COMPENSATING RESTRICTIVE FISHERIES MANAGEMENT MEASURES: DISTRIBUTION OF IMPROVED COCKS TO KAINJI LAKE COMMUNITIES 1997 - 2001[2]

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ABSTRACT

The Nigeria-German Kainji Lake Fisheries Promotion Project (KLFPP) promoted the distribution of genetically improved cocks to the Kainji Lake fishing communities aiming to compensate for possible short-term income losses due to the implementation of fisheries management measures restricting the use of the Lake's resources, and to provide alternative sources for income generation, especially for the women.

Out of 5,075 cocks, produced 4,171 were distributed at subsidized prices mainly to women comprising 116 fishing villages of Kainji Lake. During an impact survey carried out in 12 villages, 6-24 months after distribution, only 25% of the cocks distributed were seen. However, potential income for each beneficiary from the hybrid offspring was estimated at minimum 1,000 Naira per year.

INTRODUCTION

Income generating opportunities were investigated by Ayeni and Mdaihi (1996) by the administration of questionnaires to fisherfolks in 12 fishing communities around Kainji Lake in order to identify alternatives to fishing. They proposed the setting up of a pilot poultry programme for 60 fisherfolks in six fishing communities and to promote local saving clubs.

As a follow-up of those proposals the Nigerian-German Kainji Lake Fisheries Promotion Project (KLFPP) started the improved cocks rearing programme at the National Institute for Freshwater Fisheries Research (NIFFR) in 1996. The rationale of the programme (Ayeni and Mdaihi, 1997) was to compensate for possible short-term income loss from fisheries due to the implementation of fisheries management measures restricting obnoxious exploitation of the Lake resources and to boost income from alternative sources. The strategy chosen for that programme was to improve the local chicken stocks owned by the fisherfolks of Kainji Lake by the introduction of improved cocks to mate the local hens in order to produce hybrid hens with bigger size eggs, larger clutch size (higher number of eggs per laying period), shorter laying pause, higher egg fertility and hatchability, higher feed conversion and faster body growth.

This paper highlights our experiences from the rearing and the distribution of six batches of the improved cocks between 1996 and 2001. (Ibiwoye and Salzwedel, 2001).

MATERIALS AND METHODS

1035 one-day old cockerel chicks of NAPRI Breed were obtained from the National Animal Production Research Institute (NAPRI), Shika-Zaria for the first batch of rearing. Four subsequent batches were Boran Nera Breed (Black Olympian or Black Harco) bought from commercial poultry hatcheries. These one-day old cockerel chicks were reared on deep litter consisting of wood shaving till the age of 20 - 24 weeks at the NIFFR Aviary Complex. *Kerosene and or the electric bulbs provided additional heat regularly for the first 70 days (brooding period) and later if sudden low temperatures are encountered especially* at night. Feed and water were provided *ad libitum* throughout the indoor rearing phase. Between the age of 20 – 24 weeks birds were transferred to the outdoor semi-intensive system where they roam freely within a defined fence. The wall of the fence was made of the local weaved grass (zana) and its stands were from locally sourced woods. Maintenance ration and water were provided *ad libitum.*

Routine medication and vaccination programme was followed.

The distribution of the improved cocks were embarked upon according to the Project's criteria as follows: selected of fishing communities; selection of beneficiaries and inventory of the existing local chicken stocks. treatment and vaccination. The cocks were transported

in wooden crates and/or baskets. The selected fishing communities were assessed by V shaped bottom engine boat and/or by 4-wheel drive pick-up.

Impact assessments of cock's performance were carried out using different questionnaires (Appendices I and II). Promotion of the improved cocks exchange programme was undertaken.

RESULTS AND DISCUSSION

The feeding schedule for the rearing of improved cocks from one-day old to age of 20 week (Table 1). The chemical composition of the various commercial mash fed (Table 2). The maintenance ration offered at the rate of 90g per day per bird in the outdoor (or grow-out or semi-intensive system) consisted of 40% corn bran, 40% guinea corn and 20% rice bran in addition to what they could pick from the range. Thus, to adapt them to range condition prior to their distribution.

Table 3 and 4, respectively showed the routine medication and vaccination programme for the improved cocks and the local chickens stocks in the selected fishing communities.

The 4th batch died completely because of the viral disease Gumboro complicated by the protozoan infection coccidiosis as diagnosed by the Diagnostic Laboratory Unit of Ilorin Zonal Station for the National Veterinary Research Institute (NVRI), Vom. The source of these infections was the hatchery from which the one-day cockerel chicks were obtained. The survival rate for the other batches varied from 75% to 100% (Table 5) improving with the experiences gained from the first five batches. The rearing of about 1200 one-day cockerel chicks per batch was due to limited infrastructure and manpower facilities available. The 6th batch raised by a commercial poultry farm had 100% survival rate and risks of losses solely borne by the supplier.

82% (4,171 out of 5075) of the totally produced improved cocks were distributed at subsidized prices mainly to women in 116 fishing communities (Table 6). From the second batch priority was given to women in purdah (confinement) as a result of Islamic injunction and whose main income sources inside the fenced compound are poultry keeping. The improved cocks were sold at 150 Naira each in 1997/1998 (1st and 2nd batches, at 250 Naira in 1999/2000 (3rd and 5th batches) and at 300 Naira in 2001 (6th batch). The step wise withdrawal of the Project's price subsidy and the continuous patronage of the improved cocks by the fisherfolks is suggestive of their acceptance of the cock exchange innovation.

The impact assessment on the cock performance were carried out, one between July and September, 1997 for the first batch, distributed to eight fishing communities in three locations (Foge Island (communities), Duga Mashaya and Buka Dubu) according to Ayeni and Mdaihi (1997) and Ayorinde (1997). The second between March and June, 2000 in 12 fishing communities for the batches two three and five (Table 7). The mean bodyweights varied between 1.8kg at Tunga Jiba and 2.5kg at tunga Alhaji Nda where most of the owners feed their bird at least twice per day in addition to their access to fish and fish byproducts and what they could pick from the range. The reproductive performance of the local hens mated with the improved cocks (Table 8) was 9 – 11 eggs incubated per hen, 78 – 80% hatchability and about 78% survival rate of F1 offspring is comparable to the results of Sonaiya (1990) which confirmed the superiority of hybrid offspring over the crosses of the indigenous chickens (Akinokun and Dettmers, 1979; Nwuso, 1979). The two assessments are suggestive that the improved cocks obviously adapted well to the free ranging extensive system (Ayeni and Mdaihi, 1997). Mean market price of the cocks, hens and offspring were determined conservatively with 350,200 and 15 Naira, respectively (table 8). Assuming that only the offspring would be sold, every owner theoretically could generate an income of at least 1,000 Naira per year from the sales.

Radio broadcast and information on chicken through drama, cartoons and discussions were used for the promotion of the cock exchange programme. According to Adegbiji *et al* (2001) an minimum of 10 programmes were produced and *aired on 60 occasions for a total 630 minutes* between January 1997 and June 2000.

Table 1: Feeding schedule for the rearing of the improved cocks.

Age (Weeks)	Daily Consumption of *Broiler Starter* in gram per bird	Age (Weeks)	Daily Consumption of of *Chick Mash* in gram per bird	Age (Weeks)	Daily Consumption of *Grower Mash* in gram per bird
1	10	5 – 6	40	13	90
2	15	7 – 8	50	14 – 15	100
3	25	9 – 11	60	16 – 17	120
4	30	12	80	18 – 24	140

Table 2: Proximate composition of the commercial mash fed to the improved cocks

Ingredient	Broiler Starter	Chick mash	Grower Mash
ME (kcal/kg)	3200	2500	2400
Crude Protein (%)	23	18.5	15.2
Ether extract (%)	-	5.1	5.1
Crude fibre (%)		6.5	7.5
Ash (%)	-	6.4	8.1
Ca (%)	1.0	1.2	0.80
P (%)	0.7	0.62	0.62
A.V.P. (%)	-	0.40	0.33
Na (%)	0.15	0.16	0.15
Mn (mg)	-	50	30
Zn (mg)	-	50	30
Lyzine (%)	1.25 - 1.35	0.78	0.60
Methionine (%)	0.86 - 0.50	0.33	0.30
Methionine+cystine (%)	0.46 - 0.40	0.66	0.52
Vitamin A (i.u.)	1500	1200	8000
Vitamin D_3 (i.u)	200	32.75	2400
Vitamin E (mg)	-	3010	15
Vitamin B_2 (mg)	-	2.6	4
Vitamin C (mg)	-	150	10

Table 3: Medication and Vaccination programme for the improved cocks

Age (Days)	Medicine / Vaccine	Application
1 – 7	Terramycin chick formula	in drinking water
8	Gumboro vaccine (1st IBDV)	in drinking water
8 – 10	Antistress (Vitamin)	in drinking water
14 – 18	Antistress (Vitamin)	in drinking water
16	Lasota vaccine (NDVL)	in drinking water
20 – 22	Antistress (Vitamin)	in drinking water
21	Gumboro vaccine (2nd IBDV)	in drinking water
23 – 17	Coccidiostat	in drinking water
31	Dewormer	in drinking water
56	Fowl pox vaccine and Antistress (Vitamin)	subcutaneously at the wing web; Antistress (Vitamin) 2-days before and after the vaccination.
63	Fowl typhoid vaccine and Antistress (Vitamin)	subcutaneously at the wing web; Antistress (Vitamin) 2-days before and after the vaccination
70	Fowl cholera vaccine and Antistress (Vitamin)	subcutaneously at the wing web; Antistress (Vitamin) 2-days before and after the vaccination
77	Coccidiostat and Antibiotic	in feed for 5-days
84	Dewormer and Antistress (Vitamin)	in drinking water for 1 day; in drinking water for 5 days.
91	Coccidostat	In feed for 5-days
98	Antibiotic	In feed for 5-days
112	Komarov vaccine (NDVK)	Intramuscularly in the and Antistress (Vitamin) thigh or breast muscle; in drinking water 2-days before and after the vaccination.
126	Antibiotic	in feed for 5-days

133	Antistress (Vitamin)	in feed for 5-days
140	Dewormer	in drinking water for 1 day
154	Antistress (Vitamin)	in feed for 5-days
168	Antistress (Vitamin)	in feed for 5-days

Table 4: Medication programme for the local chicken stocks existing in the selected fishing communities.

Day	Chicks (less than 9 weeks old)	Adults (9 weeks old and above)
1 – 5	Vitamin plus antibiotic orally / drinking for 5 consecutive days.	Vitamin plus antibiotic orally / drinking. Water for 5 consecutive days
2	./.	Komarov vaccine (NDVK) intramuscularly.
3	Lasota vaccine (NDVL) orally / drinking water.	./.
4	./.	Tripple vaccine (fowl px, fowl typhoid, fowl cholera) subcutaneusly at the wing web.
5	Anti-diarrhoeal plus dewormer orally / drinking water.	Anti-diarrhoeal plus dewormer orally / drinking water.

Table 5: Numbers of the improved cocks reared and distributed

Batch No.	Period of raising	No. of one-day-old cockerels	No. of cocks at the end of the raising time	Survival rate (%)	Period of distribution	Loss during distribution
1st	Nov 96 – Mar 1997	1,035	900	87	April – May 1997	50
2nd	Nov 97 – Mar 1998	1,200	936	78	March – Apr 1998	33
3rd	June 98 - Mar 1998	1,200	978	82	Oct – Nov 1998	25
4th	Feb 99 – July 1999	1,200	0	0	./.	0
5th	Jan – June 2000	1,200	1,061	88	June – July 2000	20
6th	Oct 2000 – Mar 2001	1,200	1,200	Not known	Mar – April 2001	10
	TOTAL	**7,035**	**5,075**	**67**		**138**

Table 6: Distribution of the improved cocks to Kainji Lake fishing communities between 1997 and 2000.

Location (Communities	No. of Cocks
1st batch (Apr-May 1997)	
Foge Islands (6 Communities)	275
Duga Mashaya	217
Buka Dubu	28
Total cocks for communities	**520**
Project HQ	300
Gifts	30
Total 1st batch	**850**

2nd batch (Mar-Apr 1998)	
Foge Islands (6 Communities)	233
Bakosawa	17
Kwaifawa	22
Hikiya (Harkimin Ahmadu)	26
Hikiya (Harkimin Hakib)	34
Sakejikinka	15
Tunga Alhaji Angulu	39
Tunga Mairuwa	93
Kwatan Wara	12
Wawu (Hakimin Labbo)	65
Wawu (Kendawa)	103
Zamare	89
Barashi	21
Amabo	40
Yelwa Yauri	19
Total cocks for communities	**828**
Project Headquarters	50
Gifts	25
Total 2nd batch	**903**

3rd batch (Oct-Nov 1998)	
Tunga Alhaji Danbaba	28
Malae	47
Shagunu	
(6 Communities)	106
Maiwundi	3
Kasabu	22
Sakejikinka	20
Gadan Zare	11
Tunga Alhaji Ibrahim	4
Tunga Alhaji Ibrahim	5

Location (Communities)	No. of cocks
Tunga Garafini Auna	33
Libata	12
Tunga Mairuwa	12
Tunga Alhaji Halidu	17
Kwatan Wara	41
Kuka Uku	7
Raishe Salkawa	52
Tunga Liman	7
Gungu Tagwaye	8
Wawu Jaji	13
Bakari	24
Sabo Dulli	4
Tsohon Dulli	12
Chupamini	8
Tunga Gafara Kendawa	9
Tunga Gafara Babba	161
Yunawat Headquarters	19
Toro	7
Total cocks for communities	**697**
Project Headquarters	231
Gifts	25
Total 3rd batch	**953**

5th batch (June-July 2000)	
Shagunu (7 Communities)	79
Buba Dubu (5 Communities)	32
Yelwa Yauri	19
Tunga Wadata	40
Tunga Gwanda	35
Tunga Maje	10
Tunga Samai	62
Kanshibawa	66
Mainasara	53
Old Bussa Islands	
(7 Communities)	166
Tunga Bala	30
Tunga Bunzawa	30
Tunga Maisaje	37
Tunga Alhaji Sani	51
Tunga Shekare	51
Tunga Kada	60

Location (Communities)	No. of cocks
Masama	45
Mairakumi	45
Hella	80
Total cocks for communities	**991**
Project Headquarters	30
Gifts	20
Total 5th batch	**1,041**
6th batch (Mar-Apr 2001)	
Anfani	29
Gungarwa (Auna)	28
Teteku	37
Yunawa (Wara)	84
Tunga Alhaji Idi	89
Kwanga	41
Tunga Alhaji Bature	45
Jijima Mangoro	60
Jijima Faransawa	48
Gungu Sarkin	95
Jalbabu	82
Inambiro	91
Tunga Leda	38
Tunga Alhaji Manu	34
Tunga Alhaji Aliyu Gado	42
Tunga Gidan Panu	37
Maigwagware	56
Rofia	51
Gungarwa (Rofia)	50
Total cocks for communities	**1,135**
Project Headquarters	32
Gifts	23
Total 6th batch	**1,190**

Table 7: Fishing communities assessed for the improved cocks performance

Location	Communities	No. of respondents in 2000
Foge Island	Tunga Alhaji Nda	16
	Magariya	9
	Yauri Kurama	12
	Goshi Dutse	10
	Dogon Yashi	
	Dadinkowa	
	Subtotal	47
Western side of Lake Kainji	Tunga Alh. Danbaba	6
	Tunga Alh. Garba Gogo	12

	Duga Mashaya Hikiya	21 10
	Subtotal	49
Eastern side of Lake Kainji	Sakejikinka Tunga Mairuwa Gafara Babba Amabo	9 18 24 12
	Subtotal	63
	Total	**159**

* **The communities on Foge Island were assessed twice (1997 and 2000).**

Table. 8: The performance of local hens crossed with the improved cocks.

	Village	No. of respondents	No. of cocks distributed.	No. of cocks seen	% of cocks seen	No. of hens seen	Ratio cock per hen	Mean no. of eggs incubated per hen	Estim. total no. of eggs	No. of eggs hatched	% of. eggs hatched.	No. of F1 offspring	Survival rate of F1 offspring
1st batch (Apr - May 1997)	Tunga Jiba (Foge Island)	5	15			10	1	10	1,382	1,171	85	749	64
	Dogon Yashi (Foge Island).	14	33			140	4	9	1,147	846	74	733	87
	Goshi Dutse (Foge Island)	8	18			40	2	9	1,662	1,331	80	1,114	84
	Yauri Karama (Foge Island)	14	30	156	59	112	4	11	1,428	1,210	85	1,112	92
	Tunga Alhaji Nda (Foge Island)	14	53			406	8	8	1,303	1,038	80	905	87
	Magariya (Foge Island)	No data	116			No data	No data	9	1,218	939	77	632	67
	Sum / Mean	**55**	**265**	**156**	**59**	**708**	**3**	**9**	**8,140**	**6,535**	**80**	5,245	80
2nd, 3rd and 5th batch (1998 - 2000)	Tunga Alhaji Danbaba	6	10	2	20	15	8	9	135	107	79	94	88
	Tunga Alhaji Garba Gogo	12	18	5	28	42	8	9	378	294	78	240	82
	Duga Mashaya	21	30	8	27	92	12	9	828	625	75	450	72
	Hikiya	10	15	3	20	36	12	10	360	301	84	253	84
	Sakejikinka	9	16	3	19	31	10	11	341	264	77	235	89
	Tunga Mairuwa	18	30	7	23	63	9	10	630	479	76	407	85
	Gafara Babban	24	45	10	22	103	10	9	927	718	77	531	74
	Amabo	12	18	4	22	47	12	9	423	340	80	238	70
	Tunga Alhaji Nda	16	25	7	28	51	7	9	459	376	82	282	75
	Magariya	9	15	5	33	27	5	9	243	181	74	125	69
	Yauri Kurama	12	20	6	30	41	7	10	410	331	81	281	85
	Goshi Dutse	10	15	4	27	34	9	9	306	263	86	213	81
	Sum / Mean	**159**	**257**	**64**	**25**	**582**	**9**	**9**	**5,481**	**4,279**	**78**	**3,349**	**78**
	Mean market price (Naira) per bird in June 2000			**350**		**200**						**15**	
	Potential total income (Naira)			**22,400**		**116,400**						**50,235**	
	Potential income per villager (Naira)			**141**		**732**						**316**	

REFERENCE:

Adegbiji, J.A., J.K. Okomoda, J. Bawa and H. Salzwedel (2001): Radio Broadcasting for extension in Kainji Lake Fisheries Promotion Project 1995 – 2000. Nigerian-German Kainji Lake Fisheries Promotion Project Technical Report Series 20, 13 pp, ISBN 978-037-019-6.

Ayeni, J.S.O. and M. Mdaihli (1996): Identification of non-fishing income opportunities around Kainji Lake, Nigerian-German Kainji Lake Fisheries Promotion Project Technical Report Series 4, 69 pp.

Ayeni, J.S.O. and M. Mdaihli (1997): Alternative income in Kainji Lake area:Introduction of improved cocks to fisherfolk, Nigerian-German Kainji Lake Fisheries Promotion Project Technical Report series 8, 25 pp.

Ayorinde, K.L. (1997): Preliminary impact assessment study of cockerel exchange programme in fishing villages in the Kainji Basin. Nigerian-German Kainji Lake Fisheries Promotion Project, Internal Report, 16 pp.

Akinokun, O. and A. Dettmers (1979): Genotype and environment interaction in an exotic commercial egg strain and the local chickens of Nigeria. Ife Journal of Agriculture 1:57-62.

Ibiwoye, T.I.I. and H. Salzwedel (2001): Distribution of improved cocks Kainji Lake communities 1997-2001: A summary, Nigerian-German Kainji Lake Fisheries Promotion Project Technical Report Series 14 pp.

Nwosu, C.C. (1979): Characterization of the Local chicken of Nigeria and its potential for eff and meat production. Proc. 1st Nat. seminar on Poultry Production Nigeria: 187-210.

Sonaiya, E.B. (1990): The contents and prospects for the development of smallholder rural poultry production in Africa. Proc. CTA Int. Sem., Thessalonika, Greece, Oct 9-13, 1990, Vol. 1:35-52.

Appendix 1

Impact Assessment Study of Cocks Exchange Programme in Fishing Villages in the Kainji Lake Basin.

Village:.....Name of keeper.....

A. General performance

1. *Number of cocks given*.....
2. *Number of cocks*.....
3. *Number of hens owned*.....
4. *Number of hens dead*.....
5. *Month(s) in which mortality was observed*.....
   a. Cockerels.....
   b. Hens.....

6. *Causes of mortality*

a.	***Disease***	*Cocks*.....	*Hens*.....
b.	*Attach by:*	*Pets*	.....
		Cats	.....
		Dogs	.....
		Kites	.....
		Snakes	.....

   c. *Stolen*.....
   d. *Sold*.....
   e. *Other causes*.....
   f. *I don't know*.....

7. Do other cocks mate with your hens? Yes..... No.....

8. Types of feed given a. Maize b. Guinea corn c. Millet

9. Quantity of feed given.....
   Frequency of feeding.....

10. Do you give your cocks to others use? Yes..... No.....

11. Have sold any of the offspring? Yes..... No.....
If yes, at what age?.....
Number of males sold..... Average price.....

B. Crossbreeding effect

1. Body weight of the cocks.....
2. Body weight of the hens.....
3. Number of eggs laid by each hen.....
4. Number of chicks hatched by each hen.....
5. Mortality pattern of chicks for each hen.....
6. Body weight of the chicks and growers for each hen.....
7. Do you use drugs for the birds Yes..... No.....
If yes, what type?.....
If yes, what type?.....
If no, why not?.....

Appendix II

Assessment of local chickens mated by improved cocks in fishing villages of Kainji Lake, Nigeria

General

Village.....
District.....
L.G.A.....
Keeper.....
No. in the Household.....

Performance Data

1. *Husbandry Data*

Birds	*No. dead*	*No. alive*	*Total*
a. Local chicks *b. Hybrid chicks* *c. Local hens* *d. Hybrid hen* *e. Local cocks* *f. Exotic cocks*			
Total			

2. *Reproductive Record for Hens*

a. How many eggs does a hen lay
b. No. of chicks hatched by a hen
c. No. of checks to maturity by a hen

3. *Management Record*

a. No. of offspring, cross ..... Local.....
b. Which of these offspring do you like to keep
Crosses ..... local ..... both .....
c. Would you like to have another exotic cock? Yes..... No..... Reason for your answer:.....

Health Data

1. Causes of mortality
   a. New castle disease (Tsukuku).....
   b. Fowl pox.....
   c. Diarrhea.....
   d. Unthriftness.....

2. How do you care for the sick or dying birds?

Income earning Data

1. Sales record / profile

Birds	*No. Sold*	*Unit Price*	*Total cost*
a. Local cocks *b. Exotic cocks* *c. Hybrid hens* *d. Local hens* *e. Hybrid cocks* *f. Local chicks* *g. Hybrid chicks*			
Eggs *Local type* *Hybrid type*			

2. Handling records (numbers)

Birds	*Eaten*	*Given out*	*Stolen / lost*
a. Local cocks *b. Exotic cocks* *c. Hybrid hens* *d. Local hens* *e. Hybrid cocks* *f. Local chicks* *g. Hybrid chicks*			
Eggs *Local type* *Hybrid type*			