Hybrid layers on free range in Bhutan.

While the extension service promotes the opposite, farmers produce better on free range.

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Free range brown egg.

- Good for the hen,
- Good for the farmer and
- Good for the consumer.

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Introduction

The Department of Livestock services (DALLS) under the ministry of Agriculture in Bhutan has several different programmes to boost livestock production in Bhutan. One of these programmes is the poultry backyard programme.

With the Poultry Backyard programme the department gives farmers the possibility of buying a certain number of hybrid pullets that can be kept in the backyard.

The pullets are raised in government owned and managed Regional Poultry Breeding centres, one of them located in Paro, and sold at the age of 12 weeks for a cost recovery price. Until that age the pullets are raised on concentrates, and are vaccinated. Transport to the districts, where the distribution occurs, is subsidised.

The extension agents, in charge of the bookings and the delivery of the pullets, try to motivate farmers to build a so-called proper shed according to their recommendations, to keep the pullets inside.
It is believed by the extension agents that when they can convince the farmers to follow this practice, they are executing their duty very well.

In Paro District, one of the most prosperous areas of Bhutan, this poultry backyard programme has become popular. Many farmers have purchased the pullets, and Extension staff managed to convince several of them to build a good shed.

For some time now, the staff have been reporting every month the following data from this programme:
Name of the farmer, Village, number of pullets supplied, number of layers present, number of eggs per day, number of layers that had died, and reason for dying; what type of feed given, and what type of shed farmers had, according to the judgement of the extension agent.

The data

The agents of two sub districts in particular have been rather serious, which has resulted in a complete register covering one and a half years.
These data have been analysed.

In the two sub districts, there were 16 farmers who received pullets during August – September 2000, ready for laying in the first months of 2001. Records were entered from January 2001 up to February 2002. Parameters are calculated based on 13 months (from February 2001 until February 2002).
The production of 3 farmers was not recorded from about August 2001 onwards, because the number of their layers had been reduced to 2 – 4. Although the total production of these farmers was low, still the data is included in the overall calculation.
Monthly production is estimated by multiplying the recorded production by the days of the month.

Production data cover 13 months, February 2001 until February 2002, although several hens were still laying by end of February 2002. They are even still laying at the writing of this document, being August 2002.

Technical parameters

Clustered data is reflected in annex 1. Technical parameters, extracted from that, are found in table 1.

Table 1. Technical parameters averaged for all the farmers.

Parameter	
Average no of pullets supplied	**15.5**
Decrease in number by: mortality, gifts, predation and not registering, over the whole period. (Autumn 2000 till February 2002)[2]	**33%**
Decrease in number by: mortality, gifts, predation and not registering, between receiving as pullet and point of lay. (Autumn 2000 till January 2001)[3]	**10%**
Overall average for egg production per bought pullet	**164**
Overall average for egg production per started layer	**183**
Percentage of laying per existing layer	**55 %**

Building a shed is considered to be the most important criteria for being awarded the qualification of progressive farmer. For that reason, data was split up according the qualification: good shed, poor shed and no shed (although a night shelter was there). This gives the following table.

Table 2. Egg production per bought pullet, for the three categories: good shed, poor shed and no shed.

	No of farmers	No of eggs per bought pullet
Good shed	9	138
Poor shed	4	177
No shed	3	215

[2] Several farmers gave some pullets away as a gift. This was not recorded separately. It means, that although the layers did not die, the decrease in number is added to the mortality. Also, continuous records were not collected from some farmers, although they still had 2 – 4 layers. This again was added to the mortality.

[3] The first 10 % of mortality occurs, apart from decrease because of gifts, just after arrival of the pullets. Travel conditions for the pullets are not that good, and the pullets suffer the change in system from a balanced concentrate ration to free range and wheat feeding.

Looking at the above data, it can be concluded that having a shed does not guarantee a good egg production, but rather the reverse. The reason for this is that, of course, the construction of a shed implies that when the chickens are kept enclosed they have to be fed with concentrates. Concentrates, however, were not within the reach of every farmer, and the combination of enclosed layers consuming single grains is leading to disappointing results. If we study the data to a further extent, and divide the data of the farmers with a good shed into a group of farmers feeding concentrate, and a group of farmers feeding single grains, we get the following table.

Table 3. Number of eggs for three categories; concentrates versus single grains (good shed and no shed)

	No of farmers	Average no of pullets supplied	No of eggs per bought pullet
No shed, single grains	3	10	215
Good shed, single grains	7	18	124
2 farmers Good shed, one farmer poor shed, all feeding concentrate.	3	20	215

From this table it is clear, that the low average production of farmers having a good shed was caused by farmers who did not feed concentrates, supporting the suggestion that the farmers probably enclosed the layers for a while. Of course, after some time they take the right decision, and release the layers, but production has already been lost

The case of Sangay Dorji of Jew village is a good example.

Case of Sangay Dorji.

He received pullets in January 2001. He has been feeding wheat and other local grains form the beginning. First he had no pen, and his layers produced well. After the construction of a shed he enclosed his layers. Then the production went down, the eggs became smaller, and the shells thinner. He had no alternative than to release the hens. After releasing the hens the production increased again. At present he has about 9 eggs from 15 layers, feeding them wheat and keeping them on free range.
When he was visited, the change of conduct was remarkable; He expected that we wanted to see the chickens enclosed. Some were outside while others were enclosed. He tried to find an explanation why some were not enclosed. As soon as he understood that it was recommended to have layers scavenging outside when no concentrate is given, he immediately released the enclosed layers.
(Sangay Dorji's batch of layers was not included in the records.)

Most economical.

To further evaluate the programme, it is necessary to look also at the economical parameters. For this calculation the situation of the farmers feeding concentrates is being compared with the farmers feeding single grains (in general wheat). The three best farmers from the group feeding single grains again are taken separately. The calculations can be found in annex 2. The results are found in table 4.

Table 4: Technical - economical parameters for three groups: concentrates versus single grains (average and the three best performing). (US $ 1.00 = Ngultrum (Nu) 47.50)

	Unit	Single grains, good performing farmers	Single grains (shed and no shed)	Concentrate +
Farmers	No.	3	13	3
Pullets supplied per farmer	No.	10	14	20
Mortality[4]	%	20	30	10
Egg prod per bought pullet	No.	215	151	215
Feed cons / hen /day	Grams	90	90	130
Feeding costs per egg	Nu /egg	1.18	1.61	2.09
Other costs per egg	Nu / egg	0,87	1.10	1.35
Gross margin per egg	Nu / egg	2.21	1.63	0.86

Difference in feeding costs are explained by the fact that enclosed chickens consume more feed, that again is a bit more costly. Difference in other costs are explained by the fact that the enclosed chickens need a good shed, counting for an annual cost of Nu 2000.-
The costs for a shed are not included in the calculation on other costs for the group eating local feeds.

Costs can be brought down, when the technical results can be increased, as was demonstrated by Dorji Tshering, from Dothey village. He kept a complete register on production and feeding costs. A few data, however were incomplete, and had to be estimated. Feeding costs per egg were around Nu 1.70, with a laying percentage of 73. This makes it very clear that backyard production will never be able to compete price-wise with eggs from the Indian market.
Therefore, competition should be based on quality.

[4] To correct for gifts and not registering, it was decided to calculate with the mortality from point of lay.

Quality of eggs

Eggs imported from India are sold for Nu 25 per dozen. They are however, considered to be of bad quality. They are not fresh anymore, and the yolk is whitish. Local eggs are considered to be of a far better quality, and for that reason they are sold locally for Nu 48 a dozen. The eggs are fresh, have a dark yolk because of all the green material the layers eats, and are considered to have a better taste overall. Distinguishing both types is easy, because the Indian eggs are white, and the local eggs are brown. However, spoilage of the market is already starting, because brown eggs from a Bhutanese commercial farm are being sold for Nu 40, - per dozen. These eggs are produced on a larger scale, based on concentrate only feeding. There is a danger that consumers are going to lose their trust in the quality of the egg, especially when the local farmers, applying the backyard production as recommended by the department, are going to produce eggs that have a lighter yolk and less flavour. So, although the staff expects to do a good job, they are actually leading the farmers into the wrong direction. This is because their mind set is into this wrong direction.

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The mindset on backyard and shed versus quality eggs.

The impression could emerge that it seems recommendable to have no shed. This is, however, a wrong impression.
Off course, it is recommended to have a good, functional night shelter for the protection of the layers. Farmers are also very much aware of this and that is part of taking care of animals. But, the cheaper it can be built, the better, as long it remains functional.

Another impression that could emerge, is that field staff do not know how to manage a flock of about 10 – 15 layers.
They do know, and they apply the free range system, as was observed. Also, that is part of a good care taking practice.

But apparently it is thought that they can only execute their duty well if they promote the confinement of the layers. Apparently their mind is set in this direction.

While, to the contrary, their mind should be set to the promotion of the free range system, or, in a broader perspective, to how they can serve the farmer making use of her / his comparative advantages. In Bhutan these comparative advantages are in the field of producing good quality eggs with the free range system.

Annex 1 **Compiled data backyard poultry register**

			mortality / gifts		Egg production		type of feed	type of shed							
name of farmer	village	pullets received	during raising	during laying	per farmer	per bought pullet	conc + =2 single grains=3	good=1 poor=2 no=3		good shed	poor shed	no shed	good shed, single grains	single grains	conc+
Chencho Pema	Kesa	10	1	2	1,864	186	3	2		0	186	0	0	186	0
Bjesa Lham	Kesa	10	3	7	662	66	3	2		0	66	0	0	66	0
Jambey	Kesa	15	1	2	2,794	186	3	1		186	0	0	186	186	0
Am Rinzin	Kesa	20	0	0	5,359	268	2	2		0	268	0	0	0	268
Sangey	Jagatocha	30	3	2	4,444	148	3	1		148	0	0	148	148	0
Samten	Thisa	10	1	2	1,895	189	3	2		0	189	0	0	189	0
Chencho Pema	Thanglaha	10	1	1	2,066	207	3	3		0	0	207	0	207	0
Am Bidha	Bara	10	1	9	807	81	3	1		81	0	0	81	81	0
Thsering	Sangma	26	5	0	4,272	164	3	1		164	0	0	164	164	0
Gyem Dorji	Bara	10	0	2	2,215	221	3	3		0	0	221	0	221	0
Sherab Wangmo	Dujidinglha	10	0	3	2,164	216	3	3		0	0	216	0	216	0
Sangay Zam	Dinglaha	15	2	6	1,671	111	3	1		111	0	0	111	111	0
Karma Phuntsho	Dzongdrakha	20	3	2	3,648	182	2	1		182	0	0	0	0	182
Dasho Liphu	Bondey	20	0	4	3,787	189	2	1		189	0	0	0	0	189
Gyem	Bondey	17	0	2	2,168	128	3	1		128	0	0	128	128	0
Kinley	Bondey	15	5	10	794	53	3	1		53	0	0	53	53	0
Total		248	26	54	40,605					1243	710	644	871	1957	640
			Per farmer		**2,538**				**per hen**	**138**	**177**	**215**	**124**	**151**	**213**

Annex 2. Gross margin calculation for three backyard poultry systems

Paro, average of three farmers with single grains, feeding local feed, starting with 10 birds, 20 % mortality

COSTS	Estimated life, years		Feed cons /day (grams)	Total cost, per unit, Nu	Annual cost, Nu
Capital costs:					
Poultry house	5			0	0
Pullets (15 weeks)		10		70	700
Feed for raising (4 months)		10	70	8	672
Total annualised capital cost					1.372

Material Inputs:	Unit	Average consumption per day	Total quantity during year	Unit cost, Nu	Cost, Nu
Feed					
Wheat, Nu 8.00 / kg	kg	0,8	318,33	8,0	2547
Veterinary fees					250
Maintenance of capital assets					100
Miscellaneous					150
Total material Costs					3047
Capital and Material Costs					4.419

H de Vries: Is (no supplied + no at the end) divided by two, times 90 grams per day. Source: local farmers

REVENUE	Unit	Production per day	Total quantity during year	Unit price, Nu /dozen	Revenue Nu
Average egg production	eggs	215	2.150	48	8.600
sale of pullets		8	70		560
Total Revenue (TR)					9.160
Gross Margin per Unit					**4.741**

	Nu
Feeding costs per egg	**1,18**
Other costs per egg	**0,87**
Gross margin per egg	**2,21**

Paro, average of three farmers, feeding concentrate, starting with 20 layers, 10 % mortality

COSTS	Estimated life, years		Feed cons / day, (grams)	Total cost, one unit, Nu	Annual cost, Nu
Capital costs:					
Poultry house	5			10.000	2.000
Pullets (15 weeks)		20		70	1.400
Feed till point of lay (3 months)		20	80	9	1.296
Total annualised capital cost					4.696

Material Inputs:	Unit	Average consumption per day	Total quantity during year	Unit cost, Nu	Cost, Nu
Feed					
Poultry feed (Nu648/70kg bag)	kg	2,5	970,71	9,3	8986
Veterinary fees					500
Maintenance of capital assets					300
Miscellaneous					300
Total material Costs					10086
Capital and Material Costs					14.782

H de Vries: Is (no supplied + no at the end) divided by two, times 130 grams per day. Source:technical req.

REVENUE	Unit	Production per started layer	Total quantity during year	Unit price, Nu /dozen	Revenue Nu
Average egg production	eggs	215	4.300	48	17.200
sale of pullets		18	70		1.260
Total Revenue (TR)					18.460
Gross Margin per Unit					**3.678**

	Nu
Feeding costs per egg	**2,09**
Other costs per egg	**1,35**
Gross margin per egg	**0,86**

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Annex 2. Gross margin calculation for three backyard poultry systems

Paro, average of 13 farmers feeding single grains, starting with 14 birds, 30 % mortality

COSTS	Estimated life, years		Feed cons / day, grams	Total cost, per unit, Nu	Annual cost, Nu
Capital costs:					
Poultry house	5			0	0
Pullets (15 weeks)		14		70	980
Feed for raising (4 months)		14	70	8	941
Total annualised capital cost					1.921

Material Inputs:	Unit	Average consumption per day	Total quantity during year	Unit cost, Nu	Cost, Nu
Feed					
Wheat, Nu 8.00 / kg	kg	1,1	424,44	8,0	3396
Veterinary fees					200
Maintenance of capital assets					100
Miscellaneous					100
Total material Costs					3796
Capital and Material Costs					5.716

H de Vries:
Is (no supplied + no at the end) divided by two, times 90 grams per day.
Source: local farmers

REVENUE	Unit	Production per started layer	Total quantity during year	Unit price, Nu /dozen	Revenue Nu
Average egg production	eggs	151	2.114	48	8.456
sale of pullets		10	70		700
Total Revenue (TR)					9.156
Gross Margin per Unit					**3.440**

	Nu
Feeding costs per egge	**1,61**
Other costs per egg	**1,10**
Gross margin per egg	**1,63**