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Dead Birds or Shattered Hopes?

A Study of the Impact of Bird Flu on Poor People's Poultry related Livelihoods in West Bengal

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Research Report

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ABBREVIATIONS

BF	Bird Flu
CDF	Cumulative Distribution Functions
DoC	Day old Chicks
FGD	Focus Group Discussions
HH	Household
MU	Mother Unit
SAPPLPP	South Asia Pro Poor Livestock Policy Programme

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Since the study required speaking to a large number of rural households and collecting detailed quantitative information, specially in the aftermath of the HPAI outbreak they had gone through, it would not have been possible to carry out the field work without the cooperation and support of Keggfarm management and staff. We take this opportunity to express our sincere gratitude to Mr. Vinod Kapur, Chairman, Keggfarms Private Ltd, Mr. Milan Biswas, Regional Manager (Eastern Zone) and all the field functionaries who helped us in carrying out the survey.

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— Study Team

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Disclaimer

Dead Birds or Shattered Hopes?

I want there to be no peasant in my kingdom so poor that he cannot have a chicken in his pot every Sunday

Henry IV

Accept this firstling of my flock, to whom also the lastling is due. To broil our benefits perhaps is not the highest way

Emily Dickinson
(in an unpublished letter to her sister-in-law, along with the gift of a young chicken from the family poultry yard)

1. THE SETTING

Small scale poultry has and continues to present a promising avenue for enhancing the livelihoods and nutritional security of the rural poor with limited employment opportunities. The small bit of income from a few birds in the backyard provides the much needed extra financial space and hope to the poorest households to begin the process of asset accumulation and break the vicious circle of poverty. A number of development initiatives in the recent past have recognized this and incorporated household poultry in their ambit. Most of these have been supported by development funds provided by local and national governments or international donors. The degree of success of these projects has varied greatly depending on the degree of backward and forward linkages these projects could forge. But private sector initiated and sustained examples of backyard poultry production are rare. One such rare example pertains to the dual purpose bird "Kuroiler", developed and promoted by the Keggfarms Pvt.Ltd.

Recognizing the 'private doorstep delivery of the village hardy bird Kuroiler' as a 'Good Practice', the South Asia Pro Poor Livestock Policy Programme (SAPPLPP) carried out an in-depth study on the contribution of rearing 'Kuroiler' birds in supporting poor peoples' livelihoods in West Bengal in the second half of the year 2007.[1]

The study focused on income generation, household nutrition, women's empowerment, and development of entrepreneurial capacity of the rural poor and combined conventional

[1] Ahuja, V., Dhawan, M., Punjabi, M., and Maarse, L. 2008. Poultry Based Livelihoods of the Rural Poor: Case of Kuroiler in West Bengal, *South Asia Pro-Poor Livestock Policy Programme. Available at: http://sapplpp.org/goodpractices/doc-12-poultry-based-livelihoods-of-rural-poor-case-of-kuroiler-in-west-bengal*

survey based research techniques with qualitative participatory tools. Data were collected from nearly 250 households and about 100 other agents in the Kuroiler chain from four districts—South 24 Parganas, Jalpaiguri, Murshidabad and East Midnapur. Based on extensive analysis, the study concluded that the 'Kuroiler' based enterprises generated high profit margin ratios at all levels in the supply chain and hence comprised a good addition to the menu of livelihood options available to the poor. The study also found that 'Kuroilers' added to the market-orientation and contributed significantly more to cash flows at the household level than *desi* birds. Although the overall *average* contribution of 'Kuroilers' to total household income of small-scale producers was just about 10 percent, their contribution to other aspects of livelihoods such as nutritional security, women empowerment, development of entrepreneurial capabilities in women, and strengthening of social networks was substantial despite not being quantifiable in monetary terms.

The field work for the above mentioned study was carried out in the months of September-October 2007. Within three months of this survey, the West Bengal government reported an outbreak of highly pathogenic avian influenza, 'bird flu' in Birbhum district.

The outbreak resulted in sudden death of more than 10,000 birds in the Margram block alone. After confirming that these deaths were caused by H5N1 strain of the avian influenza virus, the State Government ordered complete culling of all poultry including ducks in an area of 5 km radius from Margram. Despite these measures the virus spread to 13 out of 19 districts within three weeks and killed an additional several hundred thousand birds[2] (Annex 2). According to some reports, total poultry losses, including culling, was more than 4 million birds, the majority belonging to poor rural households. More than sixty percent of the birds culled were in Birbhum, Murshidabad and Nadia districts alone (Table 1).[3, 4]

Margram, where the outbreak was first reported, was part of the sample surveyed in the 2007 study. In Margram and other neighbouring villages, the government of West Bengal ordered and carried out culling of all poultry birds. Although some households initially managed to hide laying hens for reproduction, while others managed to smuggle their birds out of the culling zone, almost all the poultry in Margram and surrounding areas was ultimately destroyed after several rounds of culling.

The villages that did not suffer directly from the outbreak of Bird Flu were also impacted indirectly. Images of poultry culling on the national television and print media and

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2 West Bengal has highest poultry density in the country and about 90% is in backyard production system. Low awareness about the disease among poor households, high duck population, which are often silent carriers, late acknowledgement and confirmation of bird flu cases, may all have accentuated the problem.

3 That unusual mortality was initially suspected to be 'Ranikhet Disease'—a common endemic disease in West Bengal. There are several outbreaks of Ranikhet in the state throughout the year particularly during the winter season. Although mortality due to Ranikhet is quite high, the reporting and surveillance system is extremely weak. This resulted in significant delays in identification of Bird Flu outbreak.

4 In our sample we had one village each from Birbhum and Nadia and three villages from Murshidabad district. For the purpose of analysis however these have been treated together and shown against Murshidabad.

Table 1: District-wise Culling Targets and Outcomes in West Bengal

Name of District	Culling Target	Number culled				Number of eggs destroyed
		Chicken	Ducks	Others	Total*	
Birbhum	1,250,000	1,199,674	144,955	–	1344629 (32.0)	159,745
Murshidabad	800,275	695,455	104,751	69	800275 (19.0)	646
Nadia	399,011	372,568	64,274	–	436842 (10.3)	49,121
Hoogly	35,700	327,191	29,598	–	356789 (8.4)	1,111,856
South 24 Parganas	20,200	193,463	13,753	–	207216 (5.0)	2,560
North 24 Parganas	202,000	200,935	795	–	201730 (4.8)	13,413
Burdwan	169,540	144,636	26,678	–	171314 (4.0)	17,134
Howrah	16,700	154,722	12,220	–	166942 (4.0)	1,012
Malda	128,488	102,536	2,060	–	104596 (2.5)	2,558
Cooch Bihar	83,523	72,716	10,807	–	83523 (2.0)	9,969
West Medinipur	10,400	77,752	10,775	–	88527 (2.1)	59,633
South Dinajpur	80,000	72,335	6,705	–	79040 (1.9)	67,988
Jalpaiguri	4,900	56,101	3,129	493	59723 (1.4)	11,897
Darjeeling	28,500	56,101	3,129	–	59230 (1.4)	9,969
Purulia	35,500	30,550	5,392	–	35942 (0.9)	4,261
North Dinajpur	17,810	15,750	2,060	–	17810 (0.4)	2,558
East Medinipur	10,400	13,942	1,175	44	15161 (0.4)	193
Bankura	11,000	9,535	1,341	–	10876 (0.3)	1,338
Total	**3,303,947**	**3,795,962**	**443,597**	**606**	**4240165 (100)**	**1,525,850**

Figures in parentheses are percentages to state total.

various announcements made by *panchayats*[5] led to confusion and panic. Rumours circulated that all poultry had to be killed, that consuming poultry meat or eggs would lead to influenza-like disease in humans, that police action would be taken against those who did not get rid of their birds, that poultry farms would be burnt etc. Poor poultry keepers panicked and did what seemed best at that time. Some slaughtered their birds and consumed the meat, others made distress sales, still others gave away birds to anyone willing to take them. Few hid them till they thought it safe to bring the birds out. The majority of households stopped consuming chicken meat for almost 2-3 months. Chicken prices plummeted to less than one third of pre-outbreak prices while some big producers gave even DoCs free of costs.

In the light of the foregoing, the SAPPLPP decided to conduct another study to examine the impact of the bird flu outbreak in West Bengal on the poultry-related livelihoods aspects of poor households and other economic agents associated with the door-step delivery system of Kuroiler bird. Specific objectives of the study were (i) to understand the impact of bird flu and control measures (culling, production ban) on livelihoods, income and nutritional aspects of poor people involved in the entire chain of 'Kuroiler' production and (ii) to draw lessons from this experience to safeguard the interests of the poor in future cases of such outbreaks.

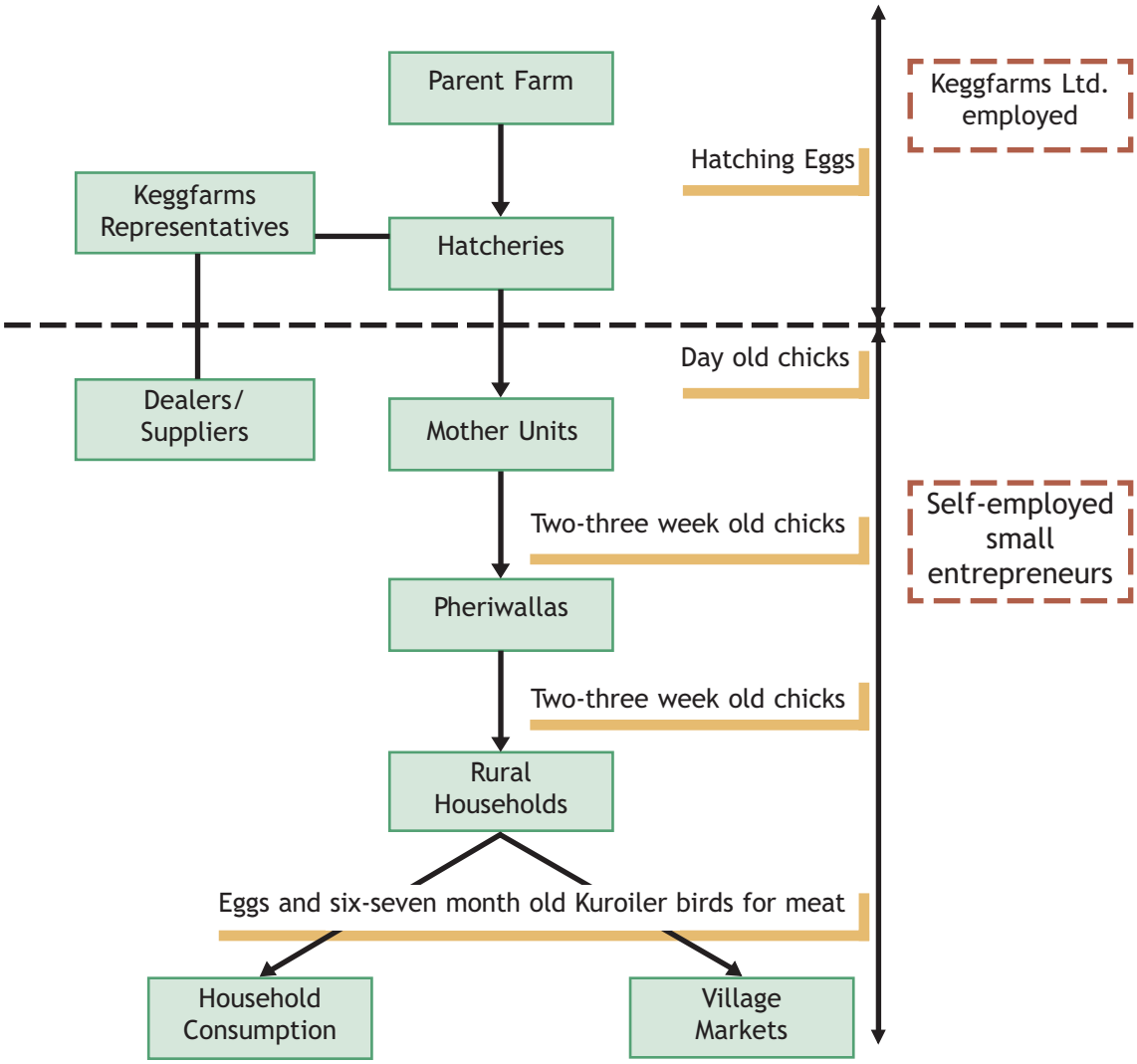
[5] 'Local Government': a decentralized form of Government where each village is responsible for its own affairs.

2. SURVEY DESIGN AND METHODOLOGY

Since the 2007 survey was conducted just before the outbreak, it was decided to use that survey as benchmark and re-survey the same households to allow a 'before and after' comparison. Hence the sampling frame was kept identical except for replacing those households who could not be located. To compensate for these households, 22 new households were included in the 2008 survey.

The key strength of the 'Kuroiler' business model, as concluded in the previous study, is the 'value chain' (door step delivery system) that supports 'Kuroiler' distribution in the villages. Keggfarms supplies its 'day old chicks' to the villages through an extensive network of dealers/suppliers, Mother Units and vendors (*pheriwallas)* across Northern and North East India. The Mother Unit operators and the vendors (*pheriwallas)* are independent local entrepreneurs whereas the dealers/suppliers are not employed but appointed by Keggfarms to provide the necessary linkages between company hatcheries and the Mother Units (Figure 1). In addition to surveying the poultry rearing households,

Figure 1: Door-step delivery system of Kuroiler bird



both studies also examined the financial returns of various agents in the value chain and their role in contributing towards the sustainability of 'Kuroiler' model. The district-wise break-up of the sample including the overlap with the previous survey is given in Table 2.

Table 2: Sample size and distribution of 2007 and 2008 surveys

District	Sampling Units* in the 2007 sample			Sampling Units in the 2008 sample			New HH
	HH	MU	PW	HH	MU	PW	
Murshidabad**	64	10	10	58	9	8	8
East Midnapore	63	9	10	60	9	9	5
South 24 Parganas	65	10	10	64	9	10	9
Jalpaiguri***	65	9	7	0	0	0	0
Total	**257**	**38**	**37**	**182**	**27**	**27**	**22**

* HH: household, MU: Mother Unit, PW: *Pheriwalla*
** Including Birbum and Nadia.
*** Jalpaiguri was not included in the second round survey due to resource constraints.

The details of the survey and questionnaire design and a descriptive analysis of the sample households are available in Ahuja *et al* (2008) and hence are not repeated here. One important difference in the questionnaire design, however, concerned the choice of reference period. While the previous survey used 'twelve months immediately preceding the survey' as the reference period, the current survey split the reference period into (i) January to March 2008, the 'immediate impact period', during which all culling took place and the government banned all poultry production activities, and (ii) April to August 2008, the 'recovery period' during which restocking and poultry production activities resumed. The Government restocking activities started on 4th November 2008.

Box 1: Anjali Maiti

Anjali suffered a loss of Rs. 4000 on her flock of 50 birds. Since the household does not own land and poultry keeping is their main source of income, situation was grave. In spite of her husband's failing health, he decided to migrate to Gujarat in search of work.

In the month of April situation improved and people began buying eggs and consuming poultry. Anjali decided to start afresh but needed capital for investment. Her daughter offered her a loan of Rs. 2000/- at no interest. With this amount she bought 50 DOC in May.

As in the previous study, the quantitative survey was complemented by qualitative research tools such as focus group discussions, village meetings and interviews of

households, Mother Units and *Pheriwallas* using the *nine-square mandala*[6] tool. The qualitative and quantitative components were administered together to ensure maximum synergy between the two methodological approaches.

3. RESULTS AND OBSERVATIONS

3.1. Stock, Prices, Perceptions and Production Practices

We begin by examining the household level stock of 'Kuroiler' and *desi* birds at the household level (i) as recorded in the 2007 survey, (ii) at the time of the bird flu outbreak (January to March 2008), and (iii) at the time of the current survey (that is September 2008; just after the 3 months 'recovery period'). Per household the poultry stock as estimated from the two surveys are given in Tables 3 and 4. The statistics in these two tables are based only on those households who appeared in both surveys. It can be seen that the average flock size at the time of the bird flu outbreak reported in the current survey is significantly higher than what was recorded in the 2007 survey. Given the short span of two months between the 2007 survey and the outbreak, it appears unlikely that the stock would have gone up drastically. This difference might therefore be either due to recall error or due to strategic over-reporting of loss due to the outbreak anticipating more Government compensation. We do not have sufficient quantitative information to resolve this issue but qualitative field observations and the systematic nature of the bias across all districts and all income groups suggest that at least part of this difference may be due to strategic over-reporting.[7] This systematic bias makes it difficult to assess the real loss of bird inventory at the household level.

It is however clear that after the poultry production ban was removed the process of restocking (for Kuroilers as compared to *desi*) has proceeded more rapidly in indirectly affected districts—East Midnapore and South 24 Parganas. Both these districts reported an average current stock of about 5 to 6 birds per household compared to about 10 to 11 birds reported in the previous survey. Murshidabad—the directly affected district on the other hand reported a current flock size of about 3 birds per household compared to about 10 in the previous survey. One reason for slower restocking in Murshidabad appeared to be poor access to seed stock; Kuroiler delivery system not yet well developed in this district, relative large number of very poor people and high price of *desi* poultry. As can be learnt from the previous study,[8] 'Kuroiler' was a somewhat recent introduction in Murshidabad (average 6.7 per household compared to 9.8 and 8.6 per household in the

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6 A description of *nine-square mandala* tool is available in the study referred to in footnote 1. See also Baumgarter, R. & Högger, R. (Eds.). (2006). In Search of Sustainable Livelihood Systems, Managing Resources and Change, Sage Publications, New Delhi, Thousand Oaks, London, or visit http://www.poverty-wellbeing.net/media/sla/index.htm and learn how to work with the "Sustainable Livelihoods Approach". In annex 6 the Rural Livelihood System Approach (shortly called the RLS Mandala) is presented plus a modified RLS Mandala with trigger points for the HPAI impact studies, while in addition 4 Mandalas for two households are presented comparing pre and post bird flu situation.

7 Considering that people were still waiting for their compensation dues or any other form of assistance the over-reporting can even be seen as rational response to survey questions.

8 Reference footnote 1.

Box 2: Bibijaan Bewa

Bibijaan is 50 years old widow who lives on her own and is dependent on her sons. She had a flock of 4 laying Kuroilers, a *desi* hen with 9 chicks when bird flu broke out in their village.

All Kuroilers, *desi* hen and 6 chicks succumbed to the disease while 3 chicks survived. Bibijan did not have the heart to part with the surviving chicks. Therefore she did not take them for culling and does not repent losing compensation amount of Rs 30/-.

Today, they are healthy and she foresees them growing into hens and hatching chicks leading to bigger flock.

Not the one to give up easily, Bibijan has already invested in 5 Kuroiler chicks with money borrowed from her son.

other two districts) and the supply chain was not yet as well established as in the other two districts. Most households kept *desi* poultry (on average 5.4 per household compared to 1.4 and 1.6 per household in the other two districts) and having lost almost all their stock to either the disease or to government culling, there was no natural way of rapid regeneration of poultry stock. The fact that restocking of '*desi*' birds has been slower (respectively at the rate of 39%, 13% and 21% for *desi* birds in Murshidabad, South 24 Parganas and East Midnapore) than Kuroilers (respectively at the rate 13%, 51% and 64% for Kuroiler birds in Murshidabad, South 24 Parganas and East Midnapore) perhaps also implies significant loss of poultry biodiversity. Notwithstanding, the directly affected district Murshidabad remarkably managed to restock with *desi* birds namely on average 2.1 per household. In this context, a conscious public effort to accelerate the '*desi*' poultry stock can add significant value towards rebuilding the biodiversity.

Across income groups however there was a difference in the pace of restocking; i.e. for *desi* respectively at the rate of 34%, 22% and 59% in bottom, middle and top category, while for Kuroiler it was 83%, 61% and 43% respectively. Indeed the poorest one third households had already restocked up-to 60 percent of the flock size reported in the previous survey. Comparable figures for other income groups were approximately 50 percent but the absolute flock size was smaller in the case of poorest 30 percent households (Table 4).[9] Interestingly, restocking rate of '*desi*' birds was somewhat faster[10] in case of top 30 percent households whereas 'Kuroiler' restocking proceeded at a more rapid rate in case of bottom 30 percent. It is worth mentioning that restocking has progressed without any active support or guidance of public agencies on the ground. Also, there has been no initiative towards systematic awareness creation and knowledge enhancement either from the government or from Keggfarms about poultry production

[9] East Midnapore is perhaps the poorest of the three districts included in the study. As a result about 40 per cent of the poorest sample households were in East Midnapore district. Comparable figures for Murshidabad and South 24 Parganas were 35 and 25 per cent, respectively.

[10] The price of *desi* birds was extremely high (Rs. 100-150 per laying hen in 'recovery period' compared to Rs.80-100 in 'pre Bird Flu period') while Kuroiler (day old chicks) relatively cheaper; consult Annex 5 for details on prices of day old chicks, *desi* hen, Kuroiler meat etc).

in general and bird flu in particular. Also, as will be shown later, the disruptions in the supply chain made it difficult to spread extension messages because old relationships of trust were weakened. Hence the knowledge base remains the same regarding bird flu and bio-security measures. However, due to close encounter with the outbreak and mass culling a lesser number reported taking specific measures to prevent diseases. Some reported washing of feet and hands before handling the birds/chicks, others mentioned applying formaline, lime, phenyl, bleaching powder, cow dung, gamaxine etc. on walls and surrounding areas where poultry are kept and/or fencing/confinement to prevent contact from other domestic and wild birds. A high number of households however reported that they stopped the practice of 'throwing dead birds in the open' and adopted 'burying the dead birds' instead (see Annex 1).

Box 3: Kamal Sheikh

Kamal Sheikh's knowledge regarding Bird Flu and bio-security measures remain as before and he queried –

"You tell me what should I do to keep the bird flu away?"

The main signs of disease described by the villagers included drooping of the head, nasal discharge, discharge from the eyes, bluish discoloration of the wattles and comb, and bloody discharge from the mouth. There was no difference in the resistance to bird flu across different breeds of birds. Households were evenly split when asked the question "which type of birds (Kuroiler or *Desi*) succumbed to bird flu first?"

Table 3: District-wise stock of *desi* poultry and Kuroilers older than 3 weeks

(Number of birds per household)

Variable	East Midnapore	South 24 Parganas	Murshi-dabad
Stock of *desi* birds as recorded in the 2007 survey	1.4	1.6	5.4
Stock of *desi* birds at the time of the Bird Flu outbreak as reported in the 2008 survey	2.3	0.5	9.3
Current stock of *desi* birds as recorded in the 2008 survey	0.3	0.2	2.1
Stock of Kuroilers as recorded in the 2007 survey	8.6	9.8	6.7
Stock of Kuroilers at the time of the Bird Flu outbreak as reported in the current survey	12.4	11.3	9.2
Current stock of Kuroilers as recorded in the 2008 survey	5.5	5.0	0.9
Stock of *desi* and Kuroilers as recorded in the 2007 survey	10.0	11.4	12.1
Stock of *desi* and Kuroilers at the time of the Bird Flu outbreak as reported in the current survey	14.7	11.8	18.5
Current stock of *desi* and Kuroilers as recorded in the 2008 survey	5.8	5.2	3.0

Table 4: Stock of *Desi* poultry and Kuroilers older than 3 weeks disaggregated by income categories

(Number of birds per household)

Variable	Bottom 30 percent	Middle 30 percent	Top 30 percent
Stock of *desi* birds as recorded in the 2007 survey	3.2	3.2	2.2
Stock of *desi* birds at the time of outbreak as reported in the 2008 survey	3.9	3.9	5.2
Current stock of *desi* birds as recorded in the 2008 survey	1.1	0.7	1.3
Stock of Kuroilers as recorded in the 2007 survey	3.5	8.0	6.8
Stock of Kuroilers at the time of outbreak as reported in the 2008 survey	9.0	12.0	9.0
Current stock of Kuroilers as recorded in the 2008 survey	2.9	4.9	2.9
Stock of *desi* and Kuroilers as recorded in the 2007 survey	6.7	11.2	9
Stock of *desi* and Kuroilers at the time of the Bird Flu outbreak as reported in the current survey	12.9	15.9	14.2
Current stock of *desi* and Kuroilers as recorded in the 2008 survey	4	5.6	4.2

When asked if they would continue keeping poultry despite the inherent risk , more than 90 percent of households in directly affected areas responded in the affirmative. In fact nearly 60 percent of the households wanted to increase their stock beyond the pre-outbreak levels. When asked for the reasons why they wished to continue poultry keeping despite such risks, more than 40 percent cited nutrition for children as the most important reason followed by contribution of poultry towards food security by selling the birds in times of need. However a significantly larger proportion of households also recognized 'disease' as an increasingly important factor that can diminish the attractiveness of Kuroiler/poultry as a means of enhancing their livelihoods. In all the three districts and in all income groups, a significantly higher proportion of households identified disease outbreaks a potential disruption factor compared to the previous survey (Tables 5 and 6). Across the three districts the proportion was understandably highest in the directly affected district of Murshidabad. What is noteworthy, though not surprising, is that across income groups, the poorest households were much more concerned about disease outbreaks than the other two groups.

Table 5: Perceived reasons for potential disruptions of Kuroiler based livelihoods –by district-

(Percent)

Reasons	East Midnapore		South 24 Parganas		Murshidabad	
	2007	2008	2007	2008	2007	2008
Price crash for poultry	11.5	16.1	14.3	18.9	12.5	4.4
Mortality due to predators	19.2	10.3	8.2	12.6	16.7	23.3
Mortality due to diseases (including outbreaks)	40.3	64.3	59.2	61.0	50.1	72.2
Other reasons	29.0	9.3	28.0	7.5	20.7	0.1

Table 6: Perceived reasons for disruptions of Kuroiler based livelihoods –by income-

(Percent)

Reasons	Bottom 30 percent		Middle 30 percent		Top 30 percent	
	2007	2008	2007	2008	2007	2008
Price crash for poultry	18.2	8.0	13.3	14.0	14.3	17.0
Mortality due to predators	21.2	13.1	16.7	14.0	9.5	18.1
Mortality due to diseases (including outbreaks)	45.4	72.1	40.0	62.0	52.0	62.5
Other reasons	15.2	6.8	30.0	10.0	24.2	3.4

3.2. Production, trade and consumption of eggs and chicken meat

As expected, production and trade of eggs and all types of poultry birds ('Kuroilers', broilers, layers, *desi*, *ducks etc.*) declined significantly during January-March 2008 because of the government ban on production and sale of all poultry products as well as real and perceived health risks associated with poultry production. Average production, trade and prices of Kuroiler birds and eggs pre- and post-outbreak periods are given in Table 7 and 8. Comparable figures for *Desi* birds in Murshidabad are given in Table 9.[11] As can be seen, there was a drastic decline in the production of eggs and trade of chicks, ready birds and eggs during the immediate impact period (January-March). Trade in chicks and eggs almost completely ceased in all three districts although some trade in ready birds did continue in the districts that were not affected directly. In the directly affected district there was almost no trade even in ready birds. In South 24 Parganas the ready birds sold is rather high but as the average sale price indicates it concerns distress sales.

Table 7: Production, trade and price of Kuroiler birds and eggs: 2007 and 2008

	2007	2008	
		Jan-Mar	Apr-Aug
Number of chicks purchased per household per month	3.0	0.4	1.2
Number of ready birds sold per household per month	1.1	0.9	1.0
Production of Kuroiler eggs per month per household	32.0	14.5	9.6
Sale of Kuroiler eggs per month per household	12.0	4.3	3.7
Sale price of eggs (Rs/egg)	2.4	1.8	2.5
Average sale price of Kuroiler birds (Rs/kg)	60.0	40.5	63.0

Note: Average production and sale numbers are calculated over all households including those with no production and sale during the respective periods.

[11] Due to small sample of *desi* birds in East Midnapore and South 24 Parganas, comparable statistics are not computed for those districts.

Table 8: District-wise production, trade and price of Kuroiler birds and eggs: 2007 and 2008

	2007	2008	
		Jan-Mar	Apr-Aug
Murshidabad			
Kuroiler chicks purchased per household per month	1.50	0.01	0.17
Ready birds sold per household per month	0.20	0.00	0.00
Production of Kuroiler eggs per month per household	21.5	3.60	2.90
Sale of Kuroiler eggs per month per household	8.00	0.35	0.20
Sale price of eggs (Rs/egg)	2.90	1.90	2.80
Average sale price of Kuroiler birds (Rs/kg)	60.8	..	..
East Midnapore			
Kuroiler chicks purchased per household per month	3.70	1.12	1.58
Ready birds sold per household per month	1.80	1.25	1.37
Production of Kuroiler eggs per month per household	41.9	17.8	13.3
Sale of Kuroiler eggs per month per household	29.7	8.10	6.20
Sale price of eggs (Rs/egg)	2.30	1.68	2.48
Average sale price of Kuroiler birds (Rs/kg)	55.2	42.6	60.2
South 24 Parganas			
Kuroiler chicks purchased per household per month	2.95	0.02	1.54
Ready birds sold per household per month	0.92	1.50	1.34
Production of Kuroiler eggs per month per household	45.3	21.3	10.3
Sale of Kuroiler eggs per month per household	21.2	4.30	3.70
Sale price of eggs (Rs/egg)	2.30	1.85	2.60
Average sale price of Kuroiler birds (Rs/kg)	65.9	38.4	65.4

Table 9: Production, trade and price of *Desi* birds and eggs in Murshidabad: 2007 and 2008

	2007	2008	
		Jan-Mar	Apr-Aug
Chicks purchased per household per month	0.1	0.0	0.4
Ready birds sold per household per month	1.3	0.0	0.0
Production of eggs per month per household	14.1	3.8	3.4
Sale of eggs per month per household	7.7		
Sale price of eggs (Rs/egg)	2.2	*	
Average sale price of *desi* birds (Rs/kg)	64.0		

* Trade data extremely limited to permit calculation of price and sale statistics.

Almost immediately after the ban period, restocking began and trade resumed, albeit slowly. Also, the price of eggs and meat bounced back to, in many cases even exceeded, the pre-outbreak level. Despite the rapid rise in prices, however, restocking remained sluggish because of (i) poor supply of Kuroiler chicks due to disruption in the supply chain at MU and *pheriwalla* level, (ii) non-availability of seed stock for *desi* birds, and (iii) lack of ready cash for purchase of *desi* hens, chicks and/or feed.

Box 4: Tehmina

Tehmina's household is perpetually in debt with the grocers and suffers from food insecurity all year around. With her flock falling prey to Bird Flu, she has lost an important source of income.

Restocking is out of her reach as the cost of one *desi* hen is as much as her father's monthly salary - Rs 150

The decline in production is also reflected in the consumption patterns of poultry products although *it is the trade that was affected more than the consumption*. Figure 2 presents per household per month consumption of chicken in 2007 and the two periods in 2008. It is obvious from the figures that there was steep decline in consumption of chicken in Murshidabad during January-March. It is interesting however that the consumption of chicken in the other two districts actually increased quite significantly and then plummeted back to or below pre-outbreak levels in subsequent months. This seems to be a result of 'distress sales' and 'forced home consumption' as prices crashed and households panicked and slaughtered their birds to consume them at home. The second panel of Figure 2 gives per household chicken consumption by income category. It can be seen that chicken consumption shot up dramatically during Jan-March in the poorest households whereas it declined in the other two income categories. Of course, as the prices reverted to their normal levels and the perceptions of health risk improved, the consumption of the poorest households reverted back to the pre-outbreak level. Eggs, on the other hand, presented a somewhat different picture. Consumption reduced quite significantly in all areas and all income categories during the outbreak period (January-March) as supply dropped sharply and there was almost no trade in eggs during that period (see Figure 3). Once again, the drop was steepest in Murshidabad; the few eggs produced by the *desi* birds have likely been put aside for hatching. Qualitative observations suggest that this had a negative impact on protein consumption among children who missed eggs from their routine diet at home as well as from mid-day meals at schools. Consumption of both chicken meat and eggs resumed in all districts from April onwards although average consumption during April-August was still lower than in

Figure 2: Average consumption of chicken meat across districts and income categories
(kg per household per month)

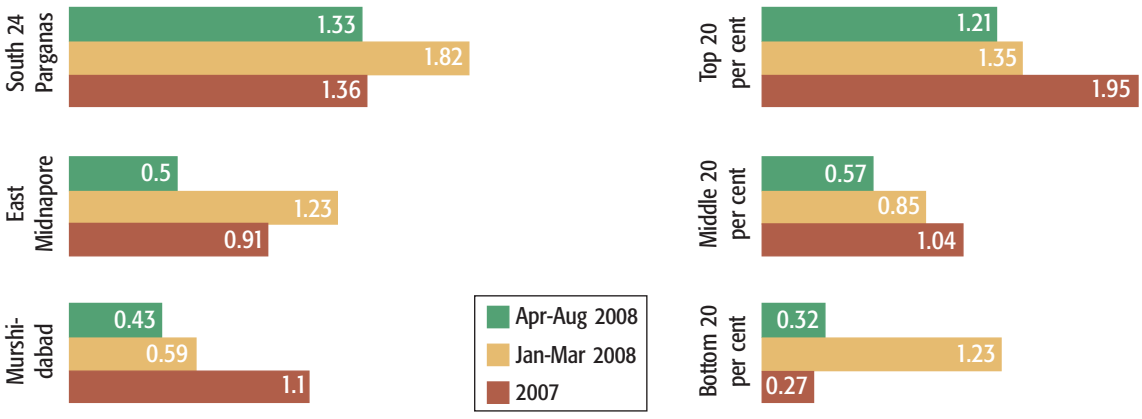
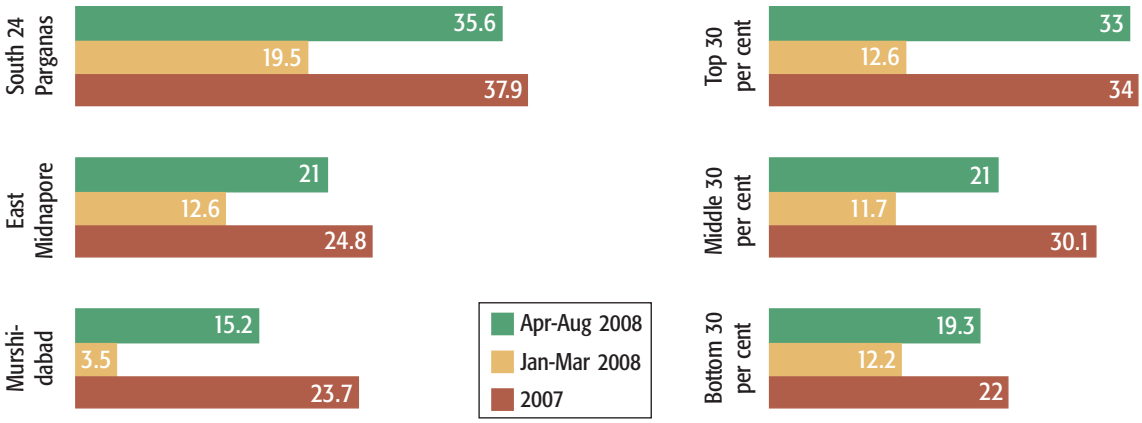


Figure 3: Average consumption of eggs across districts and income categories
(number per household per month)



the previous year due to demand outstripping supply leading to higher prices, and reduced buying capacity of households.[12]

Box 5: Minu Mondal

"For poor people like us, such occasions are rare where we get to consume poultry meat".

Another connected question in this context relates to the impact of the Bird Flu outbreak on consumption of other food items due to reduction in disposable cash and possible substitution with other sources of protein. Tables 10 and 11 present average consumption of grains and other food items across districts and income categories. While there is some decline in rice consumption (from 63 kg per household per month to 50 kg per household per month) in Murshidabad, all differences in wheat and rice consumption across all districts and all income categories are statistically insignificant. Similarly in case of pulses the differences are insignificant in Murshidabad and South 24 Parganas. Interestingly there also appears to be some substitution between pulses and vegetables as suggested by statistical significance of the difference in pulses consumption in areas

Box 6: Kamal Haldar – Mother Unit owner

"Quantity of food remained same, quality of food went down."

[12] At least part of this gap may be attributed to inherent lag in the production cycle. Day old chicks bought in Apr-May would have come in production sometime in Sep-Oct. We do not have monthly data on consumption and it is quite possible that by September/October, the consumption may have returned to pre-outbreak levels.

Table 10: Average consumption of grains and other food items across districts

Consumption per household per month (kg)	2007	2008	
		Jan-Mar	Apr-Aug
MURSHIDABAD			
Rice	63.3	50.5 [0.34]	50.6 [0.11]
Wheat	11.3	10.5 [0.98]	10.3 [0.85]
Muri (puffed rice)	..	13.2	13.4
Pulses	2.00	2.00 [0.930	1.25 [0.25]
Vegetables	22.6	36.6 [0.01]	32.2 [0.01]
Non poultry meat	..	2.98	1.08
Poultry meat	..	0.60	043
Total meat (including chicken)	2.60	3.50 [0.43]	1.50 [0.21]
Fish	1.10	4.10 [0.00]	3.80 [0.00]
EAST MIDNAPORE			
Rice	76.7	72.8 [0.57]	82.2 [0.74]
Wheat	5.40	7.44 [0.45]	8.10 [0.43]
Muri (puffed rice)	..	11.0	11.6
Pulses	1.00	0.60 [0.05]	0.70 [0.23]
Vegetables	18.3	18.6 [0.83]	20.6 [0.36]
Non poultry meat	..	0.20	0.30
Poultry meat	..	1.20	0.50
Total meat (including chicken)	1.30	1.40 [0.87]	0.80 [0.83]
Fish	1.30	6.90 [0.00]	7.90 [0.00]
SOUTH 24 PARGANAS			
Rice	62.5	74.5 [0.17]	71.1 [0.30]
Wheat	6.47	11.3 [0.05]	11.4 [0.05]
Muri (puffed rice)	..	14.6	14.4
Pulses	2.25	2.20 [0.89]	1.76 [0.29]
Vegetables	20.2	34.7 [0.01]	32.2 [0.02]
Non poultry meat	..	0.35	0.28
Poultry meat	..	1.80	1.30
Total meat (including chicken)	3.89	2.17 [0.06]	1.61 [0.01]
Fish	1.02	11.9 [0.00]	11.2 [0.00]
ALL SAMPLE HOUSEHOLDS			
Rice	67.2	66.3 (0.80)	68.3 (0.93)
Wheat	7.90	9.80 (0.11)	10.0 (0.14)
Muri (puffed rice)	..	13.0	13.2
Pulses	1.72	1.69 [0.86]	1.25 [0.06]
Vegetables	20.3	30.0 [0.00]	28.4 [0.00]
Non poultry meat	..	1.14	0.52
Poultry meat	..	1.20	0.80
Total meat (including chicken)	2.65	2.4 [0.78]	1.3 [0.00]
Fish	1.20	7.7 [0.00]	7.8 [0.00]

Figures in the parentheses are p-values associated with paired sample t-test of comparison of mean with 2007. Differences between pre- and post-outbreak levels are statistically significant wherever p-values are below 0.05.

Table 11: Average consumption of grains and other food items across income categories

Consumption per household per month (kg)	2007	2008	
		Jan-Mar	Apr-Aug
BOTTOM 30 PERCENT			
Rice	64.6	65.5 [0.60]	66.0 [0.61]
Wheat	7.20	8.23 [0.650]	8.35 [0.23]
Muri	..	9.75	9.67
Pulses	1.20	1.60 [0.76]	0.75 [0.11]
Vegetables	13.8	25.0 [0.17]	24.0 [0.64]
Non poultry meat	..	0.30	0.40
Poultry meat	..	1.23	0.32
Total meat (including chicken)	0.80	1.53 [0.02]	0.72 [0.34]
Fish	0.54	7.38 [0.00]	5.97 [0.00]
MIDDLE 30 PERCENT			
Rice	71.0	72.5 [0.93]	76.7 [0.76]
Wheat	9.16	10.6 [0.34]	11.3 [0.44]
Muri	..	13.9	14.5
Pulses	1.58	1.25 [0.92]	1.03 [0.02]
Vegetables	20.4	30.4 [0.00]	33.0 [0.01]
Non poultry meat	..	0.50	0.31
Poultry meat	..	0.85	0.57
Total meat (including chicken)	2.23	1.35 [0.03]	0.88 [0.01]
Fish	1.17	7.82 [0.00]	7.60 [0.00]
TOP 30 PERCENT			
Rice	64.9	60.2 [0.99]	62.0 [0.99]
Wheat	8.90	10.5 [0.27]	10.3 [0.51]
Muri	..	15.3	15.4
Pulses	2.01	2.24 [0.71]	2.00 [0.95]
Vegetables	25.6	33.0 [0.01]	34.0 [0.04]
Non poultry meat	..	2.68	1.00
Poultry meat	..	1.60	1.21
Total meat (including chicken)	2.35	4.28 [0.02]	2.21[0.47]
Fish	1.20	8.00 [0.00]	10.0 [0.00]

Figures in the parentheses are p-values associated with paired sample t-test of comparison of mean with 2007. Consumption is statistically significantly different from the pre-outbreak level wherever p-values are below 0.05.

where the differences in vegetable consumption are significant, and vice versa. This is quite plausible given that both pulses and vegetables are used as accompaniments to grains in Indian diets. Overall, there are no noticeably alarming patterns in consumption of grains, pulses and vegetables. The same is also true of consumption across income categories. Households in all three income categories managed to maintain their overall

consumption of grains, vegetables and pulses with minor adjustments in the food basket.[13] Meat consumption on the other hand is significantly lower in Apr-Aug period. This is consistent with earlier observation on distress sale and forced consumption during Jan-Mar and resulting demand-supply gap in subsequent months. Interestingly the reported consumption of fish is several times higher than was recorded in the 2007 survey. While fish did substitute for chicken in routine diets as well as in social events,[14] it is not clear if this factor can fully account for almost seven times rise in fish consumption. We are also not able to rule out measurement error in measuring this variable.

Focus group discussions and qualitative interviews with individual households further indicated that due to sudden drop in ready cash, the household women tried to cope by reducing expenditure on food items. For some households this meant substitution of normal grain with poorer quality substitutes and for others reduction in the quantity of somewhat expensive food items such as pulses with potatoes. There was also some degree of economizing on the use of oil and spices.[15]

The 2007 survey had highlighted that the cash earnings generated by the poultry (Kuroiler) enterprise were often used for financing expenses on children's education and medical emergencies. The study had further noted that, contrary to conventional wisdom, many households indicated that they give priority to education of girls. That could be the result of Kuroiler/poultry money going into the hands of women who would like to see their daughters becoming useful earning members of the family. With that background, we now examine the shifts in expenditure patterns on education, health and clothing.

Box 7: Shantana

In spite of heavy loss incurred, Shantana did not stop her children's tuitions. She took loan from money lender by pledging her gold chain for Rs 3000/-. It is still lying with money lender as she has not been able to pay back the loan.

Monthly expenditure data on these items before, during and after the outbreak is presented in Tables 12 and 13. It can be seen from these tables that there was some reduction (between 10 and 15 percent) in education and clothing expenditure in East Midnapore and Murshidabad. Most of this adjustment occurred on the side of private

[13] Paired t-tests for comparing the mean consumption of food items revealed that the difference in consumption of wheat, rice, and pulses are not statistically significant. For vegetables the differences are statistically significant. For meat the data are not directly comparable due to differences in measurement and hence the statistical tests were not conducted.

[14] This was a consistent observation in focus group discussions and qualitative interviews with households. Households also pointed out that during this period male members made the efforts to go to nearby ponds, sea, and rivers to source fish which they did not do earlier.

[15] In this context it is important to note that in Indian rural settings women are typically last in the allocation of food within the family. In case of any adjustment in food consumption therefore women end up bearing a disproportionate burden of this adjustment. Qualitative survey team observed some impact of this adjustment on the health of the female poultry keepers. The visible signs were loss in the weight and other health problems reported by female poultry keepers.

instruction (tuitions) and stationary related expenses. For some this meant pulling out one child from private instruction classes and for others reducing the scope of private instructions. In the case of health expenditures, there are no major shifts, or declines. Also, it is not easy to attribute shifts in health expenditures to the bird-flu outbreak without controlling for other sources of variation. The qualitative survey data further highlights that women made all efforts to sustain settlement of costs related to education and going as far as taking loans with the money lenders or being indebted to the tutor.

Table 12: Other household expenditures by district before, during and after the outbreak

Expense type	Estimated average expenditure (Rs per month)		
	Before the outbreak	During the three month ban period (Jan-Mar)	During the current period (April – August)
MURSHIDABAD			
School fees	17.0	17.0	17.0
Private tuition fees	192.1	152.3	195.0
Books and stationary	98.6	93.4	102.0
Health	173.7	157.1	207.5
Clothes	81.2	82.2	83.0
EAST MIDNAPORE			
School fees	44.3	38.7	38.7
Private tuition fees	242.0	201.0	245.0
Books and stationary	351.8	247.0	356.0
Health	173.9	157.0	207.0
Clothes	72.1	11.4	48.2
SOUTH 24 PARGANAS			
School fees	89.2	81.0	80.9
Private tuition fees	296.0	293.0	293.0
Books and stationary	314.0	291.0	315.0
Health	198.4	164.3	209.0
Clothes	137.9	64.9	90.9
ALL SAMPLE HOUSEHOLDS			
School fees	50.9	46.4	46.4
Private tuition fees	242.5	214.5	244.0
Books and stationary	257.4	217.0	260.3
Health	157.1	197.0	244.0
Clothes	110.5	63.0	91.0

Table 13: Other household expenditures by income group before, during and after the outbreak

Expense type	Estimated average expenditure (Rs per month)		
	Before the outbreak	During the three month ban period (Jan-March)	During the current period (April – August)
BOTTOM 30 PERCENT			
School fees	77.4	74.8	74.8
Private tuition fees	174.3	132.3	175.9
Books and stationary	256.7	201.1	257.0
Health	118.3	129.7	277.0
Clothes	79.7	32.1	74.9
MIDDLE 30 PERCENT			
School fees	34.7	32.0	32.0
Private tuition fees	249.4	222.9	246.5
Books and stationary	221.8	178.0	225.3
Health	122.9	209.0	161.2
Clothes	90.9	54.6	74.5
TOP 30 PERCENT			
School fees	41.5	33.9	33.9
Private tuition fees	298.0	281.1	302.9
Books and stationary	292.0	267.4	296.5
Health	228.9	248.5	294.7
Clothes	159.0	101.2	122.1

It is arguable that given the nature of these expenditures the 'averages' may not be very informative in absence of the 'measures of variation'. For example, the distribution of expenditure on health is likely to be much wider with heavier tails than perhaps for clothing, and the averages might be unduly influenced by the observations in those tails. Although sufficient care has been taken to ensure that the leverage exerted by the outliers is minimized, some measure of variability in these expenditures can provide further insights about the distribution of adjustment. However, instead of presenting the point estimates of variability (standard deviation or the coefficients of variation) we choose to present the entire cumulative distribution functions (CDF) for expenditures on school fees, private instruction, stationery and educational supplies, health, and clothing. A comparison of these distributions across the three time periods can provide better understanding of the burden of adjustment than simple coefficients of variation. While the CDF for health and clothing expenditure are prepared over all sample households, the CDFs for educational expenditures are prepared after excluding those who reported zero expenditure on education in 2007. The CDFs are presented in Annex figure 2. Following observations can be made based on these functions

- There was some adjustment in school fees expenditure in the lower tail but the magnitude was small.
- There was larger and significant adjustment in the expenditure on private instruction, again mostly in the lower tail. Upper tails is more or less indistinguishable across the

three periods. But at the same time the adjustment was temporary since the distribution function for Apr-Aug period is more or less indistinguishable from that in 2007.

- There was some adjustment in expenditure on stationery and educational supplies but most of this adjustment was in the upper end of distribution. Once again, the adjustment was temporary since the distribution for Apr-Aug period is more or less indistinguishable from that in 2007.
- There are no major shifts in health expenditure patterns. Proportion of households at the bottom end (Rs.50 per month) did go up but the rise was not very significant and difficult to assign to loss of income due to bird flu. Once again, the Apr-Aug expenditure pattern at the bottom end is hardly distinguishable from 2007 pattern.
- Proportion of households reporting no expenditure on clothing increased from 35 percent in 2007 to almost 60 percent during Jan-Mar 2008 although Apr-Aug period saw some resurgence in this respect with the proportion falling to about 50 percent. But these numbers need to be interpreted with great degree of caution because Jan-Mar months are usually low on clothing expenditure. That is because Nov-Dec being the main festival months, most clothing is purchased during that time. Also some expenditure in this respect occurs during June-Jul due to harvest in Apr-May and school opening in June-July.

The 2007 study had underscored the contribution the poultry enterprise made in strengthening the self-esteem and self confidence among women poultry keepers. Many of them were also beginning to get market oriented and the small income had ensured

Box 8: Paucity of assets, endowments and capabilities

If poverty is reviewed not as mere lack of income but paucity of assets, endowments and capabilities (Scoones 1998, Sen 2000), then assessments of 'Kuroiler model' reveals that aside income enhancement, its most substantial contribution to livelihoods was towards

i. augmenting Food Security with eggs and meat from home production contributing directly or indirectly to family nutrition with top 20% households consuming 40% of home produce and poorest 20% consuming just 10% but selling it for profit and rice to provide for two square meals. Herein improved nutrition is interpreted as a proxy for added capabilities and improved livelihoods (Dolberg 2003);

ii. enhanced livelihood implications for women, who contributed about 90% of labour for poultry rearing, and were primary beneficiaries if sales were made from home. This lead to marked development in their entrepreneurial capacities and affected their intra-household expenditure allocation and decision making capacities. Further money in hands of women tended to also bring educational and nutritional benefits to children;

iii. asset development of ultra poor who found it prestigious to meet sacrosanct social obligations through poultry, with case studies revealing psychological faith in poultry to save families in times of medical emergencies or fees payments; thereby establishing a symbiotic link between poultry rearing and enhanced quality of life of ultra poor. Finally this poultry enterprise is preferred because it fits well with people's resource bases, societal hierarchies, risk anxieties and social networks thereby flagging the complex forces that define livelihood choices of the poor.

independence in taking decisions on its utilization. This had contributed to their position and status within the household and as a result husbands would pay attention to their opinions, provide minimum respect and appreciation for their financial contribution to the household budget. With poultry keeping coming to sudden halt and the consequent loss of income, the women's self confidence had taken a beating. Qualitative interviews with a number of households revealed resentment over the loss and an ongoing blame-game within the households. In households where investment decisions were generally made by husbands, women were finding it difficult to justify their decision to keep poultry. Some women even claimed erosion of importance in the eyes of their husbands;[16] their intra household bargaining and negotiation power reduced. Even decisions regarding whether to kill the birds, to hide them or to sell them at throw away rates caused acrimony within the household.

Box 9: Saharbanoo

Bird flu has been the proverbial last straw to break Saharbanoo's frail back. Saharbanoo is heartbroken that her daughter had to migrate in search of livelihood when she should be getting married. With tears in her eyes Saharbanoo laments-

"Who wants to send a daughter far-away to work? With nothing to eat here, I had no choice."

In some female headed ultra poor households the loss of income from poultry meant migration of young girls in search of an alternative livelihood.[17] For others, it meant reverting to highly labour intensive and less remunerative options such as *Beedi* / cigarette rolling. Contractual obligations of such occupations also imply less autonomy and loss of status within the community.

3.3. Issues in compensation

As noted before, Margram Block was the epicenter of outbreak in West Bengal. Complete culling was ordered in the villages within five km radius of Margram, and the households in these villages were offered compensation in return. While culling was not accepted by a large number of households, sustained efforts by the authorities and fear of repercussions resulted in more than 90 percent of the stock being culled. Culling was carried out at a predetermined spot in the village where farmers had to bring in their birds.

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[16] Bargaining within the household is often hidden, involving emotional manipulation and unspoken power games that may not be readily detectable or fundamentally threatening. Also, while certain areas of gender relations may permit a degree of negotiation, others routinely do not (Locke et al., 1999). The study team found that women poultry keepers not only lost their birds but also lost their bargaining power within the household. Losing a bird to disease or a predator is taken in stride by the poultry farmers with fortitude but when the loss is due to forced circumstances (culling, distress sale or forced consumption) it becomes unbearable.

[17] In a society where marriage of a daughter is the ultimate aim, migration of young unmarried girls can be seen as a sacrilege.

Box 10: Nadir Sheikh – Mother Unit owner

Bird flu has changed Nadir's life like never before. He has not been able to recover from the losses suffered at that time. He still awaits a compensation claim of Rs 40,000/- his only hope for reinvesting in the MU business. In the past months he had to sell his fish pond and also take loan from his friend to make ends meet.

In our sample, we had three villages in directly affected areas where culling took place. In these villages, about 75 percent of sample households reported that they were promised compensation from the government. Compensation (see Annex 4) for culling was offered at Rs 40 for an adult bird while there was no compensation for the birds lost to the virus. Apart from this and in a later stage (17th March '09), the State Government had also decided "to provide a onetime grant at the rate of Rs. 500/ as relief to the affected families".[18] Based on the field data following observations can be made regarding culling and compensation-

- In one affected village, interim relief was received by all households irrespective of the fact whether or not they reared poultry.[19] Out of the two other villages where culling took place, households in one village were promised interim relief of Rs.500 per household but none had received it at the time of this survey. In the third village no such relief was promised. In all only 40% of the households in the three affected villages surveyed received this interim relief.

- Per bird compensation was to be given to all those households whose birds were culled by the animal husbandry department. However, only seven out of 36 sample households in these three villages reported receiving on the spot cash compensation in return for the birds offered for culling.[20]
- Of those who received any compensation (for culled birds or interim relief) more than 75 percent used the money for meeting day to day expenses.

Box 11: Samsa Nehar

"Rs 500 were given as grant to all households in February before elections. That got spent on household items. That time restocking was banned. Now chicks are available but we have no money".

[18] Notification No. 514-AR & AH/San./CSS&SP/AD/P/4A-35/06 Pt.III, 17th March 2008.

[19] The general view in the villages was that it was given prior to local elections to entice votes rather than help poultry keepers recoup their lost livelihood. As per their perception that was one reason why all households in the village received it irrespective of the fact whether or not they kept poultry.

[20] Many of those who did not receive the cash compensation were given receipts for their birds. These receipts were to be honoured at block/Panchayat offices at a later date. But most of these receipts had not been en-cashed in spite of continuous efforts in the past 8 months.

Box 12: Kamal-Julepha Sheikh

Kamal sold Kuroiler, broiler and *Desi* from his small shop at the village market. His was a poultry based livelihood that got disrupted by Bird Flu outbreak and subsequent ban on dealing with poultry. He survived these months by borrowing money and living off his in–laws, something he is not proud of. He failed to get a loan from Bank and had to borrow Rs 10,000 @ 4.5% interest from friends to invest in restocking. Since his birds had died of Bird Flu before the culling began, he is not eligible for compensation from Government.

The primary objective of a compensation scheme is to promote effective disease control and to reduce livelihood distress. The success of a compensation scheme depends critically on the ability of authorities to identify genuine beneficiaries and establish losses so as to tailor the level of compensation to meet the objectives of compensation programme. Experience also shows that compliance is usually better when there is a broad consultative process that considers the need of different types of beneficiaries and promotes a feeling of inclusiveness in the planning process and allows for an open grievance mechanism to address the concerns of those who might feel excluded. Although there are a number of economic agents outside the official circles who interact with poultry keepers on a regular basis and can serve as liaison agents for trust and awareness building or assisting in other departmental tasks in emergency situations, generally the departments do not see any value in involving agents from outside the department in their control or outreach efforts. Partly due to official ethos and partly due to general unpreparedness, no consultative process existed in case of culling and compensation in West Bengal. The process was haphazard and *ad hoc* at best and left wrong messages. There was a general feeling among the households that those who offered birds for culling had not been appropriately compensated by government agencies while those who managed to hide their birds got the reward of a high market price for their poultry after the ban was lifted. It is anybody's guess what a large section of the poor would do in case of a recurrence of Bird Flu.

3.4. The supply chain

The previous study had pointed out that effective functioning of the value chain/door-step delivery was the most critical aspect for the success of the Kuroiler model that distinguished it from other schemes/models aiming at disseminating poultry birds in remote rural areas. The key to its viability is the inter-dependence of agents within the chain. Each link depends on the other and it is in the interest of all to ensure the viability of others in the chain. In addition to the households at the end of the chain who rear Kuroilers, the chain provides livelihood opportunities to a large number of entrepreneurs. Mother Unit owners and *pheriwallas* are self-employed entrepreneurs who depend largely, if not solely, on Kuroiler business for their livelihood support, and have little ability to withstand shocks. Most of the *pheriwallas*, for example, are landless and were unemployed or worked as farm and non-farm labourers prior to entering this occupation. Many of them belong to the poorest income strata and are in many cases even poorer than the poorest Kuroiler HH.

As mentioned earlier, quantitative and qualitative data were collected on the functioning and impact on Mother Units and *pheriwallas*. One reasons for focusing on MUs and *pheriwallas* was because they are perhaps most vulnerable to such shocks while at the same time their financial sustainability is critical to continuation of the delivery chain. In addition to these entrepreneurs, company representatives and dealers/suppliers[21] were interviewed to understand how the company responded and reacted to the bird flu outbreak.

3.4.1. Stock of birds

3.4.1.1.At the company/hatchery level

The Company has its parent stock at 5 different locations, namely Ludhiana (Punjab), Khandsa (Haryana), Gorakhpur (Uttar Pradesh), Hosur (Tamil Nadu) and Kelamangalam (Karnataka). Although none of the parent stock was in West Bengal, one of its major Hatcheries is located in Kolkata and it receives hatching eggs from both Karnataka and Uttar Pradesh. At the time of Bird Flu Kolkata hatchery was producing on an average 3.5 lakh day old chicks every month. These chicks were supplied to parts of Bihar, Orissa and all over West Bengal. Not only did the demand plummet in West Bengal, it went down in neighbouring states as well. Moreover with Government ban on sale and transportation of poultry and its products, the day old chicks produced had to be destroyed and setting of eggs stopped for about a month. All production was stopped for a month and company incurred heavy losses. They had applied to the Government for compensation for the losses incurred but have not received any so far.

At the time of survey, the company's production of day old chicks had reached 4.5 lakh per month from 3.5 Lakh (pre bird flu) and there was increased demand in all districts. The hatchery sold chicks for Rs 9 per chick (pre bird flu), during the months of April 08 and May 08, day old chicks was sold at Rs 5 per chick while in September 08 (post bird flu) the price increased to Rs 12 per chick.

3.4.1.2.At the Mother Unit Level

We can not claim to have a representative sample of Mother Units (and *pheriwallas*) to provide accurate estimates of losses at these levels. On the other hand, our field observations suggest that the units we visited are not atypical and hence can provide fairly reasonable insights into the extent of losses. The statistics presented in this and the next section, are however subject to this caveat.

Box 13: Firdausi Bibi

With closure of Mother Unit post Bird Flu, Firdausi has lost her special position in the village. She views it as a huge come down. She is used to a status within her family and community. With her financial condition deteriorating, her position has also gone down. It has affected her so much that she has actually lost weight and is not her usual chirpy, confident self that the study team had met last year same time.

[21] Most dealers / suppliers are also self-employed but all representatives are Keggfarms employees.

Table 14 presents data on the total stock of Kuroiler birds in the 27 Mother Units included *in our sample*. The table shows significantly higher mortality among younger chicks (less than 3 weeks). In Murshidabad, the district affected directly by the outbreak, mortality in young chicks was as high as 85 percent compared to less than 10 percent in the case of Kuroilers more than 3 weeks of age. Interestingly, as was also noted in the previous study, the Mother Units in Murshidabad have the practice of selling Kuroiler chicks at a significantly older age compared to the other two districts. Hence the proportion of very young stock is usually on a lower side in Murshidabad. That factor may have moderated the mortality levels somewhat at the Mother Unit level.[22]

Table 14: Stock and mortality at Mother Unit Level

District	Kuroiler stock at the time of BF		Number of Kuroiler birds died at the time of BF	
	< 3 weeks	> 3 weeks	<3 weeks	>3 weeks
South 24 Paraganas	8,900	1,300	2,588 (29)	90 (7)
Murshidabad	1,900	8,250	1,600 (84)	570 (7)
East Midanpore	13,500	500	3,250 (24)	0 (0)
Total	**24,300**	**10,500**	**7,438 (31)**	**660 (7)**

Of course, the older surviving birds in Murshidabad were consumed immediately or sold off urgently at throw away prices (see Figure 4). Interestingly only two out of nine Mother Units surveyed in Murshidabad reported offering their birds to the government culling teams and one of these was a relatively large MU with 5000 birds. In the other two districts, the reported mortality was not as high as in Murshidabad simply because these areas were not directly affected by Bird Flu and no government culling took place. Many MUs however chose to starve their young stock to death as the market for young chicks had completely collapsed during Jan-Mar 2008. Also, there was severe shortage of feed due to government ban on trade and movement of poultry feed.

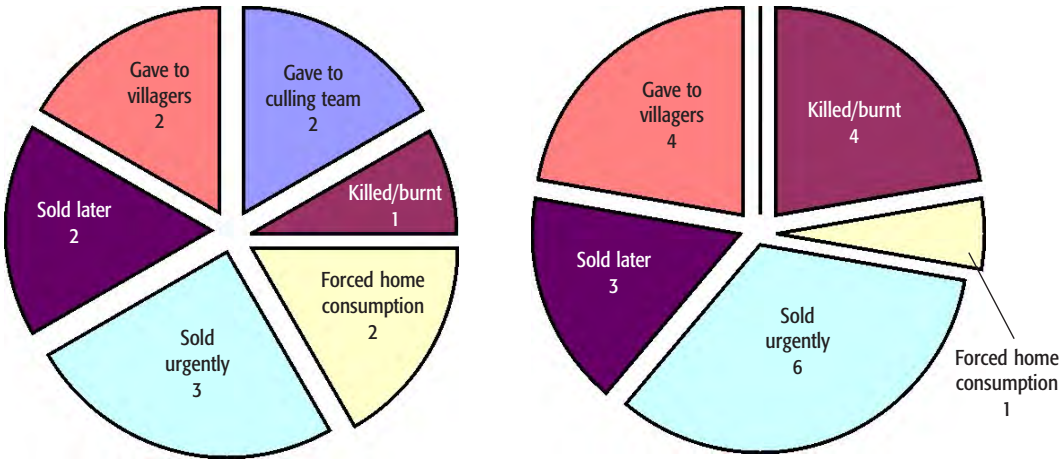
Procurement of day old chicks began immediately after the three months ban period. Figure 5 presents the data on average procurement by Mother Units in all three districts taken together.[23] As can be seen, procurement has been increasing steadily since April and by August had almost caught up with the pre-outbreak level, despite the fact that the company had raised the price of day old chicks from Rs.10 to Rs.12 per chick due to a rise in feed cost.[24] It is also worth noting that 11 out of 27 units were still closed and

[22] This finding—relating mortality to age—is perhaps not very robust due to small sample of Mother Units. Out of the nine MUs surveyed in Murshidabad—the directly affected district—only two reported young chick stock at the time of bird flu and both these units reported very heavy mortality. These units did not have any birds older than three months. The other 7 units, on the other hand, did not have any young chick in stock and five of them did not experience any loss of birds due to bird flu. Remaining two units reported limited mortality. Most of these units either gave the birds away to villagers or to government culling time. The other two districts were 'officially' not affected by bird flu hence it is not clear if mortality was indeed due to bird flu.

[23] The average is calculated over those 27 units that appeared in both surveys.

[24] The company however offered a promotional price of Rs.5 per chick during the early phases of restocking for faster revival but the promotion period was restricted to few weeks in April.

Figure 4: Disposal of living birds/chicks in sample Mother Units



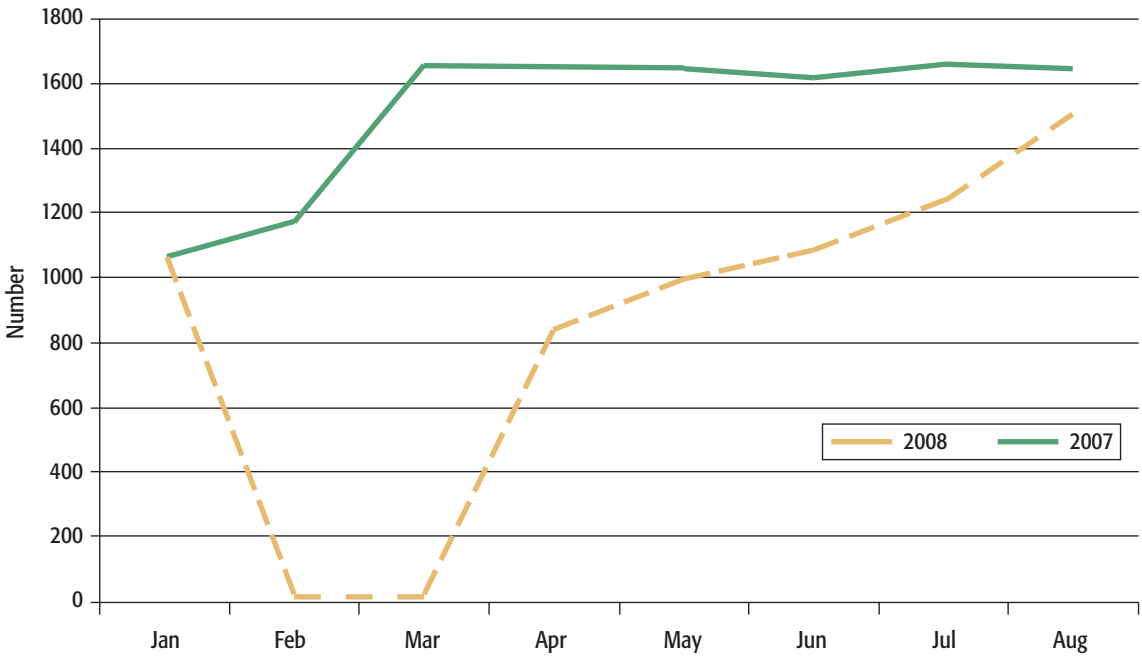
Murshidabad
(Total number of responses = 12)

East Midnapore and South 24 Parganas
(Total number of responses = 18)

Box-14 Sanjeeb – Mother Unit owner

To let starve the chickens was a painful decision however. Such large mortality due to starvation left a mark on the households psyche. The women and children, who saw chicks dying of starvation over a period of 2-3 days, do not like to be reminded of it. Some even claimed that no food was cooked when it happened and it was as if a member of the family had passed away.

Figure 5: Average monthly procurement of day old chicks by sample mother units



those that had re-opened were doing better business than in the pre-outbreak period. About half of these closed Mother Units were in the directly affected district of Murshidabad. Interestingly two of the units in Murshidabad chose to significantly upscale their business to take advantage of the steep rise in demand (at higher prices) for day old chicks. One of them has also forward integrated and is now contracting with the *pheriwallas* for rearing as well as selling the birds. In general, those who could mobilize sufficient resources have engaged in forward and backward integration to take advantage of the market situation created by sudden decline in stock of birds. Other MU owners also expressed their desire to restart the business but have not been able to do so due to lack of finance.

Box 15: Kamal Haldar – Would like to restart his Mother Unit

Kamal Haldar has been running a Mother Unit for the past 7 years. He has a MU infrastructure with a capacity to house 4,000 chicks. At the time of BF his MU had 3,700 chicks that had cost him Rs 7 per DOC. He had to make distress sale when bird flu broke out . Ever since then he is out of business.

Kamal is interested in starting afresh but needs around Rs. 50,000 to start a 3,000 chick MU. He failed to get credit from Keggfarms and feels let down since they did not help him in his hour of need inspite of doing business with him for more than 7 years. Since he has invested in a shed for housing chicks, he wants to restart as soon as he is able to muster resources for it.

3.4.1.3 At the *Pheriwalla* Level

Pheriwallas served as a link between MU and poultry keepers. Their frontline status made them vulnerable to the wrath of public and police when BF broke out. They were often accused of bringing in infection in the village and were sometimes even beaten up, put in police lock-up, their baskets damaged and chicks killed or thrown out to die. Since *pheriwallas* earn their livelihoods through sale of Kuroiler chicks and were rendered jobless all of a sudden, they had to take up wage labour in and around their village. The jobless *pheriwallas* were left with no option but to migrate in search of work to places as far as Surat and Bangalore. Others took loans from relatives and friends or sold assets in form of jewellery or livestock.

Box 16: Nawab Khan – The man who was nearly lynched

Nawab Khan, a *pheriwalla* was nearly lynched by a mob when he went to Orissa to sell Kuroiler chicks after the bird flu was declared. The locals told him not to come to their village and the police also advised him to stop selling chicks. Thereafter he not only lost 500 chicks he had in stock to starvation since feed was not available but was also rendered jobless for the next three months.

At the time when the team met him, Nawab was determined to get back into *pheriwalla* business and was eagerly waiting for the mother unit to resume operations. He was even willing to go and sell in Orissa since business is better there!

In spite of the setbacks suffered, none of them has given up on poultry enterprise in favour of any other means of livelihood.

Box 17: Maya Poria

Maya was out of *pheriwalla* work for 2 months. She put in application in Panchayat for compensation/dole for the losses incurred but they did not accept her application. To tide over these months she took a loan of Rs 10,000 at 4% interest to run her HH and pay the MU for the chicks she had bought prior to BF catastrophe. She cut down on food consumption and has lost weight.

In fact, out of the 27 *pheriwallas* included in the survey, only 3 had not restarted business. Two of them reported lack of availability of chicks in their area and the remaining one lack of finance as the constraining factor. Of the 24 who had restarted also managed to rapidly scale-up their operations. In the indirectly affected districts of East Midnapore and South Parganas, *pheriwallas* were already operating at a scale significantly higher than reported in 2007 survey (Figure 6). It is also interesting to note that both South Parganas and East Midnapore were ahead on the Kuroiler adoption curve and there existed strong distribution network of Kuroilers prior to the outbreak. Since *pheriwallas* are the key retailers of Kuroiler chicks, they could capitalize on their customer base by 'backward integrating' their operations and meeting the upsurge in demand. Many of them reported obtaining 'day old chicks' either from hatcheries or distant Mother Units, raising them for a few days and selling to rural households. While this helped *pheriwallas* make windfall gains, it may have compromised the integrity of chain by skirting the essential vaccination function. No *pheriwalla* reported vaccinating the chicks before selling to rural households. This meant shifting of entire disease risk to the rural households.

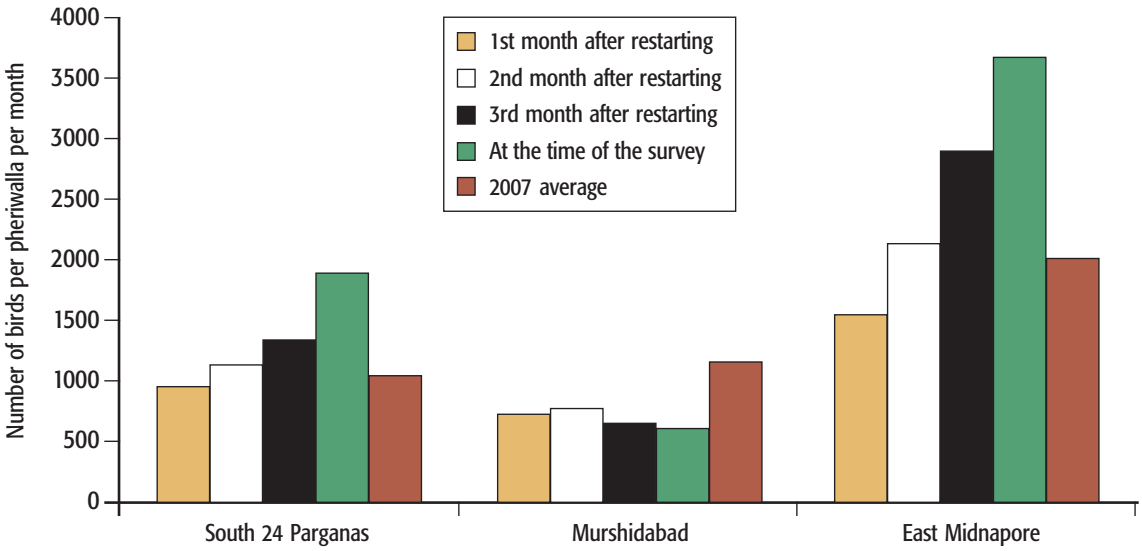
Box 18: Kalu Sheikh

Kalu is one of the few *pheriwallas* who has emerged out of the situation as a winner. Through keen entrepreneurship and taking right decisions at the right time, he is now running a mother unit along with his *pheriwalla* work.

He saw an opportunity in poultry business post Bird Flu where fe/male farmers would restock and decided that he would be the one providing them with that stock!

He restarted his *pheriwalla* work in June with investment amount provided by his father. Initially chicks at MU were available at 72/-kg (5 week old). Within 3 months the rate were up to 95/- kg and chicks were in short supply.

Figure 6: Sale of birds at the pheriwalla level



3.5. Prices and margins

The cost of the two key inputs—the day old chicks and the feed increased considerably immediately after the ban period. The average cost of Kuroiler DOC had risen from about Rs. 9 before the outbreak to approximately Rs. 12 at the time of this survey but with a promotional price (Rs. 5) for a period of about 4 weeks immediately after lifting the ban (April 08).

The comparable figures for average feed cost were Rs.14 and 19 per Kg. Since more than half the mother units were still closed at the time of the survey, it is not possible to meaningfully calculate the margins at the mother units level but qualitative observations suggested a squeeze in the net margins despite rising sale prices of chicks at the MU level. This required larger scale to break even and make sufficient profits. Some resourceful entrepreneurs who could scale up their operations and forward integrate their operations made good profits. The smaller entrepreneurs on the other hand could not take advantage of the prevailing market situation and were still closed.

High investment cost and higher operating capital requirements have therefore been the critical barriers in resuming operations at the MU level. Even among those who did restart, many of them were attempting to (i) economize on the operating capital requirement by selling birds at a younger age – about 8 to 12 days, compared to 14-16 days in the pre-outbreak period, and (ii) cut down on expenses related to vaccination and preventive medicine. This could possibly have further debilitating effect on the public health aspects of the chain.

At the *pheriwalla* level, as noted earlier, the revival has been much more rapid. We are therefore able to calculate margins at the *pheriwalla* level and the same are presented in Table 15.

Table 15: Gross and Net Margins for *Pheriwallas* before and after Bird Flu

	South 24 Parganas		Murshidabad		East Midnapore	
	2007	2008	2007	2008	2007	2008
Scale	1026	1881	1156	597	2005	3157
Purchase Price (Rs.)	16.7	12.6	36.9	44.6	13.8	13.8
Selling Price	19	14.1	46.9	58.9	15.8	15.4
Gross margin	2360	2822	11560	8537	4010	5051
Expenses	511	856	1127	1943	1024	679
Net margin	1849	1966	10433	6594	2986	4372
Return/day (Rs.)	62	66	348	220	100	146
Returns/bird (Rs.)	1.8	1.0	9.03	11.0	1.5	1.4

Interestingly, the per bird margin in Murshidabad—the only directly affected district, increased significantly from approximately Rs.10 to over Rs.14—an increase of about 40 percent. The other two districts—both of which were indirectly affected and had significantly longer exposure to Kuroilers and a more extensive Kuroiler distribution network, experienced declining margin on a per bird basis although overall surplus (or total net margin) increased in both these districts due to higher scale. This implies that supply response was much more rapid in these districts which, in turn, may have kept the prices in check. In Murshidabad, on the other hand, larger demand deficit and poor supply response may have created opportunities for super normal profits for better endowed and more resourceful entrepreneurs. Of course, steep rise in the prices of chicks also meant exclusion of poor and marginal households from this market with adverse effects on their livelihood options.

Curiously, the outbreak had an adverse effect on the flow of credit through the chain. Before the outbreak, the dealers/suppliers[25] often extended the credit to the MUs. In turn, the MUs typically extended credit to the *pheriwallas*.[26] One would expect that after the outbreak the dealers/suppliers would be liberal with extending the credit to MUs to enable faster revival. The situation on the ground was however quite the opposite. After the outbreak the dealers/suppliers were selling birds only on cash payment basis since many of the mother units had not been able to pay their outstanding loans. Similarly, the MUs were much more circumspect of extending credit to *pheriwallas*, although they did recognize the role of credit in more rapid revival of the entire chain, including their own businesses.

On the whole, it appears that the livelihood of economic agents in the chain—Mother Units and *pheriwallas*, were disrupted much more significantly than those of the poultry keeping village households. Mother Units seem to have suffered the brunt of the losses since investment at this stage in the chain was significantly higher than that of the other players in the distribution chain. The breakdown of the supply chain resulted in a

[25] Formally the company does not sell any DOCs on credit basis.

[26] The average credit time was 3.5 days—approximately equal to the number of days it took *pheiwallas* to sell one batch.

supply shortfall in Kuroiler chicks leading to a sharp increase in their sale prices and the exclusion of bottom poor households from the market. Since private markets have not been successful in mobilizing enough capital, there may be a genuine rationale for public intervention in provision of subsidized credit to help these entrepreneurs get back on their feet. Similarly, there is a need for the Animal Resources Development Department to not only help in restocking but also in providing basic health services in the form of vaccinations and extension. Unfortunately, these services continued to remain conspicuous by their absence in most villages surveyed.

4. SUMMARY AND CONCLUSIONS

This study was initiated to examine the impact of the bird flu outbreak in West Bengal on the livelihoods of poor households and other economic agents associated with Kuroiler business. More specifically, the objective was to understand the impact of the outbreak and the control measures that followed, on the livelihoods, income and nutritional status of poor people engaged in the Kuroiler distribution and rearing. A survey of Kuroiler rearing households (and *desi* poultry rearing household in control sample) and those engaged in the Kuroiler supply chain just before the outbreak served as the benchmark to allow a 'before and after' comparison.

The outbreak was first reported in Margram area of Murshidabad in January 2008 and claimed more than 10,000 birds in that area alone. Following the confirmation of the presence of H5N1 strain of the virus, the state Government ordered complete culling of all poultry in an area of 5 km radius from Margram. Yet, however, the outbreak spread to 13 out of 19 districts within a span of two weeks and resulted in loss of more than 4 million birds. The villages that did not suffer directly from the outbreak of Bird Flu were also affected quite significantly due to rumours, price crashes, and ban on production and movement of poultry products. The ban continued until March end and prohibited production, trade and movement of all poultry related products.

Production and consumption of eggs and chicken was affected quite significantly during and in the months immediately following the outbreak. But, it was the trade that was affected more than the consumption. The consumption of chicken in fact increased quite significantly immediately following the outbreak and then plummeted back to or below pre-outbreak levels in subsequent months. This was due to 'distress sales' and 'forced home consumption' as prices crashed and households slaughtered their birds to consume them at home. Interestingly, in the months immediately following the survey, chicken consumption shot up dramatically in the poorest households whereas it declined in the other two income categories. As the prices reverted to their normal levels, the consumption of the poorest households reverted back to the pre-outbreak level.

Eggs consumption reduced in all areas and all income categories during the outbreak period. This had a negative impact on protein consumption among children. Consumption of other feed items—cereals, vegetables, etc. was not affected in any significant manner although there was some substitution between pulses and vegetables and between chicken and fish. Overall, however, there were no alarming patterns in consumption of

grains, pulses and vegetables, and the same was true in all income categories. Households in all three income categories managed to maintain their overall consumption of grains, vegetables and pulses with minor adjustments in the food basket. Fish emerged as an important substitute for chicken.

There was some reduction in education expenditure and most of this adjustment occurred on the side of private instruction (tuitions) and stationary related expenses. A large proportion of this adjustment was in the lower tail of expenditure distribution, but the adjustment was temporary and the educational expenditures caught up with pre-outbreak level within a few months. There were no major shifts in health expenditure patterns.

Poultry keeping being mainly a women's enterprise, gender relations and household dynamics did suffer with the sudden loss of poultry income. Qualitative interviews with a number of households suggested disturbed gender dynamics within the households. In households where investment decisions were generally made by husbands, women claimed loss of bargaining and negotiation power within the household. In some female headed ultra poor households the loss of income from poultry also resulted in migration of young girls in search of alternative livelihood opportunities whereas some others took up other labour intensive but less remunerative vocations such as *Beedi*/cigarette rolling.

The process of restocking for Kuroilers began immediately after the termination of ban period. Supply of Kuroiler day old chicks responded fairly rapidly in the districts that were affected indirectly—East Midnapore and South 24 Parganas, whereas it took a little longer in areas affected directly. At least part of this was due to the fact that indirectly affected districts had longer exposure to Kuroilers and a better developed distribution network. There was not much difference in the pace of restocking across income categories. Indeed, if anything, the rate of restocking was faster in the case of the poorest one third households. That is a clear indication of the close dependence of the livelihoods of bottom poor with backyard poultry.

The restocking of *desi* birds has hardly taken off and only limited number of households in the upper income category managed to obtain and effort *desi* hens. In the bird flu affected district Murshidabad which had previously a relative large number of households with *desi* poultry the restocking pattern shows that the Kuroiler bird is now taking up in a big way. The fact that Kuroiler chicks were largely available at the door step, while *desi* hens were not available or too expensive had significantly contributed to it.

At the Mother Unit level, procurement of day old Kuroiler chicks picked up after the ban period and within six months had almost caught up with the pre-outbreak level. Not all MUs were however able to restart the business and about 40 percent of the units in our sample were closed even until after a year of the outbreak. At the same time, those that had re-opened were doing better business than in the pre-outbreak period. About half of these closed Mother Units were in the directly affected district of Murshidabad. Interestingly two of the units in Murshidabad had significantly up-scaled their operations to capitalize on the steep rise in demand for day old chicks. One of them has also

forward integrated and had started contracting with the *pheriwallas* for rearing as well as selling the birds. In general, those who could mobilize sufficient resources were engaged in forward and backward integration to take advantage of the market situation created by sudden decline in stock of birds. Others, who could not mobilize required resources, suffered and were struggling to get back on their feet even after a year after the outbreak.

Being the frontline operators, the *pheriwallas*, suffered much more during the outbreak. But, they bounced back more rapidly due to low capital requirements and high demand for chicks. Out of the 27 *pheriwallas* included in the survey, only 3 had not restarted business. Of the 24 who had restarted also managed to rapidly scale-up their operations and take advantage of the gap in demand and supply of chicks. A large number also backward integrated their operations to minimize transactions costs. Since *pheriwallas* are the key retailers of Kuroiler chicks, this backward integration helped them capitalize on their customer base. While this helped them make windfall gains, it may have compromised the integrity of chain by skirting the essential vaccination function. No *pheriwalla* reported vaccinating the chicks before selling to rural households. This meant shifting of entire disease risk to the rural households.

There was no grassroot support for restocking. Neither the government nor the Keggfarms extended any support to the Mother Units, *pheriwallas*, or the Kuroiler rearing households. Neither was there any initiative towards systematic awareness creation and knowledge enhancement about poultry production in general and bird flu in particular. Hence the knowledge base remains the same regarding bird flu and bio-security measures. The villagers continue to apply the same husbandry practices with the only exception of burying the dead birds instead of throwing them out in the open.

The cost of the two key inputs—the day old chicks and the feed increased considerably immediately after the ban period. The average cost of Kuroiler DOC had risen from about Rs. 9 before the outbreak to approximately Rs. 12 at the time of this survey but a Rs. 5 price for a promotional period of 3 weeks immediately after the ban period. The comparable figures for average feed cost were Rs.14 and Rs. 19 per Kg. Since more than half the mother units were still closed at the time of the survey, we could not calculate the margins at the mother units level but qualitative observations indicated a squeeze in the net margins despite an increase in the sale prices of chicks at the MU level. This required larger scale to break even and make sufficient profits. Thus, high investment costs and operating capital requirements at the Mother Unit level emerged as the critical barriers in rebuilding of Kuroiler distribution chain.

Credit was adversely affected by the outbreak. Before the outbreak, the agents typically extended the informal credit to other agents downstream. This informal credit almost completely dried up after the outbreak since many of the agents had not been able to pay their outstanding loans but opened avenues for new comers. Although all of them recognized the role of credit in faster revival, most of them were also circumspect of extending credit to those next in chain but still indebted. Also, there was no mechanism in place to rescue those deeply indebted.

On the whole, it appears that the livelihood of economic agents in the chain—Mother Units and *pheriwallas*, were disrupted much more significantly than those of the poultry keeping village households. Mother Units seem to have suffered the brunt of the losses since investment at this stage in the chain was significantly higher than that of the other players in the distribution chain. The breakdown of the supply chain resulted in a supply shortfall in Kuroiler day old chicks leading to a sharp increase in their sale prices and the exclusion of bottom poor households from the market. Since private markets have not been successful in mobilizing enough capital, there may be a genuine rationale for public intervention in provision of subsidized credit to help these entrepreneurs get back on their feet. Similarly, there is a need for the Animal Resources Development Department to not only help in restocking but also in providing basic health services in the form of vaccinations and extension. Unfortunately, these services continued to remain conspicuous by their absence in most villages surveyed.

The design of compensation scheme was *ad hoc* and unsystematic and implementation incomplete. In this context, it is important to understand that the success of a compensation scheme depends critically on the ability of authorities to identify genuine beneficiaries, establish losses, and disburse cash without much delay. Also, compliance is usually better when there is a broad consultative process that considers the need of different types of beneficiaries. This, in turn, requires constant trust building involving the economic agents outside the official circles. Unfortunately, no such process existed in West Bengal and a large proportion of genuine beneficiaries did not receive any compensation for their birds. This left wrong messages and it is not clear how the poor households will behave in case of future such outbreaks.

Finally, it is important to understand that unless people's awareness and their sense of consciousness are raised; neither prohibition nor administrative agility can secure the desired result. This requires sustained awareness programme as well as preparedness plans. It is recommended that the Animal Husbandry Department organizes aggressive awareness campaigns relating to the nature, extent and ramifications of HPAI, measures to prevent outbreaks and preparedness plans at block level in case of a new outbreak. The government must also involve relevant private sector agencies, civil society organizations, universities to enhance effectiveness and ownership of such outreach efforts. Above all the non existence of relationship between the Animal Husbandry Department and the backyard and small holder poultry keepers need to be addressed so that they are made part of the solution; without their support it will be very difficult to envisage how the veterinary profession will control the endemic existence of bird flu in West Bengal.

Box 19: Bhagmati

"We need a vet who should come to village. Women cannot take animals to him."

REFERENCES

Ahuja, V., Dhawan, M., Punjabi, M., and Maarse, L. 2008. Poultry Based Livelihoods of the Rural Poor: Case of Kuroiler in West Bengal, *South Asia Pro-Poor Livestock Policy Programme. Available at: http://sapplpp.org/goodpractices/doc-12-poultry-based-livelihoods-of-rural-poor-case-of-kuroiler-in-west-bengal*

Catherine Locke and Christine Okali, 1999. "Analyzing changing gender relations: methodological challenges for gender planning", *Development in Practice*, Volume 9, Number 3, May.

Scoones, I. (1998) Sustainable Rural livelihoods. A framework for analysis. IDS Working Paper No. 72. IDS

Sen, A (2000), Development as Freedom, Oxford University Press

Dolberg, F (2003), Review of Household Poultry Production as a Tool in Poverty Reduction with Focus on Bangladesh and India , PPLPI Working Paper No 6, FAO

West Bengal Veterinary Association.2008 Avian Influenza in West Bengal- Present Status. The Technical Bulletin. Vol.28 No.1 PP: 1-13.

Annex 1: Poultry management practices in Sample Households – 2007 and 2008

(Percent)

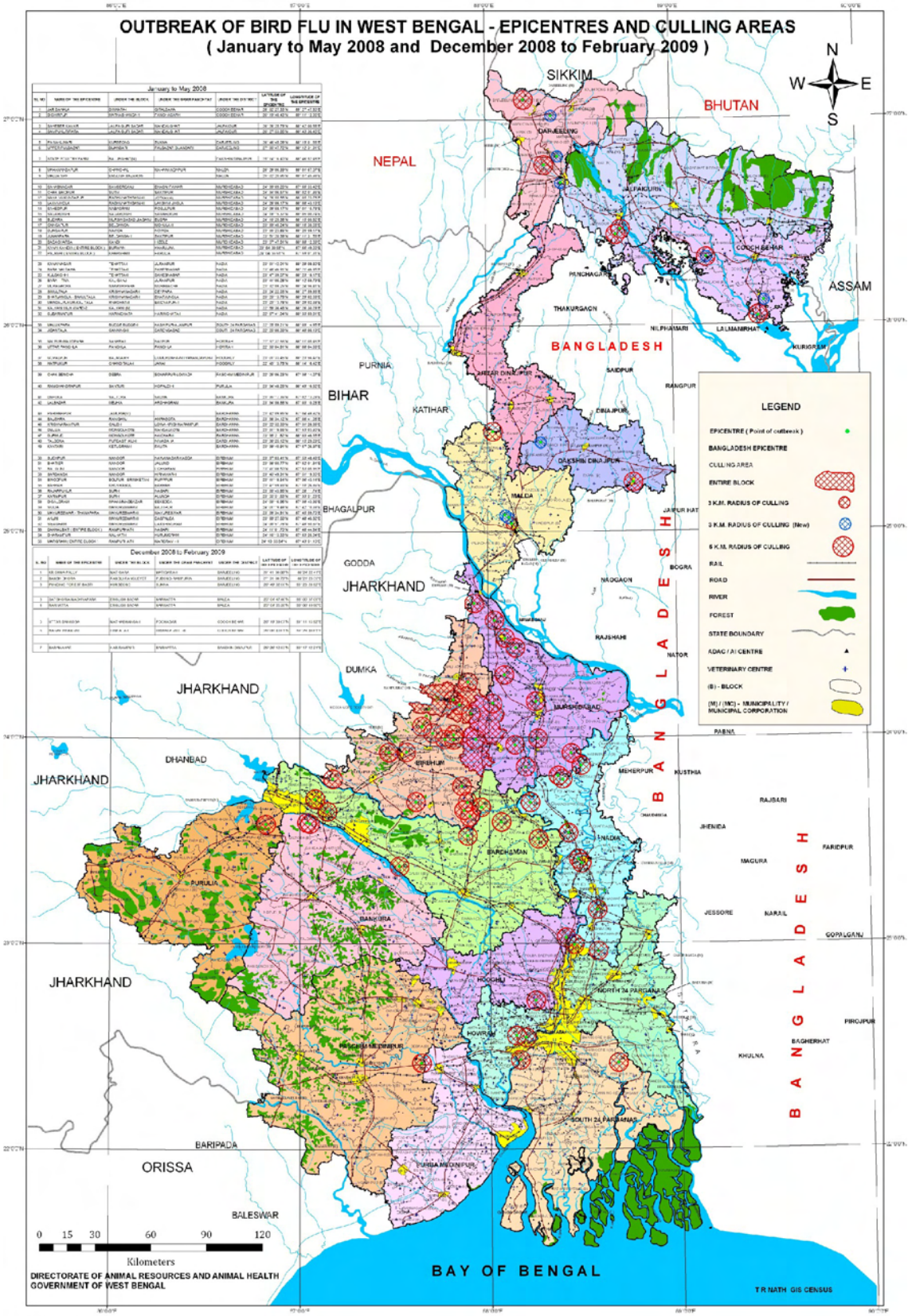
	2007	2008
How do you disinfect/clean the poultry sheds/baskets?		
Simply swipe the dust and garbage	51.7	48.0
Wash with water and phenyl	16.2	22.0
Wash with water and then clean with ash/cow dung/lime/ etc.	10.8	14.0
Wash with plain water	12.3	12.0
Fumigate the sheds	1.5	2.0
Do nothing	7.5	2.0
How do you give water to birds		
No treatment, normal water	93.8	98.7
Normal water but add supplements to water	5.2	16.6
Boil the water	0.9	1.2
Where do you keep the poultry birds?		
Separate poultry shed	88.7	91.1
In the same house where we live	9.4	7.2
Other (specify)	1.9	1.7
Do you take any specific measures to prevent diseases (percent households)		
Yes	35	65
No	74	26
Nothing	73	35
Do you vaccinate your birds?		
Yes	32.1	26.6
No	67.8	73.3
Frequency of vaccination		
1	31.8	20.8
2	37.8	37.5
3	19.7	37.5
4	6.0	4.1
Other	4.5	4.2
Type of vaccine given		
Don't know	66.6	64.5
F1, Gumboro, New castle, R2B, F2 Strain	33.3	35.2
Reason for no vaccination		
They were already vaccinated when I bought them	13.4	22.1
Vaccines are too expensive and I can't afford them	9.9	13.9
Vaccines not available	9.2	..
No vaccinators are there in my village	12.0	13.1
I don't know about poultry vaccines	24.8	20.4
I don't feel vaccination is necessary	15.6	23.7
Other	14.1	5.7

(Percent)

	2007	2008
Disposal of sick chicks*		
Got them treated by the veterinarian/paravet	14.2	..
Got them replaced by the seller	4.0	..
Slaughtered and thrown in open area	36.7	27.1
Slaughtered and thrown in pond/river	4.0	3.2
Slaughtered and buried	12.2	66.0
Consumed	4.0	5.0
Sold	4.0	..
Other	20.4	1.10
From where do you get information about poultry housing, feeding and disease prevention?		
Veterinary dispensary	9.4	5.0
Mother Units/Keggfarm employees dealers	24.0	43.0
Pheriwallas	5.0	15.0
Neighbours	5.3	13.1
Ownself	11.7	5.0
None	43.6	19.0
Have you received any training in poultry health management?		
Yes	7.5	3.3
No	92.5	96.1
Reason for no training		
No training programme was ever held in my area	84.2	98.8
I don't feel it's necessary	5.7	0.5
Other	10.0	0.7

* 2008 survey collected information on disposal of dead birds. Thus the two columns with respect to this question are not directly comparable.

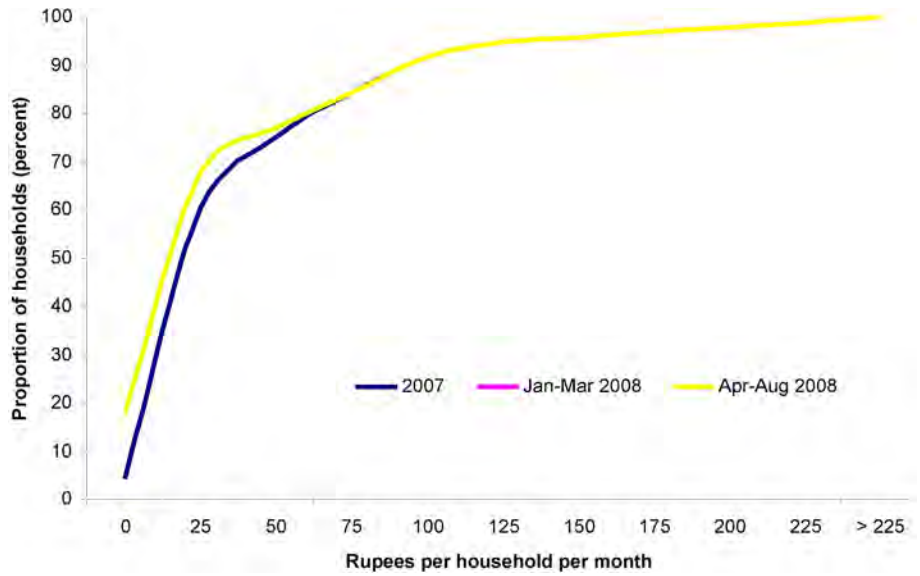
Annex 2: West Bengal Fird Flu Map



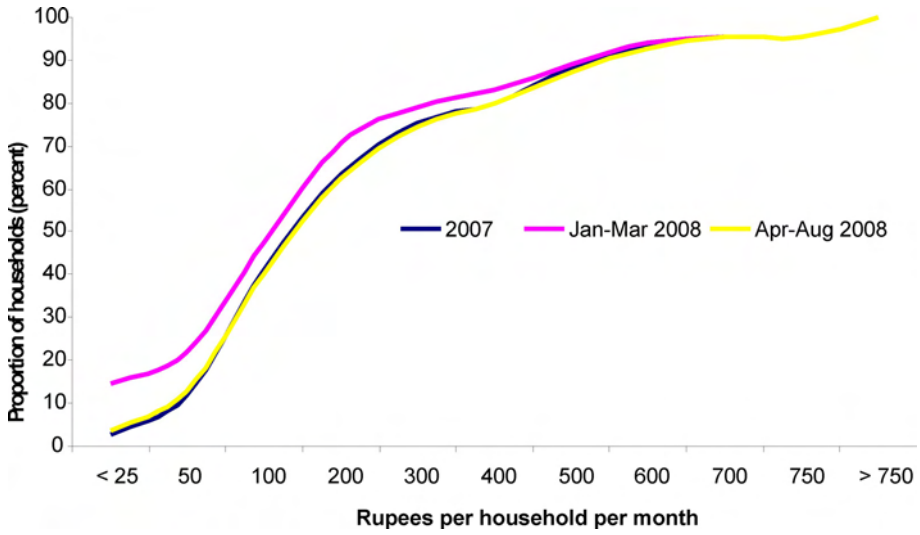
Source : www.mapsofindia.com

Annex 3: Cumulative distribution functions for educational and health expenditures

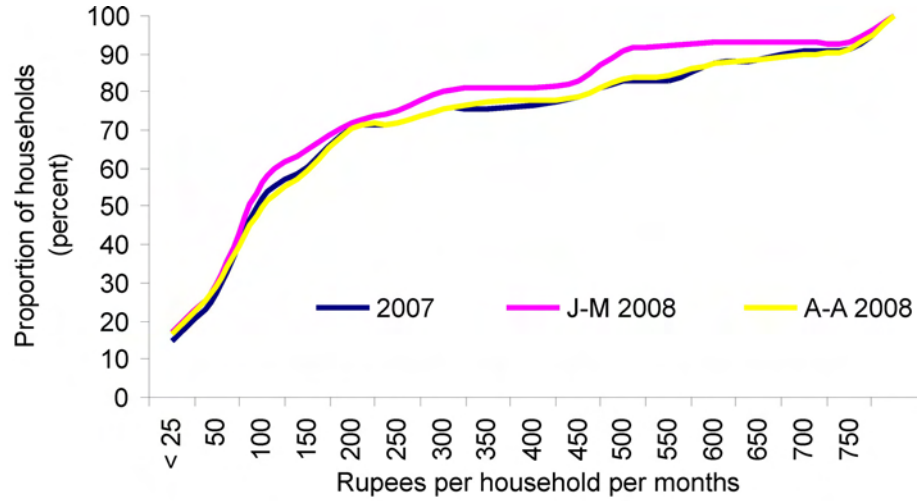
Cumulative distribution function for expenditure on school fees



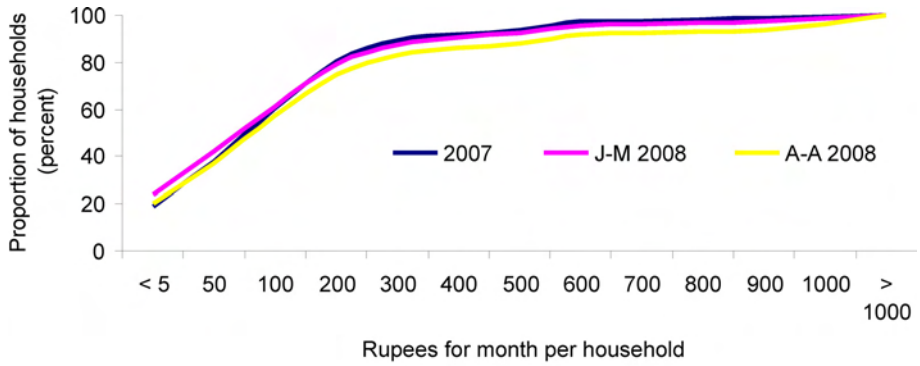
Cumulative distribution function – Expenditure on private instruction



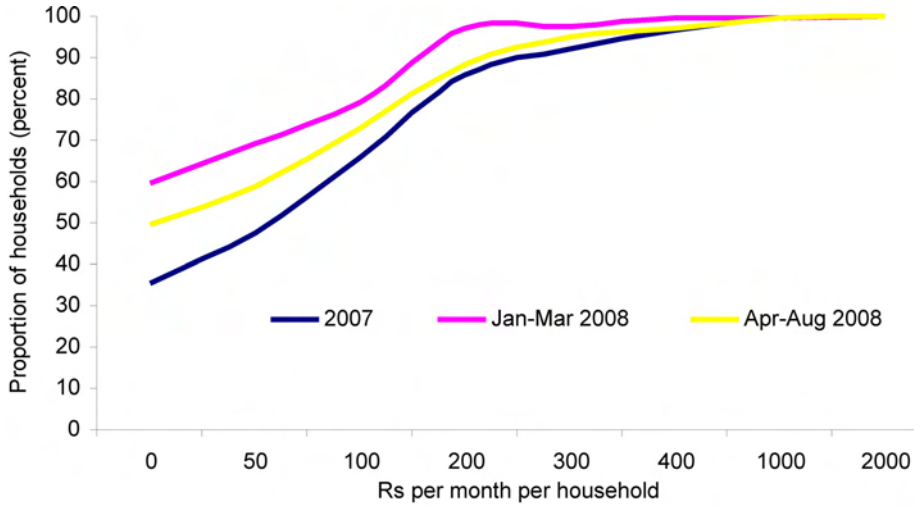
Cumulative distribution function – Expenditure on stationary and other educational supplies



Cumulative distribution function for Expenditure on Health



Cumulative distribution function for Expenditure on Clothing



Annex 4: Rates of compensation vide Govt. of W.B. Order No. 62/S-ARD/4A-35/06 (P-III) dated 09.5.2008

(Rupees)

Item	Chicks (less than 10 weeks)	Grower/Adult
Layer	20.00	50.00
Japanese Quail	5.00 (up to 3 weeks)	10.00
Geese	35.00	75.00
Turkey	60.00	160.00
Poultry feed	6.00 per kg	–
Broiler	20.00	40.00
Duck	35.00	75.00
Guinea Fowl	20.00	50.00
Egg	2.00 per egg	–

Annex 5: Comparative prices of day old chicks, *desi* laying hens and Kuroiler meat pre versus post bird flu period

(Rupees)

Category	Unit	Before Outbreak*	Current
Murshidabad			
Broiler (meat)	Kg	48 – 50	55
Kuroiler (meat)	Kg	70 – 80	Not available
Desi (laying hen)	Hen	100	150
Desi poulette	Kg	80	130
Kuroiler DoC	DoC	11.3	11.3
Kuroiler chick (appr. 30 days)	Chick	35	40
South 24 Paraganas			
Kuroiler (meat)	Kg	55	70-80
Desi (laying hen)	hen	100-125	Not available
Desi poulette	Kg	Not available	
Kuroiler DoC	DoC	10	13-14
Kuroiler chick (appr. 3 weeks)	Chick	18	15.25**
East Midnapur			
Kuroiler (meat)	Kg	65-70	90
Desi (laying hen)	hen	80	130-150
Desi chick/poulette	Kg	Not available	
Kuroiler DoC	DoC	10	Not available
Kuroiler chick (appr. 2 weeks)	Chick	13	15-16

* The prices are sourced from Focus Group Discussions and reflect rates in Dec 08 just prior to Bird flu outbreak. Fluctuation in prices is due to seasonal variation for instance in Sep 08, Kuroiler meat sold @Rs 55/kg in East Medinapur while in Dec 08 it sold @65-70/kg as it was festival time and consumption is more in winters.

** The average selling age after BF had declined to about 12 daysKuroiler chick (appr. 30 days) Chick

Annex 6: Application of Rural Livelihood System Approach (RLS-Mandala)

The Rural Livelihood System Approach (RLS Mandala - Standard)

9 - Individual Orientation • Visions • Hope • Aspirations • Fears • Self Image/respect • "Gurus", Models	**8 - Family Orientation** • Ancestors • Caste, social status • Aspiration to leadership, education, jobs • Aspiration to power, wealth, social mobility	**7 - Collective Orientation** • Subsistence agriculture • Food security • Religion, traditions • CPRs, state laws • World views, school • Capitalistic values, city, new prosperity
6 - Inner Human Space • Integrity, identity • Awareness • Selfishness, compassion • Responsibility • Affection, curiosity, courage	**5 - Family Space** • Gender relations • Nutrition distribution • Health • Family planning, distribution of work load • solidarity	**4 - Socio-economic Space** • Production relations • Systems of co-operation • Community organisations, govt. institutions • Market of goods, land, labour and capital • Contractors, industry.
3 - Emotional Base • Memories • Attachments • Feelings • Anxieties • Boredom	**2 - Knowledge & Activity Base** • Technology • Agricultural patterns • Experiences, skills • Traditional knowledge • Labour, crafts, services • Modern professions	**1 - Physical Base** • Natural environment • Natural resources • Animals • Habitat • Accumulated wealth

The RLS Mandala: Applied – Trigger points for impact study on Bird Flu

9 - Individual Orientation • loss of confidence • hHopes shattered or still hopeful • fears • views on BF • strategy for hiding birds	**8 - Family Orientation** • caste Barrier to change from poultry keeping • social status • any caste associated with culling • consuming diseased/dead birds	**7 - Collective Orientation** • any scheme /help to earn living • entry of any organization to help • ban on poultry keeping acceptable • in Social functions poultry still finds place
6 - Inner Human Space • change in status/importance within house/society • coping with the situation • feeling stigmatized	**5 - Family Space** • compensation received by • change in decision making, financial control , division of labour post BF • plate composition-poultry products, change in diet • preferential food allocation • decision on culling and no. to be culled, birds to be hidden • role of children in poultry keeping	**4 - Socio-economic Space** • role of Panchayat-culling compensation, restocking • provision of alternate means of livelihood • role of creditors • fall of prices • role of NGOs etc. • change in mktg. / buying birds/eggs • discrimination in compensation • relations with other villages • sense of togetherness in community
3 - Emotional Base • Memories associated with birds • Sense of loss • Mass culling impact	**2 - Knowledge & Activity Base** • change in occupation • Increase in knowledge (BF, Bio-sec, differentiate between BF and Newcastle disease.) • Change in management system • Activities undertaken to cope with BF • Degree of resistance amongst *desi*, synthetic ducks etc	**1 - Physical Base** • Reason for increase/ decrease in flock size • change in livestock • affect BF on assets/savings

RLS Mandala: Household Shantana – Pre Bird Flu

Individual Orientation

- Will increase the flock size
- Very motivated
- Wants son to get education & job
- For daughter wants wedding

Family Orientation

- Below sustenance family
- All brothers have huts close by
- Food shortage during summer months

Collective Orientation

- Community helps in case of need
- No help from any organization.

Inner Human

- Fear mortality of birds due to predators
- Open minded
- Good entrepreneur skills
- Kuroiler keeping was very good experience
- worries about accidents involving her husband as he comes home late at night

Family Space

- Nuclear family with father-in-law staying with them
- Husband wife take joint decision on everything
- Husband has faith in wife's business sense
- Kuroiler money used in children's education & food for school tiffin
- Kuroiler related work is done by Shantana
- Father-in-law supports her decision of Kuroiler keeping

Socio Economic Space

- Income from Kuroiler – major contribution
- Income from 'Coolie' job not sufficient
- Loan taken for initial investment & for father-in-law's medical expenses
- Veterinary services available & accessed
- Extension by neighbors, MU person

Emotional Base

- Attachment to village life
- Attachment to Kuroiler

Knowledge/Activity

- Non-Agricultural labor (coolie)
- First time poultry keeping
- Does Zari work
- Birds vaccinated & treated at veterinary hospital
- Kept in separate shed
- Saw dust & lime used as litter material
- No mortality so far.
- Stall fed (lack of space)

Physical Base

- Small kutcha Hut
- No land or fish pond
- Kuroiler 20
- Kuroiler shed
- Bicycle

RLS Mandala: Household Shantana – Post Bird Flu

Individual Orientation

- Sense of loss of face
- Will still continue poultry keeping

Family Orientation

- Moral and financial support by Shantana's family
- Food scarcity in monsoon months
- Children education very important

Collective Orientation

- No Government or NGO support
- Rumours and hearsay play a major role in decision taking.
- Poultry replaced by fish in social functions

Inner Human Space

- Status within household lowered post bird flu
- Despondency and sadness setting in

Family Space

- Diet devoid of poultry meat for 2 1/2 months
- Number of eggs consumed reduced
- Amount of food reduced
- Relationship with husband affected
- Woman relegated to background in decision making.
- Woman has least share in food allocation

Socio-economic Space

- Announcement by Panchayat that compensation would be given for birds killed.
- No awareness program initiated
- Credit taken from money lender
- Mother unit not yet functional in the village
- Lack of money for investing in poultry an issue
- Crash of poultry price during bird flu
- Exploitation by embroidery agent.

Economic Base

- Feeling of hopelessness
- Attachment to birds

Knowledge/Activity Base

- More emphasis on embroidery work
- No awareness of bird-flu/ bio-security measures etc
- Diseased dead birds thrown out in the open

Physical Base

- Loss of 19 birds to disease
- Distress sale of 14 birds
- No poultry flock due to lack of finances.
- Gold chain pledged for Rs.3000/-
- Poultry shed lying in state of disrepair

RLS Mandala: Household Renu Jana -Pre Bird Flu-

Individual Orientation

- Wants to lease land
- Would diversify into agriculture and par boiled rice business

Family Orientation

- Low social status (schedule caste) family
- Traditional occupation boat rowing
- Son's education a priority

Collective Orientation

- Brick house through govt scheme
- Active in Panchayat
- Active as member of local political party
- Women don't sell livestock in market

Inner Human

- Open to new ideas
- Optimist
- Advises others
- Depends on husband for final word

Family Space

- 3 members nuclear family
- Division of labour very clear: indoors and Kuroilers for woman and outdoors for man
- Joint decisions but final word of man
- Totally dependent on Kuroiler for livelihood

Socio Economic Space

- Sale from home and market
- Vet hospital not accessed
- Smooth supply of chicks
- No organized marketing facilities
- Extension through neighbors and mother unit owner
- Credit from mother unit owner

Emotional Base

- Concern for son's education
- Predators, storms and rains are cause of worry

Knowledge/Activity

- Boat rowing
- Agri labour
- Kuroilers keeping
- Pheriwala
- New entrants in poultry sector
- Semi – scavenging birds
- Mash, paddy and boiled rice as supplementary feed
- Bio – security measures lacking
- Mortality due to storms and cold
- Ethno veterinary medicine practiced

Physical Base

- Own hut
- 12 Kuroiler
- Cyclones/storms damage shed and house

RLS Mandala: Household Renu Jana -Post Bird Flu-

Individual orientation

- Resilient
- Hopeful
- Entrepreneur

Family orientation

- Strong extended family support
- Child's education a major concern

Collective orientation

- No Government or NGO support
- Rumours and hearsay play a major role in decision taking.
- Lack of employment opportunities

Inner Human Space

- Emerged stronger and more independent post bird flu

Family Space

- Woman left to run the household in absence of man
- Migration undertaken by husband
- Differences of opinion on choice of livelihood post Bird Flu
- Reduced nutritional intake after Bird Flu
- Son's private tuitions stopped for 3 months

Socio-economic Space

- No awareness program initiated
- Asset sold
- Re-investment in poultry through credit by mother unit owner
- Crash of poultry price during bird flu

Emotional Base

- Sense of insecurity associated with migration of husband

Knowledge/Activity Base

- Agri-labour work undertaken
- Daily wage construction work
- Change in area covered by pheriwala husband

Physical Base

- 12 pullets
- Distress sale 23 birds
- Gold earrings sold

SOUTH ASIA Pro Poor Livestock Policy Programme

A joint initiative of NDDB and FAO

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Our Motto

*"development of **healthy environments** in which **healthy animals** are reared by **healthy people**"*

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