78MM

Layer populations







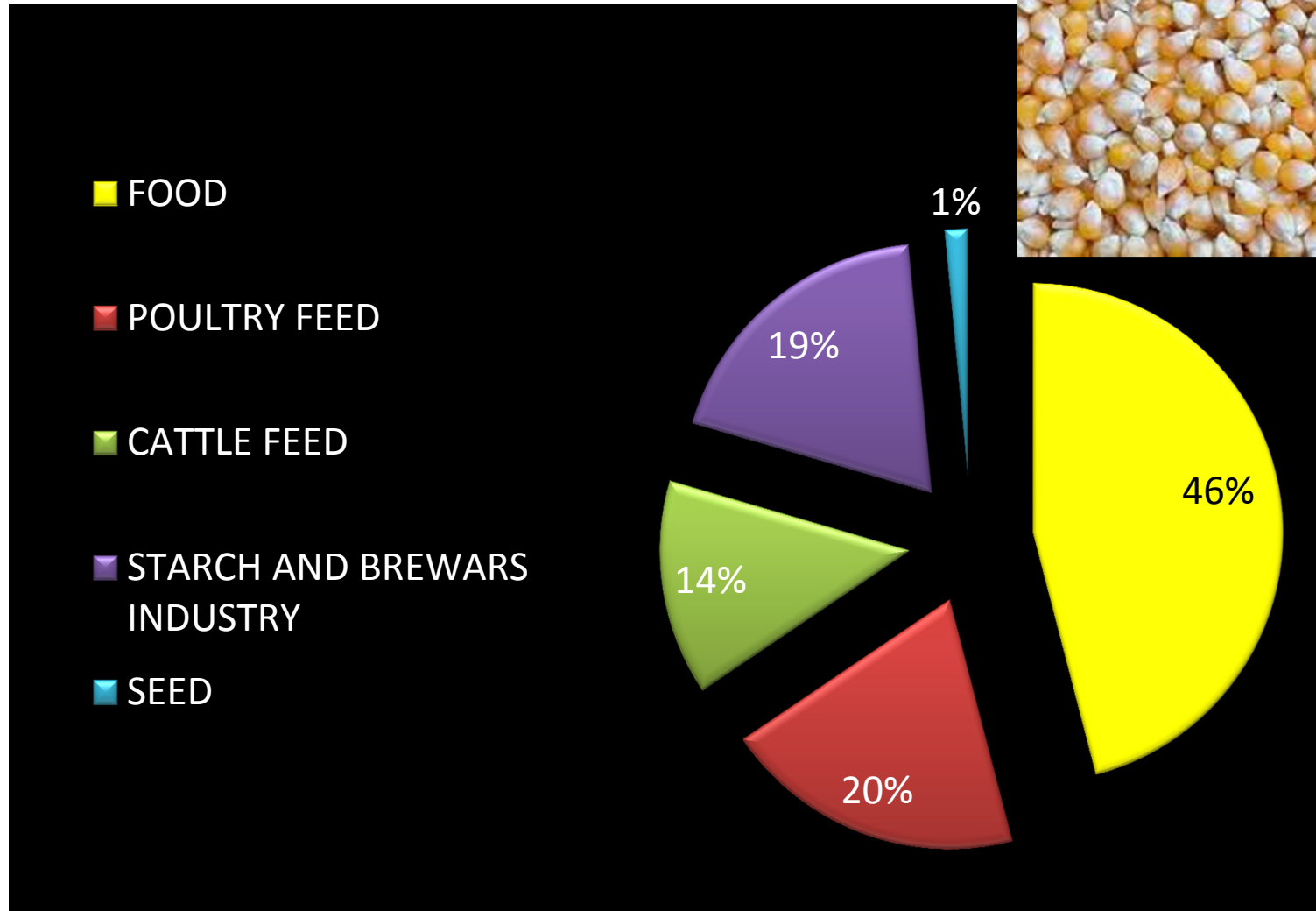
Competition between food and feed industries for using available resources



Increased production cost and added pressure on poultry producers.

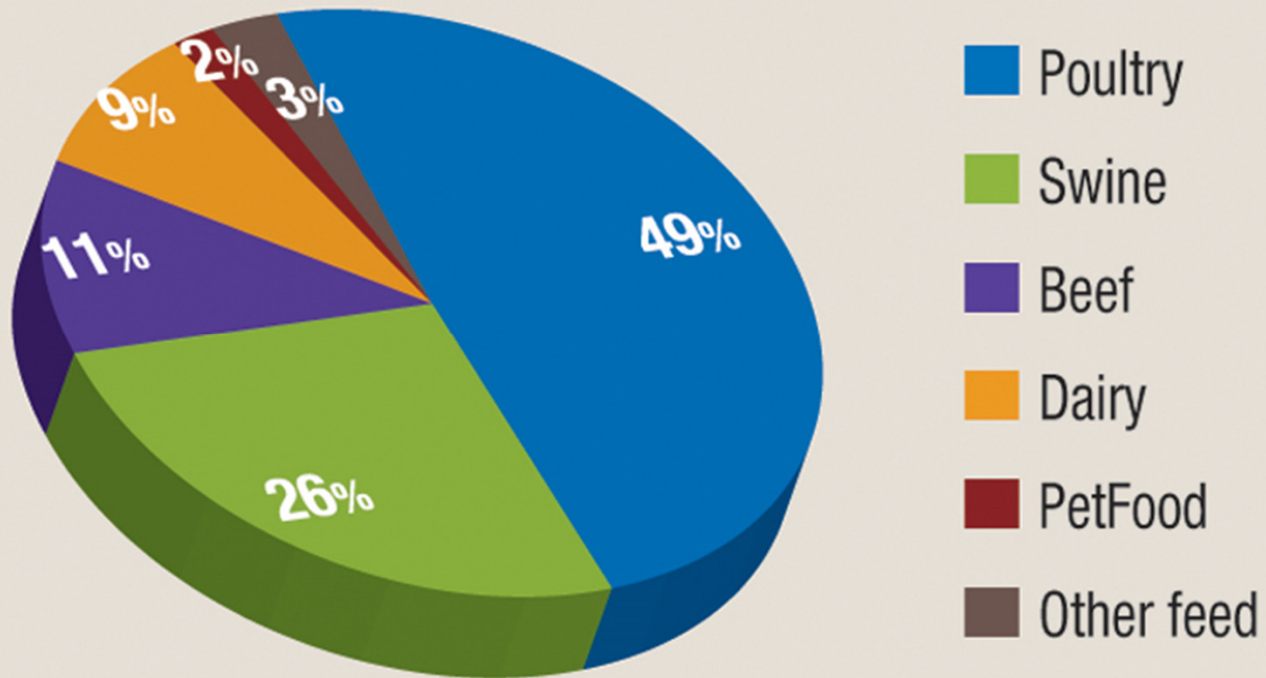


Feed ingredients





Soybean meal use

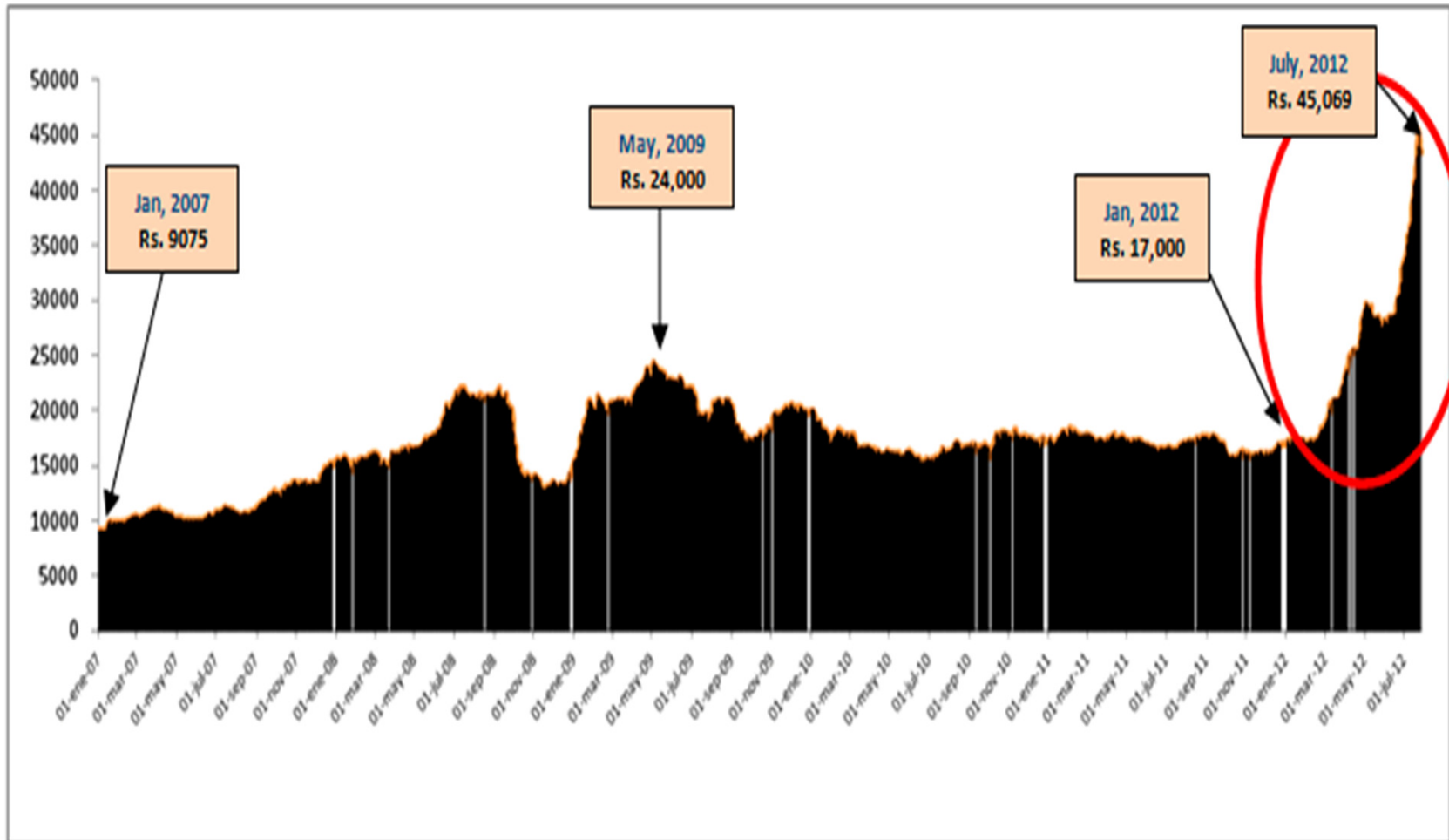


- Frequent monsoon failure
- Low productivity
- Insects, weeds
- Cost efficiency
- Sustainability
- Declining area under cultivation
- Globalization
- Diversion of farmers to cash crops or commodity crops.



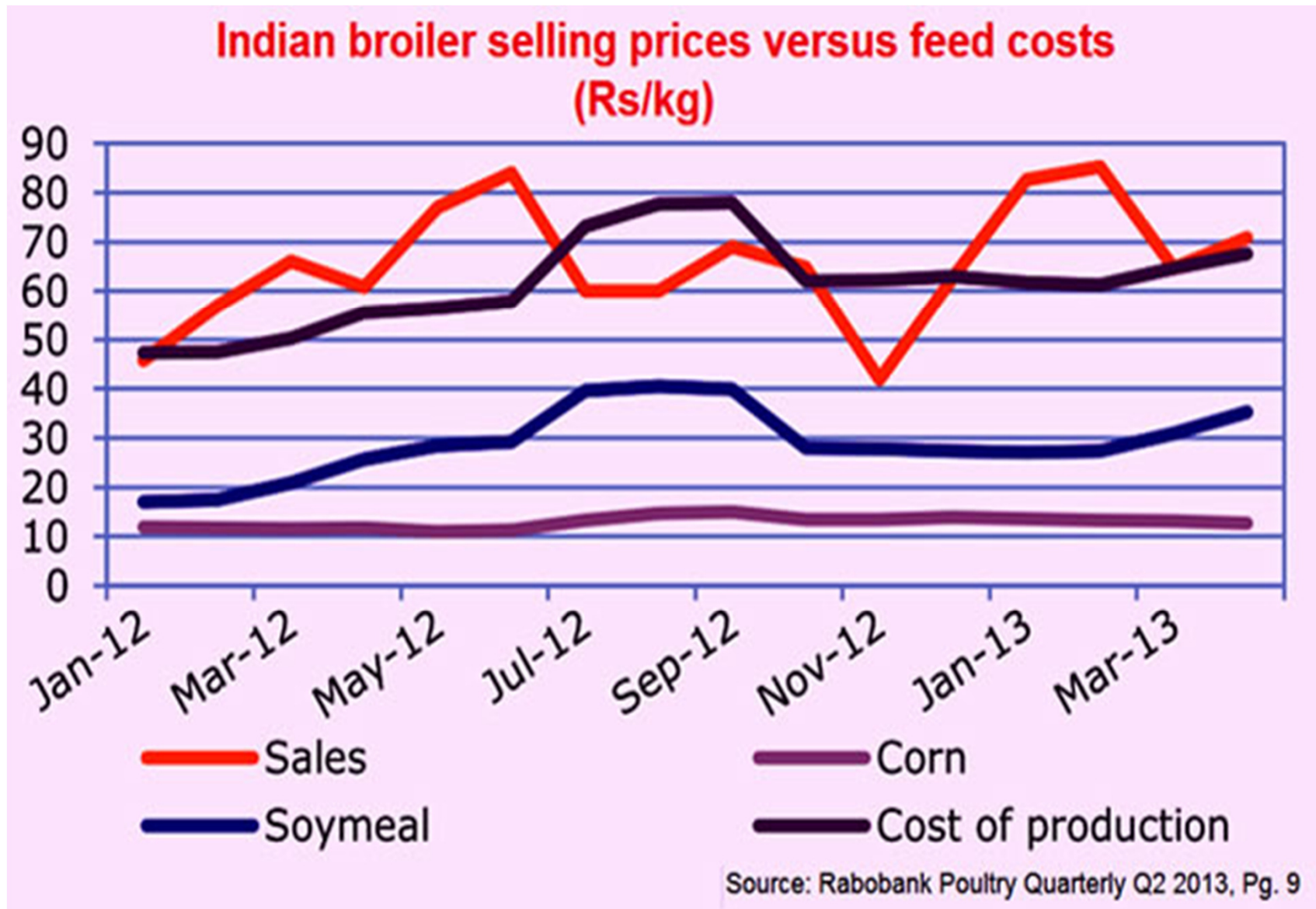
Feed Prices

PRICE MOVEMENT OF SOYABEAN MEAL (MARKET YEAR 2007 TO MARKET YEAR 2012)

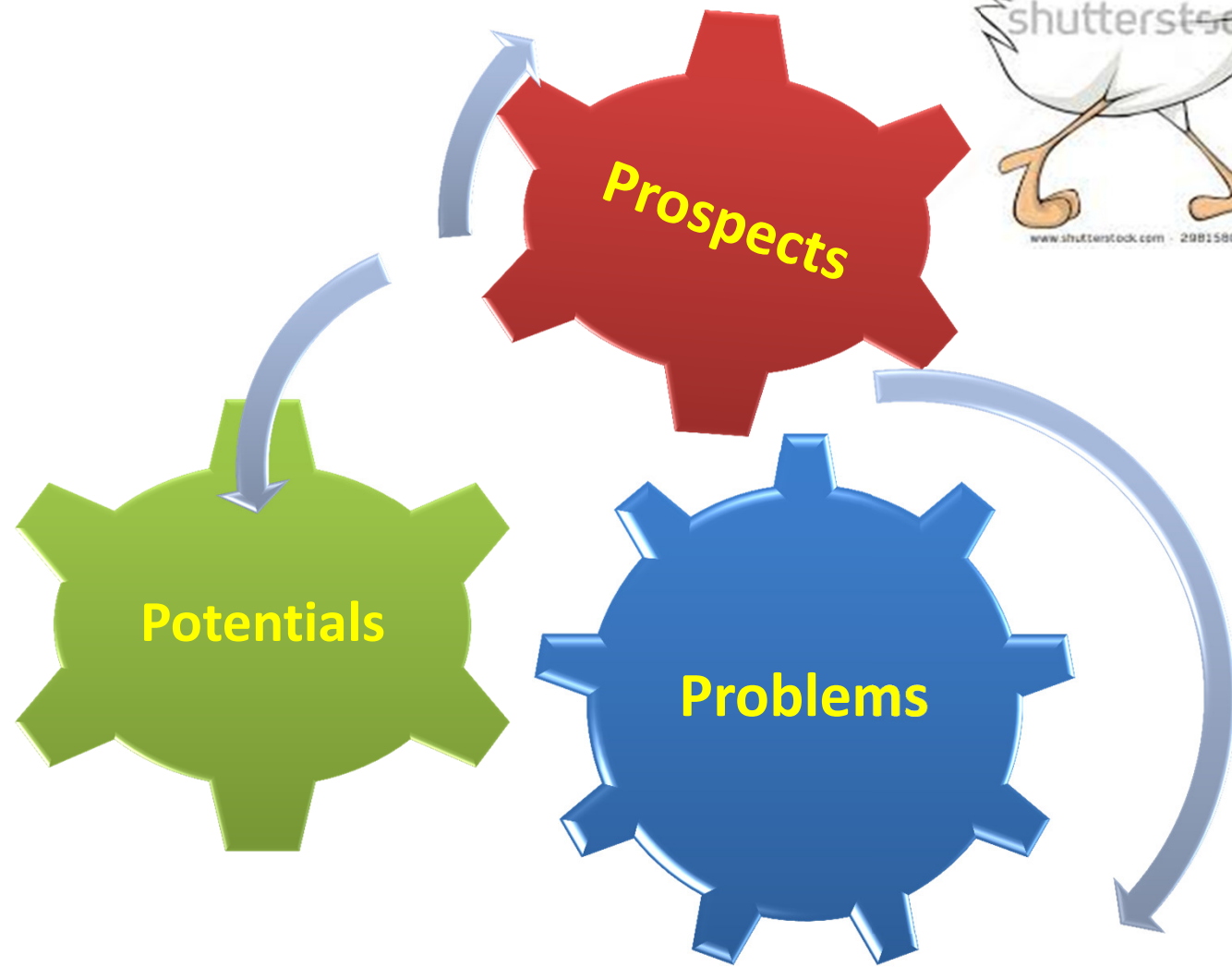


Source: NCDEX

Feed ingredient trend



Objectives



Energy sources



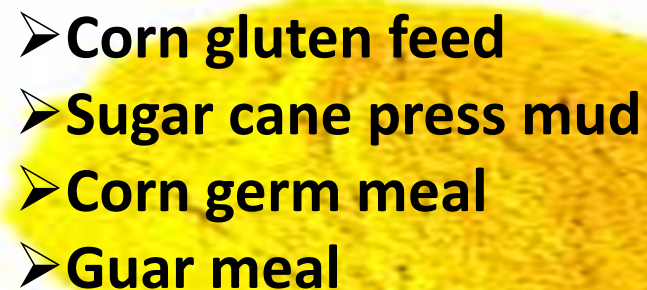
Vegetable protein sources



Animal protein sources



Protein cum energy sources



Potentially interesting sources

Category	
Oil seeds	Proteins of defatted soybeans, rapeseed and sunflower seed
Grain legumes	Peas, lupines and their concentrated, chick peas
Cereals and pseudo cereals	Proteins from oat and quinoa or cereal co-products
Leaf proteins	Grass , sugar beet leaves
Aquatic protein	Algae, both macro and microalgae , duckweed Mussel meal
Insects	Meal worm , housefly, black soldier fly
Microbial proteins	Bacterial protein meal

Non conventional ingredients/importance

Energy Source			
Source		ANF	Max
De oiled salseed meal	Sal fruits	Tannins	5%
Tapioca meal	Tubers of tapioca	Cynogenic substance	3%
Dried poultry waste	Caged layer droppings	Pathogenic organisms	3%
Molasses	Sugarcane	High mineral content	3-5%
Bajra	Def.Lys.	No pigments	Up to 50% of maize
Sorghum	Def in lys, Met, Arg	Tannins	Up to 60% of maize

Protein sources (Vegetable)

Source	ANF	Max in %
Mustard cake	Glycosides , goitrogens	5 ---10
GNC	Trypsin inhibitors, toxins	25-35
Sesame meal	Oxalates and phytates	15
Cluster bean	Trypsin inhibitors	3-5
SFM	Fiber	10-20
Copra meal	High variability in oil , mycotoxins	3-5
Safflower meal	High fiber	5-10
CSM	Gossypol	10-15
MGM	Prone to mycotoxins	10-20
Pencillium Mycelium Waste	Residual antibiotic activity	2-3
Linseed meal	Cyanogenic glycoside, antipyridoxial factors	3-5

Contd...

Animal protein sources

Blood meal	Un palatable	2-3
Silkworm pupae meal	High fiber Poor protein digestibility	2-3
Hatchery byproduct meal	Pathogenic organisms	2-3
Feather meal	Not easily digetible	2-3
Poultry by product meal	Pathogenic oranisms	5
Meat cum bone meal	Phosphorus content & adultration	5
Fish meal	Histamine & Gizzarosine	10

Novel feed resources

Item	Chi.	Adv/ANF	Max	Ref
Spirulina	Broilers	60-70% Protein	0.1%	Kathirvelan & Purushothaman 2014.
Karanj cake	Layers	Karanjin , tannins & trypsin inhibitors	9%	Raju <i>et al</i> 2014.
Corn germ meal	Broilers	20-23% protein	25%	Lakshmi <i>et al</i> 2014.
Sugarcane press residue	layers	Minerals /major elements	15%	Suma <i>et al</i> 2014
Fruits and fruit by products	Broilers	Citrus, pineapple, plantain and mango	2-5%	Ojebiyi <i>et al</i> 2009

Contd.....

Miscellaneous

Leafy plants	Leaf meal , green algae, plankton, aquatic plant meal, duck weed	Alikwe et al.2012 Durunna et al 2007.
Insects	Larva, termites and flies	Ijaiya et al 2009 b
Worms	Earth worms and maggots	Okah and Onwujiariri 2011.
Mollusk	Snail meal , oyster meal and shells	Olomu 2011.
Synthetic a.a, Vitamin premix, Mineral supplements, Enzymes , Probiotics, Prebiotics , Dried yeast, Skim milk powder		Adeyemi et al 2009, Lala et al 2009.

Limitations to the utilization of alternative feedstuffs

Feed stuff origin	Limitation	Inclusion levels
Cereal	High non starch PS – viscosity problems	50-65% depending on the source, age breed of poultry and processing technique
Cereal by products	High fiber High risk of rancidity	5-40% depending on the source and processing technique
Roots and tubers	High starch content with low protein , powdery texture, needs detoxification to reduce ANF	5-40% depending on the source and processing technique Class of poultry
Fruits and fruit by products	Low palatability and high amounts of ANF	5-20% depending on source and nutritive improvement strategy.
Oil seed meals	High fiber content, ANF, risk of mycotoxins, poor texture and low palatability.	5-30% depending on the source and processing technique , age and Class of poultry

SOURCE : FAO

Feed stuff origin	Limitation	Inclusion levels
Green meals	High fiber and moisture contents thus requires extensive drying procedure	≤5%
Dried fish silage	Requires drying, inconsistent nutrient profile due to offal: fresh ratio.	≤5%
Blood meal	Deficient in essential amino acids, poor palatability and risk of zoonotic diseases	≤5%
Hydrolyzed feather meal	Deficient in EAA and risk of transmissible diseases	≤5%
Skimmed milk powder	Obtained from rejected milk thus high risk of zoonotic diseases and not readily available.	≤5%
Insects worms and mollusks	No commercial production and harvesting system yet	50% depending on availability

SOURCE : FAO

Potentials



- Very cheaply available, Not require extensive processing .
- Sufficient quantity available
- Good quality protein
- Have functional effect
- Medicinal property
- Lower the cost of production

Problems



Technical aspects

- Seasonal and unreliable supply (need for storage)
 - Bulkiness , wetness and /or powdery texture
 - Processing requirements
 - Lack of research and development efforts
- (Sogunle et al., 2010)

Contd....Problems

Nutritional problems

- Variability in nutrient levels and quality
- Presence of naturally occurring anti nutritional and or toxic factors
- Presence of pathogenic micro-organisms
- Need for supplementation of enzymes or extensive processing... results in added cost (Bruneton ,1999; D' Mello, 2000).



Figure 1. A schematic of the phosphorus (P) cycle illustrating how water running off the soil surface can move phosphorus into nearby streams or ponds and how good soil management can reduce those runoff losses. Note the higher amount of soil organic matter in the schematic on the left hand side of the stream and the lower particulate and soluble P losses. The size of the arrows represents the magnitude of P input, recycled or lost from the system. From Nutrient Cycles in the Southern Piedmont, 1998. Dr. Darz Frankish Inc. USDA ARS, Watkinsville, GA.



Contd....Problems

Socio economic problems

Poor prices relative to other arable crops could discourage the involvement of most people in producing such ingredients.

Where processing is required, more cost are incurred which may not commensurate with the cost per gram of energy, protein or other nutrients sources in conventional feedstuffs (Sonaiya 2009).



Prospects



- Nutritional composition
- Use of enzymes to improve their nutritional quality
- Most of the ANF present below the threshold levels
- Abundant sunshine could facilitate prompt drying – in turn ANF can be kept below the threshold levels.

Contd....Prospects



- Organization of orientation programme to create awareness about novel feed stuffs for production that will fast track animal agriculture in a challenged economy
- 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

Need of the hour

- Scientific documentation
- Identification of more & newer resources
- Maximum and minimum level of incorporation
- Identifying the incriminating factors
- Supplementation of critical micro nutrient
- Biotechnology innovations & processing techniques



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- 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.



***Thanks for your
attention***

