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Marketing of fish from peri-urban Kolkata

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¹Institute of Aquaculture, University of Stirling

²Institute of Wetland Management and Ecological Design, Department of Environment, Government of West Bengal

³Department of Fisheries, Government of West Bengal

For further information please contact the project team leader:

Dr Stuart Bunting Institute of Aquaculture, University of Stirling, Stirling FK9 4LA, Scotland
Tel: +44 (0)1786 456573, Fax: +44 (0)1786 451462

or visit the project website at: <http://www.dfid.stir.ac.uk/dfid/nrsp/kolkata.htm>

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EXECUTIVE SUMMARY

Trading of fish in Kolkata

1. Livelihoods of poor people in Kolkata and the State of West Bengal are inextricably bound up with a cultural and dietary preference for fish. Consumption of fish, particularly freshwater fish, is known to be among the highest in the World. In social terms the catching and handling of fish in India dominated by lower caste people but consumption of fish is almost universal.
2. Previous studies indicated the importance of the East Kolkata Wetlands as a source of cultured fish but also the role of imported cultured fish and wild fish species in the markets and diets of Kolkata. The current study, which followed trading in the major wholesale markets located within the wetlands area through the year and developed an overview of retail markets indicates some interesting trends, but confirms the importance and role of fish from the *bheries*.

Overview of fish marketing in and around Kolkata

3. West Bengal remains the major source of fish seed and market for cultured freshwater fish in India. Fish seed production occurs at several concentrations (see Working Paper 7) but the major wholesale markets in Kolkata such as Howrah and Seladah are important points of transshipment to other parts of the State, neighbouring Bangladesh and the Gulf States.
4. Fish culture occurs throughout West Bengal but occurs as a major concentration in the *bheries* located within the East Kolkata Wetlands. There are major imports of large fish raised in commercial systems elsewhere in India, particularly from Andhra Pradesh (AP), and their importance appears to be increasing. The Indian Major carps (IMC), catla and rohu, dominate sales and prices appear to have declined over the last 5 years in response to intense competition.
5. Cultured river and swamp catfish (*Pangasius* and *Clarias* species respectively) from AP appear to have entered markets relatively recently although in small amounts. These tend to be exotic species, or hybridized with exotic species.
6. The evidence from the auction markets suggests that the production of sewage-raised fish in *bheries* also appears to be increasing. Small exotic tilapias and Indian major carps (<200g) dominate the trade but the exotic silver and common carps are also important and tend to be produced and sold at a larger individual size (300g+).
7. The activity of the auction markets within the wetlands, where live fish from the *bheries* are traded suggests that large quantities of the smallest fish are transported to outlying Districts of the State. Wild, indigenous species continue to be widely available in retail markets, but expensive. They are sold in the auction markets but are only significant during the cool season when ponds are drained and they can be caught easily.

Auction markets

8. Four of the major markets in the East Kolkata Wetlands were monitored throughout 2002, Bamanghata, Bantala, Chowbhaga and Chingrighata. The main trends indicated a gradual increase in the number of traders involved at each market over the last decades by a factor of up to 6.
9. Currently more than 200 auctioneers trade daily through the year although volumes of fish traded can vary by almost 100%. The number of trades made each day remains similar but the average amounts traded/sale varies. More fish is traded in the months May-October and least between November and April.
10. Overall it is estimated that in excess of 18,000 MT of fish are being traded through these 4 markets annually, mainly from the *bheries*. Fish yields in excess of 4,500 MT/ha (based on a figure of 4,000 ha) appear to be sustained.
11. Exotic species, especially tilapias have become increasingly important over the last few decades. Two main types of tilapia are identified by producers, intermediaries and consumers; the darker 'tilapia' (*Oreochromis mossambicus*) and the lighter 'lylantica' (*Oreochromis*

- niloticus*). The latter now predominates although the former is considered superior by consumers and together they constitute 40 - 50% of the wetlands production.
12. Other introduced species mainly common carp (*Cyprinus carpio*) and silver carp (*Hypophthalmichthys molitrix*) make up approximately 5% each and remainder (40-50%) comprises small Indian Major carps - 'pona' (*Labeo rohita* and *Cirrhinus mrigala*).
 13. Large numbers of people are employed during the hours of the auctions (typically 4-10 am, seasonally dependent). At least 4 people are employed for each auction trading house (writer and many casual labourers find employment for carrying water. Employees of the *bheries* tend to be paid a fixed rate to carry live fish to the market, usually Rs20 per load. Loads vary but are typically around 30 kg.
 14. Others benefit through selling ground water from nearby and the numerous teahouse operators. Children, often working before school, earn token amounts for helping move fish in cash or kind.
 15. Relationships between *arotdars* and sellers of fish are complex, usually involving advances of cash or fingerlings and resulting in variable commission rates at the time of purchase.
 16. A complex system of financial settlement is used within the auction markets to ensure benefit streams from buyers (1%) and sellers (4-5%) of fish and to cover the retailers losses during retailing of small quantities of fish. The buyers of fish are of three major types- (1) poor retailers who then individually carry live fish, usually in aluminium *patils* on bicycles to retail markets in Kolkata or its vicinity. Alternatively (2) fish are transported by vehicle in oil drums to more distant markets by groups of traders who then 'break' the fish into smaller quantities before retailing. Another strategy (3), especially for very small fish and those that are already dead, is icing and transfer to other markets through West Bengal e.g. Ramaghata (80 km away). This trade appears to be increasing.
 17. The small size of fish produced and traded and an increasing dependence on exotics reflects changes in the market and demand. Several traders mentioned the increasing importance of the tilapia for the poor, which together with small IMC remain readily saleable. Maintaining live fish in nets prior to transportation is one practice that appears to be increasing.
 18. Interest in, and markets for, larger live fish also appear to be increasing but higher risks seem to make this a problematic option for *bherie*-based production even though the labour unions support it. Poaching of larger fish in particular and high labour costs were reported to make this an unfavourable option. The current system of auctioning large quantities of live fish is also much easier for smaller individual fish.

Retail markets

19. There are a large variety of markets in Kolkata and surroundings and fresh fish is a dominant product, purchased on a very frequent basis by most households. The diversity of fish products is immense in even small markets; usually fish retailers are located together in an identifiable section although in informal street markets, aquatic products are sold in small quantities alongside vegetable traders. Most fish tend to be sold whole, live or iced. Retailers may specialize in one specific type of aquatic product or sell a variety, the latter is more common in formal markets although some formal, more up-market markets have more extreme forms of specialization among aquatic product vendors.
20. The dominance of aquatic products on sale compared to other forms of high quality foods (e.g. meat) is extreme in the markets of Kolkata. The numbers of vendors selling aquatic foods of all types was higher than meat by a factor of 3-12 among a range of retail markets surveyed. Freshwater fish is also more dominant than seafood; stalls selling freshwater species outnumbered marine by a factor of over 2. Cultured fish are also sold by more stalls, and in greater quantities, than wild species which are more likely to be sold live and to command higher prices.
21. Common forms of specialization among retailers were those selling whole or steaked large IMC from AP, compared to those selling small live tilapias and carps from the wetlands. Apart from vendors specializing in seafood, many sold both seafood and large IMC.
22. The type of market-its location and customer base was important in characterizing the likely profile of vendors. Markets patronized by richer customers tended to be formal and permanent and to sell a great variety of products. A level of specialization characterized stalls vendors selling only a variety of live indigenous fish, or seafood, or IMC for example.

23. The quantities of fish sold per vendor and margin per kg tended to be higher for the large imported IMC than for small live tilapias, IMC and exotic carps from Kolkata wetlands. Larger live carps and tilapia however attracted high prices and margins, but availability was low. Gross incomes of people selling small carps and tilapias ranged from less than Rs200-500 per day. Marketing costs usually around 15-20% of gross income.
24. Scheduled caste or tribal people were most commonly involved in trading fish; depending on the market, women were often active traders. Vendors specializing in selling large iced IMC typically had a minimum of two people per stall, one of whom was involved in streaking and/or cleaning the fish. Vendors selling small live carps and tilapias and/or small wild fish tended to trade alone and have relatively smaller amounts of fish for sale. Cleaning of such fish is normally contracted by independents. Sitting among the traders, fish cleaners tend to be very poor and earn Rs1-3 per time depending on the size and difficulty of the fish to be cleaned.

Consumers

25. People generally prefer to purchase and consume a variety of species and sized fish, freshwater, marine, captured and cultured fish are all available in every market, although the range of produce available does vary between markets. Customers in Kolkata markets tended to consume fish on a daily basis, whereas meat of all types is much less frequently consumed; fish were eaten on more than 5 occasions a week compared to less than once for all meat. The mean amount of fish bought was around 0.89 kg per customer. Better -off consumers tended to consume fish more frequently than poorer people, although even the poorest group consumed fish more than 4 times per week on average.
26. Approximately 50% of people interviewed had a negative opinion on the use of wastewater to raise fish, the remainder having a positive perspective or no opinion. Consumers purchased between 400g to over 2 kg of fish on each occasion. Based on the amounts bought on each occasion and the stated frequency of consumption and household size, per capita consumption of aquatic products exceeds 60 kg annually.
27. The timing of the survey may have influenced the relative abundance and importance of wastewater reared fish compared to other sources as supplies were relatively low at this time. The substitution of other sources for wastewater fish seems clear and only a longitudinal survey would determine if imported IMC varied significantly through the year. Recall of the vendors suggests that markets for large IMC continue to expand and not prone to large variation in this respect.

Trading of fish in Kolkata

Livelihoods of poor people in Kolkata and the State of West Bengal are inextricably bound up with a cultural and dietary preference for fish. Consumption of fish, particularly freshwater fish, is known to be among the highest in the World. In social terms the catching and handling of fish in India dominated by lower caste people but consumption of fish is almost universal. Kolkata has been known as a 'fish deficit' area (Saha, 1970) since the end of the 18th century and highly dependent on outside sources of fish. This shortage has intensified since Partition and the loss of rich fishery resources to the East to the new State, Bangladesh and dereliction of formerly productive fisheries.

Previous studies indicated the importance of the East Kolkata Wetlands as a source of cultured fish but also the role of imported cultured fish and wild fish species in the markets and diets of Kolkata (Morrice et al. 1998). The current study, which followed trading in the major wholesale markets located within the wetlands area through the year and developed an overview of retail markets indicates some interesting trends, but confirms the importance and role of fish from the *bheries*. Saha (1970) estimated the amount of fish reaching Kolkata markets from the wetlands as being around 5 MT daily and the activity to employ nearly 5,000 fishers. In spite of losses of wetland since this time, this study suggests that a ten-fold increase in production has occurred. Many key informants point to a decline in the *bheries* but timeline analysis of the auction markets, through which the majority of the wetlands fish are traded suggests that tremendous growth has occurred.

Overview of fish marketing in and around Kolkata

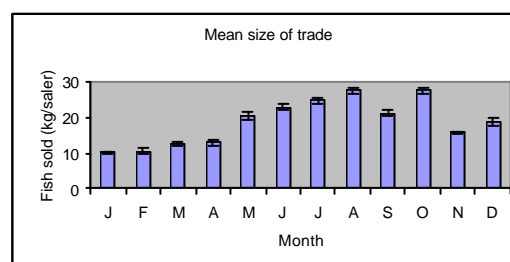
West Bengal remains the major source of fish seed and market for cultured freshwater fish in India. Fish seed production occurs at several concentrations (see Working Paper 7) but the major wholesale markets in Kolkata such as Howrah and Seladah are important points of transshipment to other parts of the State, neighbouring Bangladesh and the Gulf States. Fish culture occurs throughout West Bengal but occurs as a major concentration in the *bheries* located within the East Kolkata Wetlands. There are major imports of large fish raised in commercial systems elsewhere in India, particularly from Andhra Pradesh (AP), and their importance appears to be increasing. The Indian Major carps (IMC), catla and rohu,

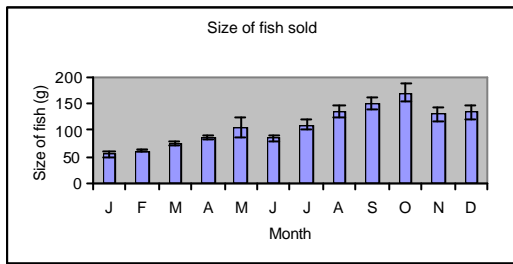
dominate sales and prices appear to have declined over the last 5 years in response to intense competition.

Cultured river and swamp catfish (*Pangasius* and *Clarias* species respectively) from AP appear to entered markets relatively recently although in small amounts. These tend to be exotic species, or hybridized with exotic species.

The evidence from the auction markets suggests that the production of sewage-raised fish in *bheries* also appears to be increasing. Small exotic tilapias and Indian major carps (<200g) dominate the trade but the exotic silver and common carps are also important and tend to be produced and sold at a larger individual size (300g+). Tilapias appear to have steadily grown in importance since their introduction and promotion by the State Government in the early 1960's. Despite Department of Fisheries attempts to control or eradicate them on account of their perceived negative impacts on established IMC, they now account for around 50% of production and the trends suggested by all parts of the production and marketing chain suggest this will continue to increase. The small IMC and tilapias appear compatible within the *bheri* production system and to meet different market needs to the larger, iced IMC imported into the State. A high level of consumer knowledge regarding fish purchase, preparation and consumption is clear. For example darker fish, more clearly 'mossambicus' in appearance, are sold separately and more expensively than the lighter, often slightly larger 'lylantica' ('niloticus'). Moreover consumers

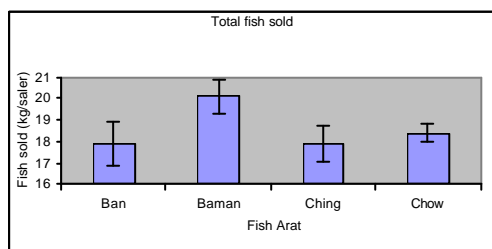
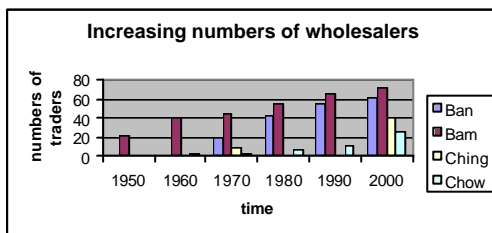
The activity of the auction markets within the wetlands, where live fish from the *bheries* are traded suggests that large quantities of the smallest fish are transported to outlying Districts of the State. Wild, indigenous species continue to be widely available in retail markets, but expensive. They are sold in the auction markets but are only significant during the cool season when ponds are drained and they can be caught easily.





Auction markets

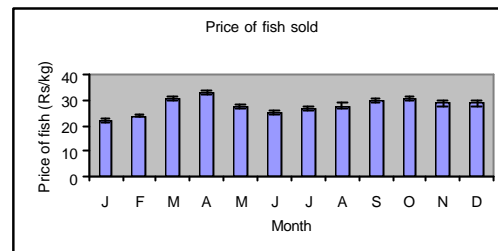
Four of the major markets in the East Kolkata Wetlands were monitored throughout 2002, Bamanghata (Baman), Bantala (Ban), Chowbhaga (Chow) and Chingrighata (Ching). The main trends indicated a gradual increase in the number of traders involved at each market over the last decades by a factor of up to 6. Bamanghata is the largest market in terms of both the numbers of traders and the average size of trade. Bamanghata is located more centrally within the wetlands and fish from this market also is sold on through Chowbhaga and Bantala auction markets as well as directly to a range of retail markets (See Appendices)



Currently more than 200 auctioneers trade daily through the year although volumes of fish traded can vary by almost 100%. The number of trades made each day remains similar but the average amounts traded/sale varies. More fish is traded in the months May-October and least between November and April. At least 4 people are employed for each auction trading house (auctioneer, writer, sweeper and accountant) and many casual labourers find employment carrying water.

Both the mean size of trade and the average size of fish sold increases during the season demonstrating a seasonality of supply that

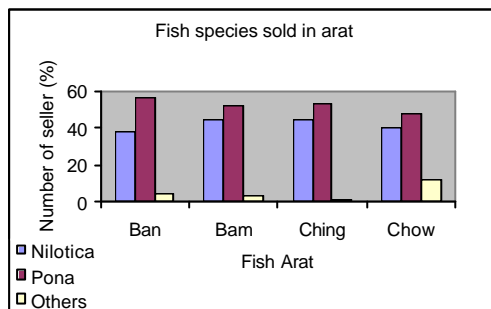
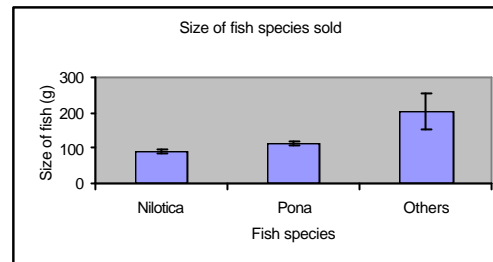
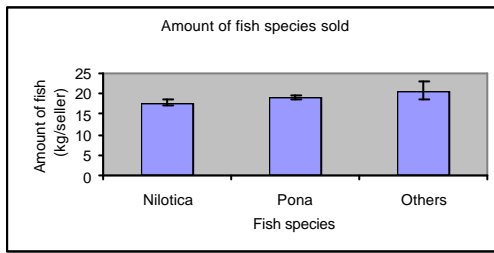
correlates with the main production cycle. Stocking occurs year-round from nursery ponds, usually operated by the same *bheri* operator and fish are then 'thinned' out and sold throughout the year. The smaller size of fish later in the year could be explained by mid-season stocking of nursed fingerlings. Hatchlings are available for much of the year but are cheapest in the mid-season (April-September).



Overall it is estimated that in excess of 18,000 MT of fish are being traded through these 4 markets annually, mainly from the *bheries*. Fish yields in excess of 4,500 MT/ha (based on a figure of 4,000 ha) appear to be sustained.

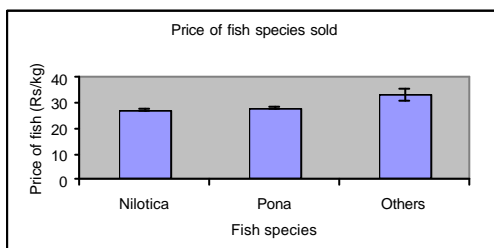
Species

Exotic species, especially tilapias have become increasingly important over the last few decades. Two main types of tilapia are identified by producers, intermediaries and consumers; the darker 'tilapia' *Oreochromis mossambicus* and the lighter 'lylantica' (*Oreochromis niloticus*). The latter now predominates although the former is considered superior by consumers and together they constitute 40 - 50% of the wetlands production. Most *arotdars* were of the opinion that the level of tilapia produced and traded has been increasing partly because it is cheaper to produce and is high demand, especially from poor consumers. . Key informants in all four markets confirmed that tilapias began to appear in the early 1960's, Nile tilapia in the mid-1980s and common carp and silver carp in the mid-1970s. Clearly some fish traded at these auction markets is derived from aquaculture and rice-fish fisheries outside of the wetland area proper. Small wild species were quite common in the markets during December and this was related to the rice production cycle and a tendency to drain *bheries* and catch residual fish at this time of year.



Other introduced species mainly common carp (*Cyprinus carpio*) and silver carp (*Hypothalmichthys molitrix*) make up approximately 5% each and remainder (40-50%) comprises small Indian Major carps – ‘pona’ (*Labeo roh* and *Cirrhinus mrigala*).

Generally between 15 and 20 kg of all species is sold per trade, which is the quantity of live fish that can be carried in a single *patil*



The larger mean size of other fish reflects the lower stocking densities used for common and silver carps compared to tilapias and IMC. These species also wholesale for slightly higher prices but the relatively small premium suggests that the significantly larger size does not outweigh the perceived advantages of small tilapia and IMC. These are easier to maintain alive and to sell in retail markets compared to the larger exotic carps.

Employment benefits

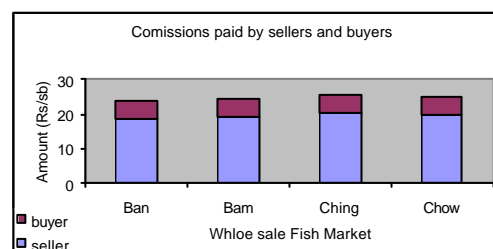
Large numbers of people are employed during the hours of the auctions (typically 4-10 am, seasonally dependent). Employees of the *bheries* tend to be paid a fixed rate to carry live fish to the market, usually Rs20 per load. Loads vary but are typically around 30 kg.

Others benefit through selling ground water from nearby and the numerous teahouse operators. Children, often working before school, earn token amounts for helping move fish in cash or kind.

Relationships between *arotdars* and sellers of fish are complex, usually involving advances of cash or fingerlings and resulting in variable commission rates at the time of purchase.

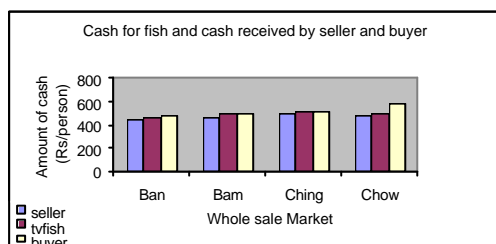
Some markets have associations of *arotdars*, membership being based on a small daily rate (Rs5 per day). Formal meetings are held in the association's own meeting house. Some markets trading fish from *bheries* is relatively recent, Chingrighata originally started as a market selling wild shrimps in the vicinity.

A complex system of financial settlement is used within the auction markets to ensure benefit streams from buyers (1%) and sellers (4-5%) of fish and to cover the retailer's losses during retailing of small quantities of fish. Linkages between *arotdars* and *bheries* exist whereby traders secure supplies of fish through advances of cash and/or seed to *bheri* operators. Most prefer cash as there are no issues over the quality and survival of seed. The level of advance influences the amount of commission levied when the fish are purchased.



The buyers of fish are of three major types- (1) poor retailers who then individually carry live fish, usually in aluminium *patils* on bicycles to retail markets in Kolkata or its vicinity. Alternatively (2) fish are transported by vehicle in oil drums to more distant markets by groups of traders who then 'break' the fish into smaller quantities before retailing. Another strategy (3), especially for very small fish and those that are already dead, is icing and transfer to other markets through West Bengal e.g. Ramaghata (80 km away). This trade appears to be increasing.

The small size of fish produced and traded and an increasing dependence on exotics reflects changes in the market and demand. Several traders mentioned the increasing importance of the tilapia for the poor, which together with small IMC remain readily saleable. Maintaining live fish in nets prior to transportation is one practice that appears to be increasing.



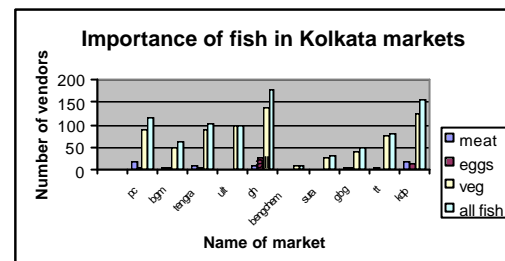
Interest in, and markets for, larger live fish also appear to be increasing but higher risks seem to make this a problematic option for *bheri*-based production even though the labour unions support it. Poaching of larger fish in particular and high labour costs were reported to make this an unfavourable option. The current system of auctioning large quantities of live fish is also much easier for smaller individual fish.

Retail markets

There are a large variety of markets in Kolkata and surroundings and fresh fish is a dominant product, purchased on a very frequent basis by most households. The diversity of fish products is immense in even small markets; usually fish retailers are located together in an identifiable section although in informal street markets, aquatic products are sold in small quantities alongside vegetable traders. Most fish tend to be sold whole, live or iced. Retailers may specialize in one specific type of aquatic product or sell a variety, the latter is more common in formal markets although some formal, more up-market markets have

more extreme forms of specialization among aquatic product vendors.

The dominance of aquatic products on sale compared to other forms of high quality foods (e.g. meat) is extreme in the markets of Kolkata. The numbers of vendors selling aquatic foods of all types was higher than meat by a factor of 3-12 among a range of retail markets (n=11) surveyed. Freshwater fish is also more dominant than seafood; stalls selling freshwater species outnumbered marine by a factor of over 2. Cultured fish are also sold by more stalls, and in greater quantities, than wild species which are more likely to be sold live and to command higher prices. The most important category of fish sold was dead and iced freshwater cultured species



Markets included *bgm*=Beleaghata; *pc*=Park Circus; *ult*=Ultadanga; *garia*=Gariahat; *mb*=Much bazar; *gh* Ghosh bagan; *tt*=Taltola; *bengchem*=Begal Chemical market; *sura*=Phulbagan *sura*, *tengra*=Tengra; *kdh*=Khidderpur

Common forms of specialization among retailers were those selling whole or steaked large IMC from AP, compared to those selling small live tilapias and carps from the wetlands. Apart from vendors specializing in seafood, many sold both seafood and large IMC.

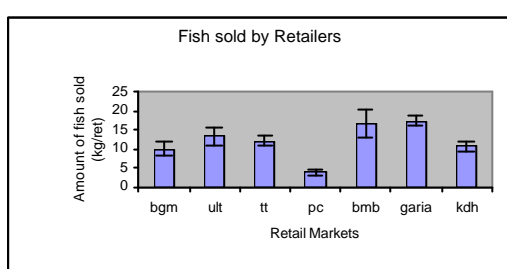


Proportion of vendors selling aquatic food trading in seafood or freshwater fish by category (n=635)

The type of market-its location and customer base was important in characterizing the likely profile of vendors. Markets patronized by richer customers tended to be formal and

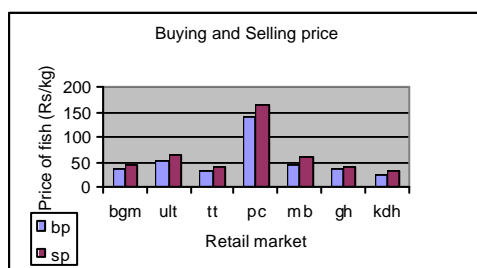
permanent and to sell a great variety of products. A level of specialization characterized stalls vendors selling only a variety of live indigenous fish, or seafood, or IMC for example.

The quantities of fish sold per vendor and margin per kg tended to be higher for the large imported IMC than for small live tilapias, IMC and exotic carps from Kolkata wetlands. Larger live carps and tilapia however attracted high prices and margins, but availability was low. Gross incomes of people selling small carps and tilapias ranged from less than Rs200-500 per day. Marketing costs usually around 15-20% of gross income.



Scheduled caste or tribal people were most commonly involved in trading fish; depending on the market, women were often active traders. Vendors specializing in selling large iced IMC typically had a minimum of two people per stall, one of whom was involved in steaking and/or cleaning the fish. Vendors selling small live carps and tilapias and/or small wild fish tended to trade alone and have relatively smaller amounts of fish for sale. Cleaning of such fish is normally contracted by independents. Sitting among the traders, fish cleaners tend to be very poor and earn Rp 1-3 per time depending on the size and difficulty of the fish to be cleaned.

Most vendors lived within 20 minutes travelling time of the market in which they sold fish, travelling by bicycle, taxi or bus. Marketing costs were typically less than Rp200/day mainly for transportation, ice and market fees.



Consumers

People generally prefer to purchase and consume a variety of species and sized fish, freshwater, marine, captured and cultured fish are all available in every market, although the range of produce available does vary between markets. Customers in Kolkata markets tended to consume fish on a daily basis, whereas meat of all types is much less frequently consumed; fish were eaten on more than 5 occasions a week compared to less than once for all meat. The mean amount of fish bought was around 0.89kg per customer. Better-off consumers tended to consume fish more frequently than poorer people, although even the poorest group consumed fish more than 4 times per week on average.

Wellbeing group	Consumption frequency (occasions per week, median values)	
	Meat	Fish
Better-off	1.5	6.5
Medium	1.0	5.5
Poor	0	5.5

Approximately 50% of people interviewed had a negative opinion on the use of wastewater to raise fish, the remainder having a positive perspective or no opinion. Consumers purchased between 400g to over 2 kg of fish on each occasion. Based on the amounts bought on each occasion and the stated frequency of consumption and household size, *per capita* consumption of aquatic products exceeds 60 kg annually.

The importance of cultured freshwater fish in the markets of Kolkata, particularly among poorer consumers

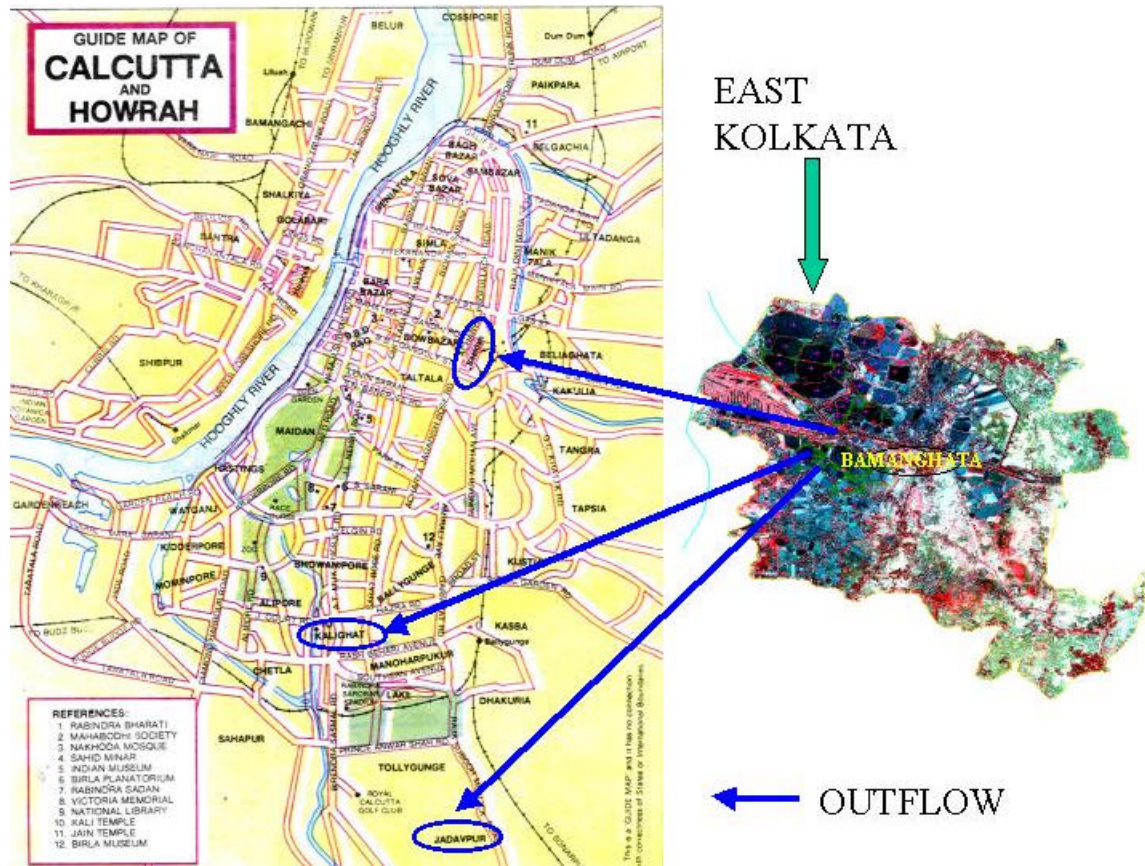
The timing of the survey may have influenced the relative abundance and importance of wastewater reared fish compared to other sources as supplies were relatively low at this time. The substitution of other sources for wastewater fish seems clear and only a longitudinal survey would determine if imported IMC varied significantly through the year. Recall of the vendors suggests that markets for large IMC continue to expand and not prone to large variation in this respect.

References

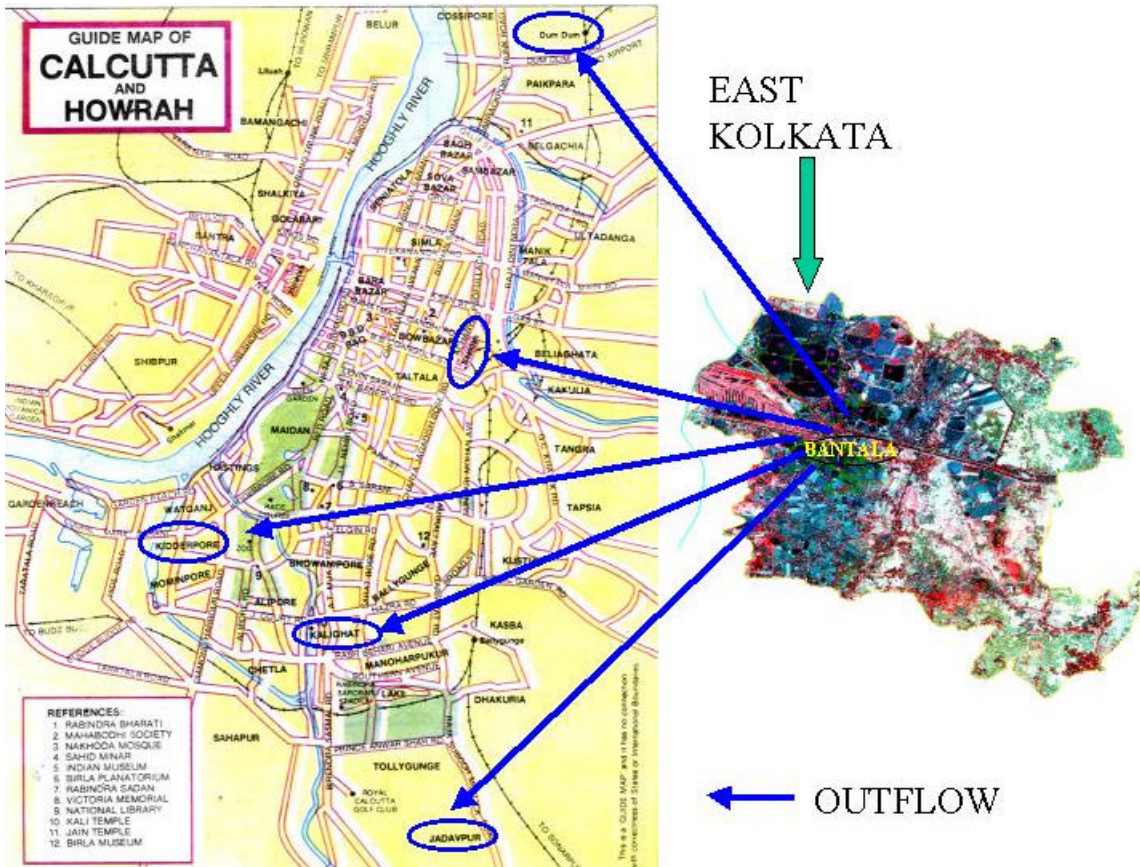
Saha, K.C. 1970. Fisheries of West Bengal. 121pp

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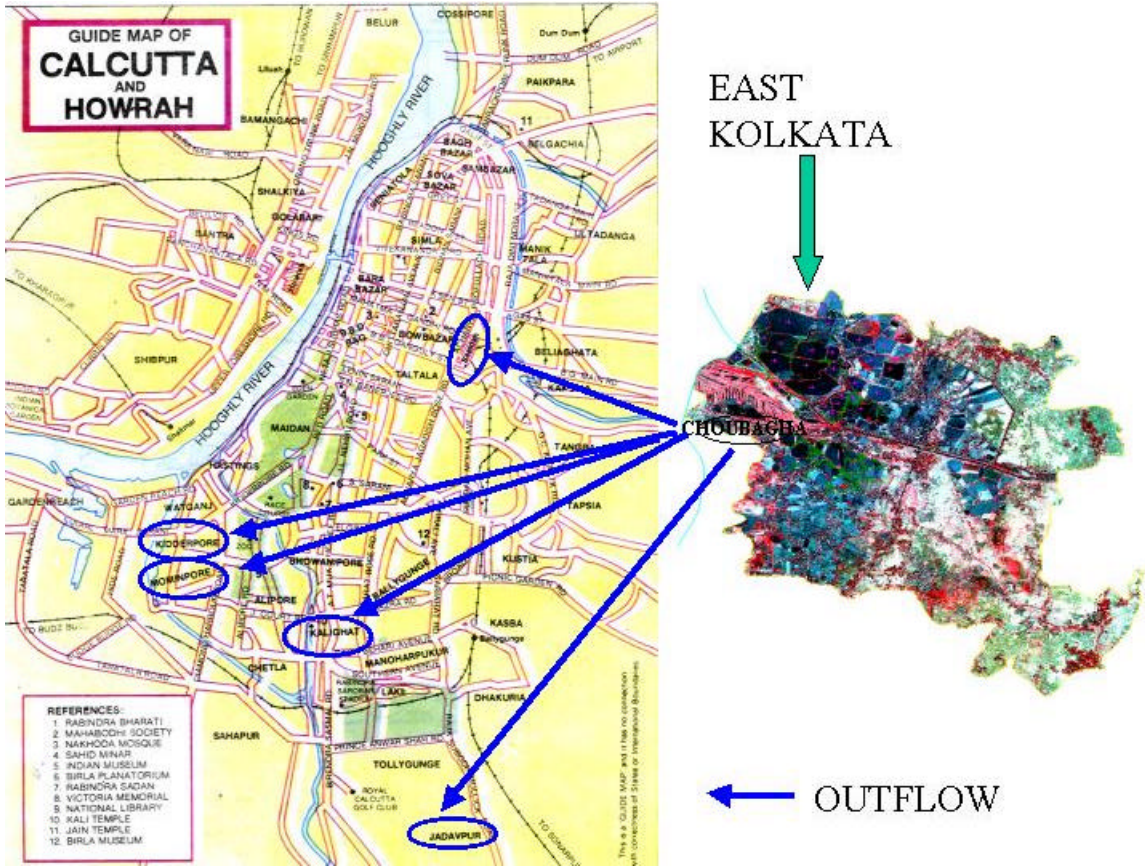
Appendices



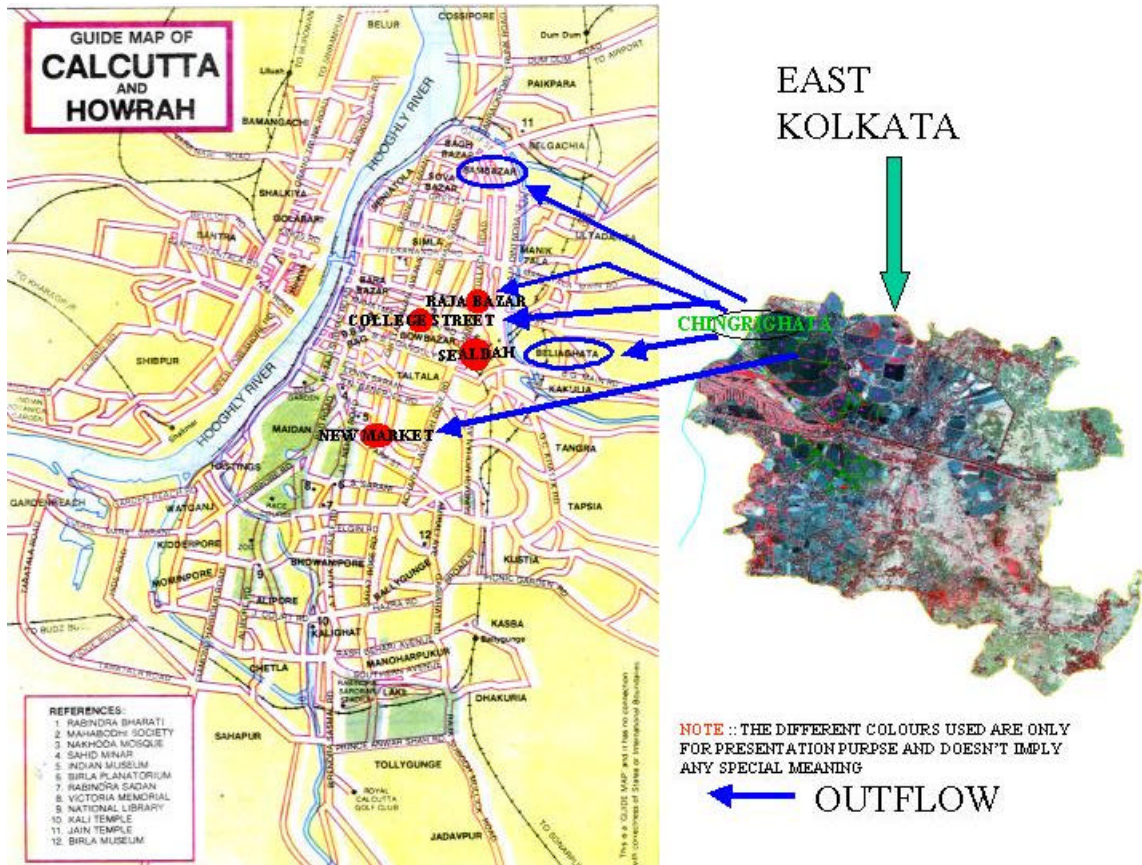
(1) Bamanghata auction market and linkages with retail markets



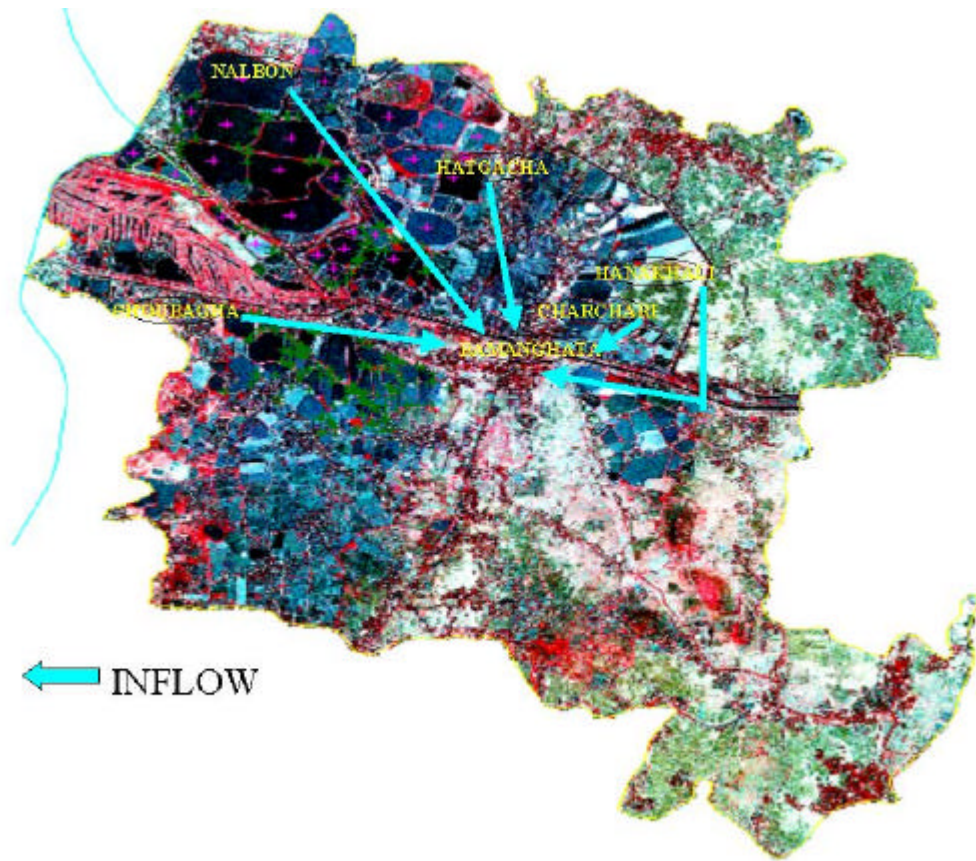
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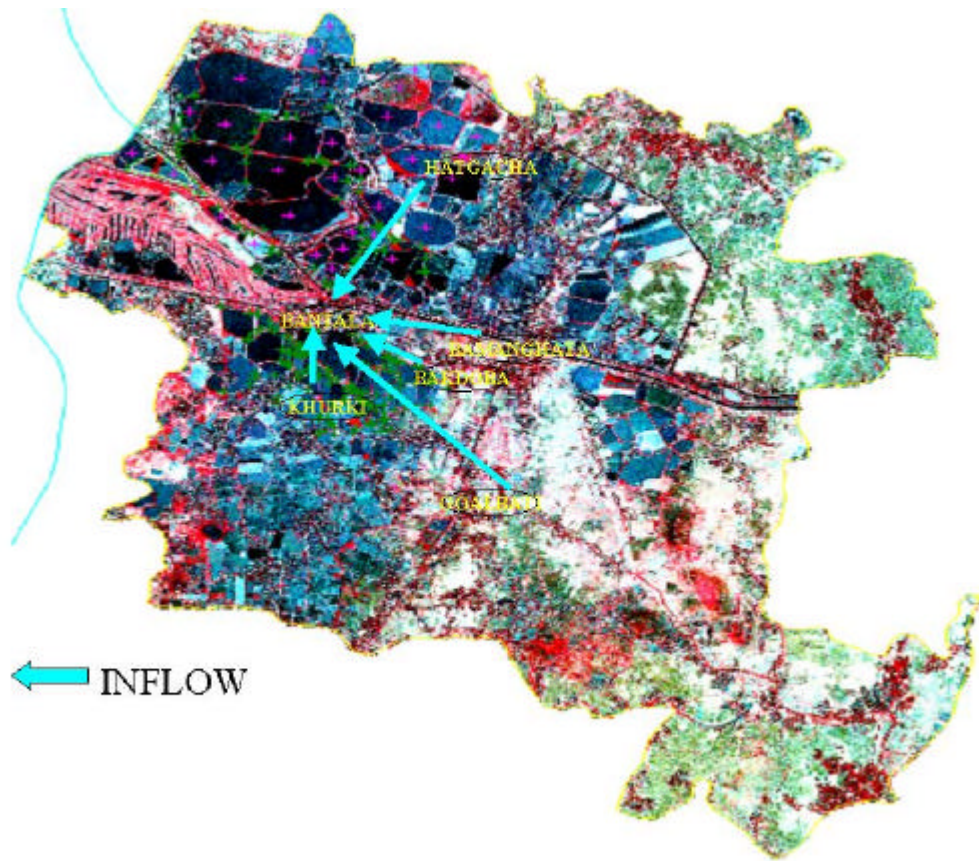
(3) Choubagha auction market and linkages with retail markets



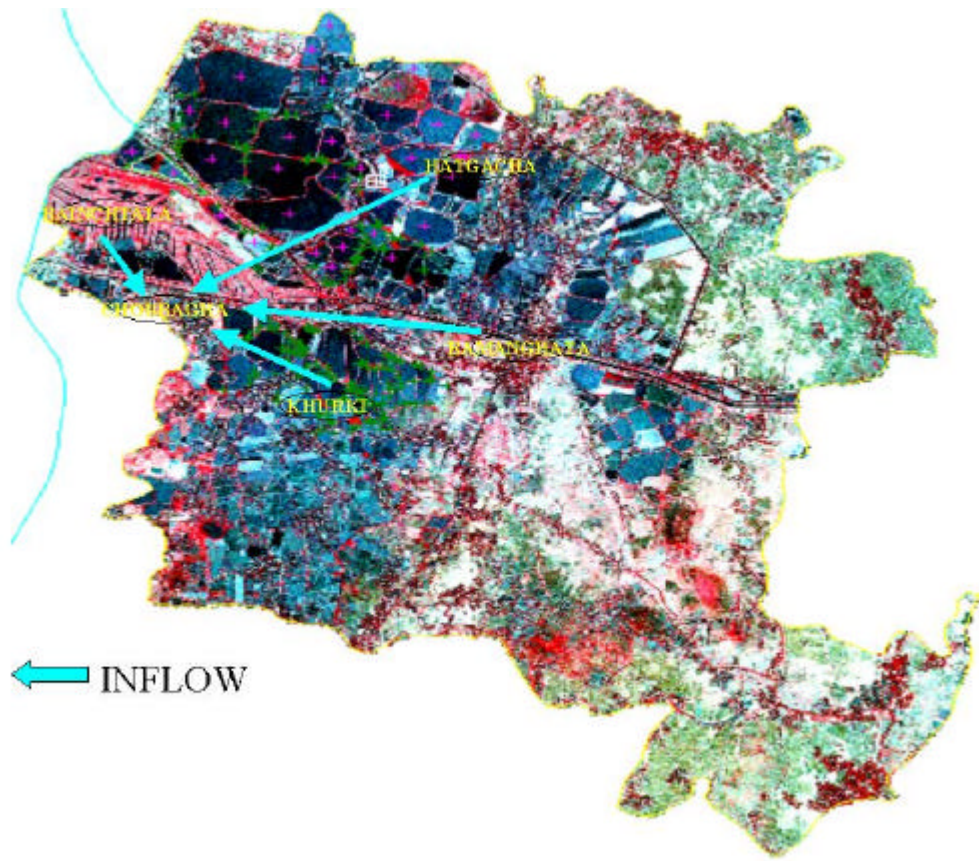
(4) Chingrighata auction market and linkages with retail markets



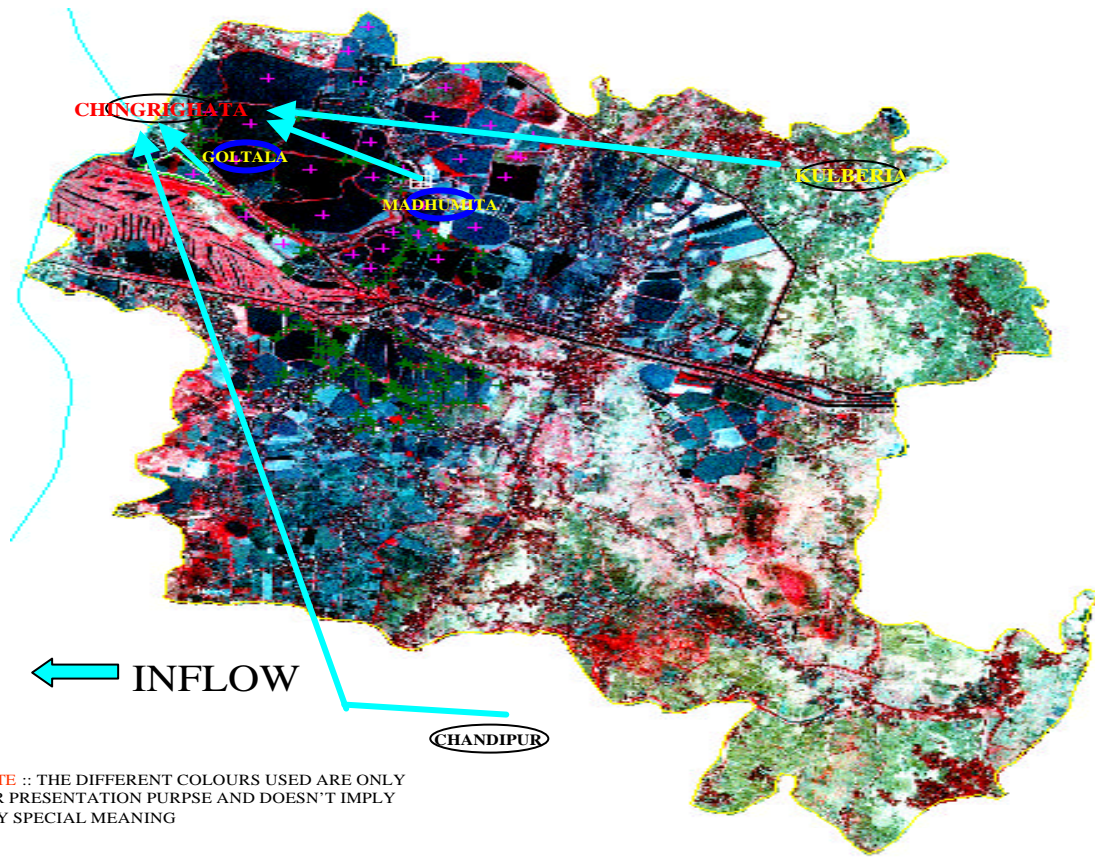
(5) Bamanghata auction market and linkages with *bheries*



(6) Bantala auction market and linkages with *bheries*



(7) Choubhaga auction market and linkages with *bheries*



(8) Chingrihata auction market and linkages with *bheries*