Training Manual on Backyard Poultry Production, Under Tribal Sub Plan (TSP) for livelihood improvement of Tribal Society

Dr. Tilling Tayo
Dr. Manish Kanwat
Dr. R. Bhagawati
Dr. S.V. Ngachan
Dr. Doni Jini
Dr. M Sharma

I C A R

KRISHI VIGYAN KENDRA, ANJAW
ICAR-RC FOR NEH REGION ARUNACHAL PRADESH CENTER, BASAR

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Keshab Gogoi

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INDIAN COUNCIL OF AGRICULTURAL RESEARCH
ICAR (RC) for NEH Region
Umiam, Meghalaya – 793 103

Dr. S. V. Ngachan
Director

Foreward

In the previous years, the livestock sector has become one of the fastest growing segment in Indian agriculture, and within livestock sector, the poultry husbandry has occupied a pivotal position both in providing employment as well as in contributing a substantial proportion to the national GDP. Even after quantum leap of poultry production, backyard poultry constitutes more than half of the country's poultry population. Market oriented backyard poultry enterprises are being recognized as a stepping stone for the poorest households enabling them to take the first step towards breaking out of the vicious circle of poverty and deprivation.

There is also growing evidence to demonstrate the role of back yard poultry in enhancing the food and nutrition security of the poorest households, reducing the livelihood vulnerability and insecurity, and promotion of gender equity. Perhaps the most important features of backyard poultry lies in that the supplementary income are widespread across different household and can be achieved with minimal inputs. In North Eastern Region farmers taking as liquid assets that can be sold immediately to meet out any urgent needs of poorer families.

In present context, farmers are managing their poultry traditionally without any scientific input.

This bulletin will provide multiplier effect in learning and understanding the back yard poultry farming with the scientific approach. I wish that this bulletin may be useful as ready reference of poultry farming not only for practicing farmers, farm women, young unemployed youth and extension professional of this district as well as state.

(S.V. Ngachan)

I. Introduction

Back yards poultry (BYP) farming is a method of rearing poultry, under which poultry are housed at night but allow free range during day to search feeds. They are usually fed grain in the morning and evening to supplement scavenging. Nests are made up of box or locally unused baskets hanged on the wall. Total poultry population of Arunachal Pradesh is 12,52,314 and Anjaw possess only 24,424 numbers, which is only 1.95 % of total share of poultry population of Arunachal as per 17th Livestock census 2013. Poultry being inevitable part of human existence, in Arunachal Pradesh of rural area backyard poultry farming is practicing since time immoral. Almost every household rear 5-10 numbers of local birds maintain under locally feed resource. The poultry in rural area are not only just keep for meat and egg purpose but also as a important sacrificial birds. Where medical facilities are out of reach and priest act as a doctor and poultry as a medicine to cure human suffering by offering to nature/God/spirits depending upon the nature of disease and sufferings of mankind, decided by priest whom to be offer.

However, the birds reared under backyards system are of local breeds with low body weight and low egg production in addition to without any health care coverage. This training manual is aim to provide improve method of backyard poultry production system, there by covering every aspect of poultry management to mitigate the morbidity and mortality of poultry under local management system and to improve daily earning within same time and energy spend in rearing local poultry.

II. Breeds of backyard poultry

To upscale the backyards poultry production system of rural area an improve poultry breeds developed by poultry scientist with high body weight gain and egg

production has been made available to rear in rural area to improvise their earning from poultry through backyard poultry rearing. Few important improve breeds of backyard poultry are.

1. **Vanaraja:**
   - Developed by the project director on poultry (ICAR), Hyderabad.
   - Multicolour feather with attractive plumage and long shank, capable to protect themselves from predators.
   - They are adaptable to scavenging system of rearing and have better immunity against common poultry disease
   - Average body weight gain of 2 kg at 20 weeks
   - Average egg production of 160-180 in a laying cycle.
   - Colour of egg is brown.

Fig.1. Vanaraja Female

Fig.2. Vanaraja Male

Source: Field survey 2014-16

2. **Gramapriya**
   - Developed by the Project Director on poultry (ICAR), Hyderabad.
   - There are two varieties of Gramapriya bird Viz. White colour Gramapriya and Coloured Gramapriya. White colour Gramapriya lay more egg than colour gramapriya.

- Multicolour plumage and its is very hardy in nature so survivability in rural area is high.
- Average body weight gain of 1.2 – 1.5 kg at 12 weeks
- Average annual egg production of 150-160.
- Colour of egg is brown.

Fig.3. Gramapriya Female

Fig.4. Gramapriya Male

Source: Field survey 2014-16

3. Srinidi

- They have ability to recycle the "Natural Food Base" as well as waste feed into high quality protein which is readily available to the rural or tribal mass.
- Average body weight gain of – 1.9 kg at 20 weeks
- Average annual egg production of 140-150.
- Attractive multi colour plumage
- Longshank to run away from predators
- High general immune competence
- Performs well at low plan of nutrition
- Produce more egg with brown colour

Fig.5. Srinidi Male

Fig.6. Srinidi Grower

Source: Field survey 2014-16

4. Griraja

- Developed by the Karnataka Veterinary Animal & Fishery Science University, Banglore.
- They are sturdy and have excellent adaptability capacity to varying environmental condition.
- They are multicolour bird
- Average body weight are 1.5 – 2.0 kg at 20 weeks
- Age at first laying 24 weeks
- Average egg production are130-150 eggs in a laying cycle
- Colour of egg is brown.

Fig.7. Griraja Female

Fig.8. Griraja Male

Source: Field survey 2014-16

5. Swarnadhara

- Developed by the Karnataka Veterinary Animal & Fishery Science University, Banglore.
- Average body weight are 2 – 2.5 kg at 20 weeks
- Age at first laying 24 weeks
- Average egg production are180-190 eggs in a laying cycle

III. Housing Management

Locally available material, especially bamboo can be used as housing material to confine them in a secure shelter at night, to protect them from natural predators, while allowing them to roam freely around house compound during daytime.

Fig.9. Low costs Scientific BYP shed model

Source: Field survey 2014-16

Fig.10. Low cost farmer BYP shed model

IV. Brooding Management

Brooding is the art and science of rearing baby chicks. A newly hatched chick does not develop the thermoregulatory mechanism fully and takes about two weeks to develop this mechanism and homeostasis. Therefore, they cannot maintain the body temperature properly for the first few weeks of life and may be subjected to chilling leading to increase mortality, if not properly taken care of. Brooding can be classified into natural and artificial brooding.

1. **Natural Brooding:** Its is done with the help of broody hen after hatching, up to 3 to 4 weeks of age.

2. **Artificial Brooding**: In artificial brooding large number of baby chicks are reared in the absence of broody hen. Equipment used for brooding is called brooders. Brooder comprises of three features:

    a. **Heating source:** Heating source may be electrical, liquid fuel like kerosene; solid fuel like coal, wood can be used as a heating material.

    b. **Reflectors:** It may be a flat type or concave type. These reflectors are called hover and may consisted ordinary electric bulb, thermostat mechanism and in some cases thermometer.

    c. **Brooder guard:** They are used to prevent chicks from straying too far away from heat supply until they learn the source of heat. We have to provide brooder guard with a diameter of 5 feet, height of the brooder should not exceed 1.5 feet. For these purpose, we can use materials like cardboard sheet, GI sheet, wire mesh and mat etc.

Fig.11. Natural Brooding

Fig.12. Artificial Brooding

Source: Field survey 2014-16

D. Procedure of Brooder preparation:

- Disinfect the brooding room three days in advance with disinfectants or with lime powder.
- Chick guard size should be placed according to the number of chicks and should be adjusted time to time as the chicks grow.
- Put rice husks/ litter material in the brooding area about a thickness of 3-5 cm depth.
- Light should be on before 6-8 hours prior to introduction of chicks to maintain temperature to 95° F.
- Spread newspaper or waste paper (2-3 layers) over the litter materials.

V. Feeding Management

During brooding for the first two weeks, chick should be maintained under complete balance diet (concentrate free-starter and starter ration). From two weeks onwards slowly on graded level @ 5% of concentrate feed per day to be replace by broken grain or any available feed source of farm origin can be incorporate and by 5^{th} – 6^{th} week concentrate feed can be completely replace by locally available feed stuff. After 6^{th} weeks on wards, the dual-purpose birds develop scavenging nature and able to pick up its food from backyards. Birds reared under backyards system in free range can meet their protein requirement by picking insect, larva, grasshopper, termite, earth worm, may fly etc. However, they must be feed with cereals (energy rich) viz. bajra, broken rice, millets, ragi etc, whatever is available in rural area @ 15-20 g/birds morning and evening, without much financial burden. When bird attained pullets stage additional calcium source must be supplement in the form of shell grit or lime powder @ 2-3 g/birds to prevent laying of thin shell or shell less egg.

Fig.13. Feeding during Brooding

Fig.14. Feeding under free range

Source: Field survey 2014-16

VI. Breeding Management

As a thumb rule 50 % of genetic material of offspring comes from male line. Therefore, selection of cock is very important, with fast growth rate and good body conformation for profitable backyard poultry farming. One cock is sufficient for 6-8 hens to obtain fertile egg. Hen producing good number of egg should be collected in separate basket for incubation and rest can be sold or used for consumption at home. Fertile egg must be collect regularly from nest, keep in cool, and well ventilate place. 10- 12 numbers of egg should be set in brooding hen (local) preferably within 2 weeks after collection for higher hatchability percentage. Egg will hatch out within 21-23 days of incubation period.

Fig.15. Collecting fertile Vanaraja egg

Fig.16. Brooding Vanaraja egg by local hen

Source: Field survey 2014-16

VII. Disease management

The dual-purpose birds developed for backyard system possess better immune system compare to other breeds. However, they are very susceptible to Ranikhet and fowl pox disease. Deworming at 3 months interval is necessary to reduce worm load in flock. In order to avoid occurrence of other disease vaccination scheduled must be follow as shown in (Table No.1).

Table No.1. Vaccination schedule for backyard poultry

Sl.	Age	Disease	Vaccine	Dose	Route
01	1 day	Marekr	HVT	0.2 ml	SC inj.
02	5th day	Ranikhet	Lasota	1 drop	eye
03	7th day	Gumboro	IBD	1 drop	eye
04	14th day	Gumboro	IBD booster	1 drop	Oral
05	28th day	Ranikhet	Lasota booster	1 drop	Eye
06	9th week	Ranikhet	R2B	0.5 ml	SC inj.
07	12th week	Pox	Fowl fox	0.2 ml	SC inj.

Source: Project Directorate on Poultry, Srinidhi.

Disease outbreak is the main constrain in poultry production system in rural area. Some of the common economic importance of poultry disease prevalent under backyard poultry rearing in rural area, its diagnosis and treatments are listed in (Table No.2.)

Table No.2. Diagnosis and treatments of economic important poultry disease

Sl. No	Disease	Causative agent	Clinical sign	Diagnosis	Preventive measure	Treatment
01	Mareks Disease	Hepres virus (DNA)	1. Paralysis of leg and wings 2. torticollis	P.M lesion: Siatic and brachial nerve paralysis, pearl eye appearnce	Vacciantion on 1st day	1. No treatment 2. Multivitamin for 7 days
02	Infectious Bursal Disease (IBD)	Corona virus	1. Diarrhoea, 2. Sitting quiet with closed eyes	P.M lesion: enlargement of bursa of fabricius.	Vaccination on 7th day and	1. Antibiotic for 3 days 2. Multivitamin for 7

				Acchymotic haemorrhages on thigh & breast muscle	booster dose on 14th day	days 3. Jiggery for 3 day @ 500gm/100 birds
03	Ranikhet disease (RD)or Newcastle disease	Paramyxo Virus	1. Greenish diarrhea 2. Drooping wings 3. Twitching of neck 4. Incoordination & paralysis	<u>P.M lesion:</u> pinpoint haemorrhage on proventicular, ulcer in intestine	Vaccination on 5th day and booster dose on 24th day	1. Antibiotic for 5 days 2. Multivitamin for 10 days
04	Leechi Disease	Adenovirus	1. Reluctant to move 2. Sudden death	<u>P.M lesion:</u> pericardium filled with fluids, enlargd liver, congested lungs	Vaccination on 7th day	1. Antibiotic for 5 days 2. Multivitamin for 7 days
05	Chronic respiratory disease (CRD)	Mycoplasma gallisepticum	1. Sneezing 2. Coughing 3. Tracheal rales & gargling sound	<u>P.M lesion:</u> catarrhael exudates in nasan, paranasal, trachea, bronchi and air sac.	Trox 1-3 days of age @ 20mg/100 birds Booster 26th days	1. Tylosin for 5 days 2. Multivitamin & liver tonic for 5 days
06	Coccidiosis	Eimeria species (Tenella)	1. Bloody diarrhoea	<u>P.M lesion:</u> Enlarged caecum, Petecheal haemorrhages in intestine	Coccidiostate @ 10mg/ 100 birds for 5 days	1. Supercox 1 gm/litr for 2 days then plain water for 2 days followed by 5gm/litr for 3 days 2. Multiviatmins for 5 days
07	Collibacillosis	E. coli	Watery Diarrhoea	<u>P.M lesion:</u> Pericarditis and fibrinous fat deposition	Restrict-L for 3 days	1. Restict-L, Enrodec-10 2. Vimeral

				in heart and liver		for 5 days
08	Pullorum Disease	Salmonella Pullorum	Whitish Diarrhoea	<u>P.M lesion:</u> Unabsorbed egg yolk. Enlarge spleen & kidney	Tetracycline @ 20gm/100 birs for 3 days	1. Endodec-10 @ 5ml/litr for 7 days 2. Multivitamin for 7 days

Source: Hand book of veterinary practitioners (S.K.Das)

VII.A. Colour picture of economic important of poultry disease under backyard system:

Fig.1. Marek disease

Fig.2. Ranikhet disease

Fig.3. Infectious bursal disease

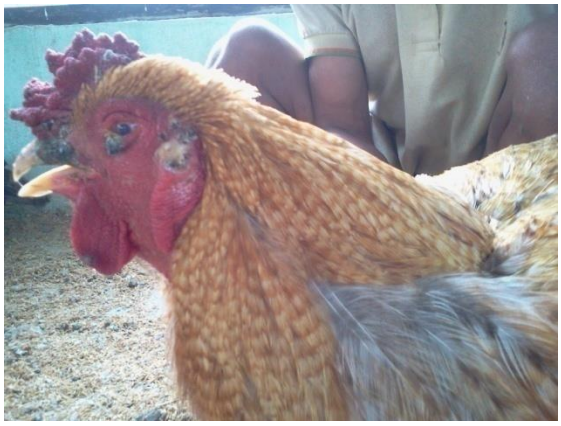


Fig.4. Fowl pox along with CRD

Fig.5. Leachi disease

Fig.6. Coccidiosis

Source: Field survey 2014-16.

VIII. Biosecurity measures

Generally, the improved breeds of poultry are very docile in nature utmost care must be taken for following threat:

1. Attack from dog and cats, even rats during chick stage
2. Attack from eagle and kite
3. Thief by human

IX. Nutritive value of egg and meat

Egg is considered as a complete balance food having biological value of 98% and only protein source, which cannot be adulterated by fraud or malicious intention because of it natural protective shell made up calcium carbonate. Egg compost of shell, albumin and yolk in ratio 11%, 58% and 31% respectively. Each components of egg have distinctive role and compose of different nutrient in each compartment to provide a comprehensive nutrient in resource poor area of tribal mass, as given in the table. 3

Table.No.3.Nutritive value of egg

Sl.No	Nutrients	Quantity in 1 egg
01	Energy (kcal)	90
02	Protein (g)	6.6
03	Fat (g)	5.5
05	Calcium (g)	0.03
06	Phosphorus (g)	0.12
07	Iron (mg)	1.6
08	Vitamin A (IU)	600
09	Vitamin D (IU)	50
10	Vitamin B1(mg)	0.095
11	Riboflavin (mg)	0.19
12	Niacin (mg)	0.04

Source: Poultry farming in India, Booklet No.49

Poultry meat is a wonderful source of protein containing all the essential amino acid and other vitamin and mineral of non-vegetarian diet. The meat is easily digestible compare to other livestock meat. Gross composition of poultry meat is presented in Table 4.

Table.No.4. Gross composition of poultry meat

Sl. No	Nutrient	Composition of poultry in Percentage (%)
01	Water	65-80
02	Protein	16-22
03	Fat	1.5-13.0
04	Carbohydrate	0.5-1.5
05	Ash	0.65-1.0

Source: Poultry farming in India, Booklet No.49

X. Cost benefit Ratio for rearing of BYP unit in small scale

Sl.	Particular	Rate	Amount (Rs)
A	**Expenditure on rearing 10 birds**		
01	Cost of poultry shed construction	LS	2000.00
02	Cost of feeder and drinker	Ls	600.00
03	Cost of 10 chicks	30/chicks	300.00
04	Cost of feed up to 4 weeks @ 2kg/bird	35/kg	1400.00
05	Cost of medicine	20/bird	200.00
Total			**4,500.00**
B	**Income**		
01	Sale of male birds (4 male birds @ 260/kg. considering 2.5 kg live weight per bird at 24 weeks)	260/kg	2600.00
02	Sale of eggs from 5 hen Hen starts laying egg from 24 week @ 14 egg/months. So, in 6 month of closing year = 6 x 14 x 5 = 420 egg	10/egg	4200.00
03	Sale of 5 culled female bird + one male birds @ 240/kg. considering 2.5 kg live weight per bird at 48 weeks	240/kg	3600.00
Total			**10,400.00**
Net Profit (B-A)			**5,900.00**

Source: Field survey 2014-16.

XI. Role of poultry in tribal community

a. Consumption purpose:

Most of rural people do not prefers milk and other milk products, unlike other mainland Indians. The rural people prefer to have boiled egg. Chicken meat are readily used in rural area because slaughtering of chicken is more suitable to meet the requirement during visiting friend and relatives at home, because a rural household can easily handle 2 to 3 kg of poultry meat compare to other livestock.

b. Religious and rituals:

Eggs, chicks and adult chicken are used in many ritual scarification and offering to nature in tribal area to please the nature God to shower blessing to village community and agriculture field for bumper harvest.

c. Biological indicator:

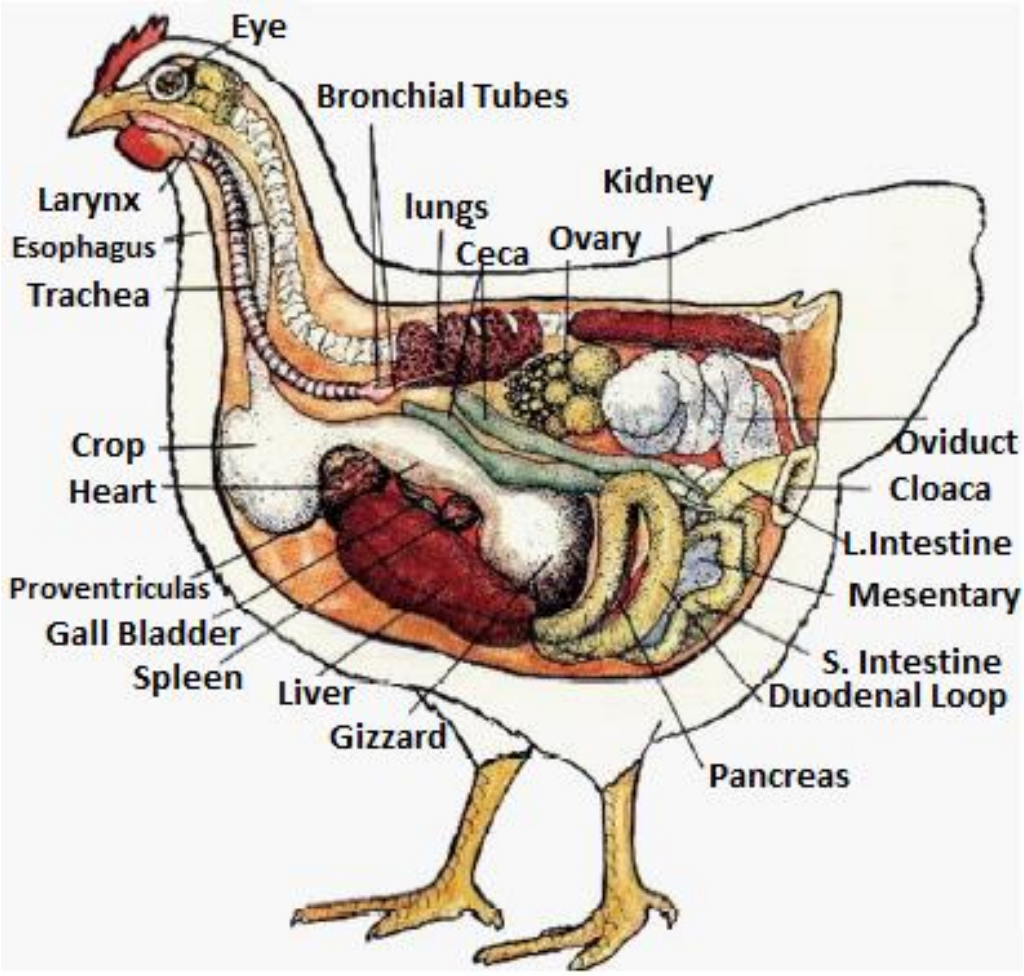
Cockcrow in early morning is wake up signal like an alarm for rural area. In olden days rural people fix the time according to the numbers of cock crow, if they have to go for hunting they fix the time to move when the cock crow for second time or third time according to the length of hunting destination because they have to reach the place before sun rise.

d. Economic:

Poultry plays very important economy activities for Tribal people to meet immediate needs such as acquiring agricultural inputs, paying school fees and purchasing household commodities use poultry as ready cash. It also acts as a financial security for the rural poor this is because rural households find it easier to find a buyer for poultry than a goat, cow and Mithun.

e. Poultry litter as FYM:

The poultry litters are efficiently used as farm yard manure (FYM) in agriculture plot to enhance soil fertility for augmenting crops and vegetable production without much used of inorganic fertilizer.



Source: Picture Book of infectious poultry disease