

5. RESULT

5.1 Market survey

5.1.1 Collection

There are some section of people who were engaged with the process of collection (called “Collector”) of *Bellamya bengalensis* and were came under the Group (Gr.) D, they were the inhabitant of several parts of the West Midnapore, Bankura and Purulia Districts.

5.1.1.1 Collection areas

Collections were done from the several wet lands, ponds, beels, canals, swamps and other aquatic areas of Haldia, Mecheda, Tamluk, Noyagram, Moina, Santaragachi, Phuleswer, Mourigram, Ramrajatala etc. The mentioned collection spots were in East and West Midnapore, Howrah etc region. Collectors of Bankura markets engaged with the collection from ponds, beels, Mukutmanipur dam, canals and other nearest aquatic sources of market area. Collectors of Purulia made their collection from Mukutmanipur dam, ponds, beels and canals and other nearest aquatic sources of market area (Table 4).

5.1.1.2 Time of collection

Every day they moved towards the collection sites at the early in the morning. After making sufficient collection, they came to their specific selling ground, almost at the time of evening. Where collectors were observed to sell their product to the wholesalers and sometimes retailers.

5.1.2 Marketing process and transaction

The whole process was mentioned in the Table 4 and Table 5. The tables indicated about the market places of each zones and their source of product (collection ground, wholesaler), along with buyer channels, selling rate (wholesaler, retailer, whole and flesh) and mode of seasonal transactions.

Different wholesalers of Rail Gate Market, purchased *B. bengalensis* from the collectors at different places such as, platform areas of different stations as well as road side areas of Panskura, Mecheda, Khirai, Radhamohonpur, Narayanpakuriamurail etc (Table 4 to 5) (Plate no. 14). Sellers of Bankura (only Mosera and Khatra markets) and Purulia (Purulia Town, Lalpur and Puncher markets) were noticed to purchase *B. bengalensis* from collectors at near by areas of Mukutmanipur dams and other nearest collection areas (Table 4 and Table 5). In every zones the number of collectors were not less than 5-10. Also the numbers of sellers were not less then 10 to 15 in each Zones (it may be varied). Collectors sold their collected product to the wholesalers and retailers (in every zone) and earn Rs.250 /- to Rs.300/- (approx.) or more than that, per day. Collectors brought the quantity (collectively), which was near about 30-40 kg to 1 quintal or more (approximately). However, it was noticed to depend on the collection site, collection season etc.

After purchasing, wholesalers and retailers returned to their own areas or zones through local train or bus. The Gr. D-IIA and Gr. D-IIB both were noticed in Midnapore zone. The sellers of Gr.D-IIA were belonging in Midnapore Town Market. The sellers of Gr.D-IIB found in Miya Market, School Market, Kotwali Market and Raja Market. Gr.D-IIB purchased *B. bengalensis* from Rail Gate Market (Gr. D-II) (Table 4 and Table 5) (Fig. 1). Wholesalers and retailers both earn renging from Rs 300/- to over Rs. 350/- (approx.) per day. Gr. D-III was seen at Kharagpur and

near by area of Midnapore-Kharagpur region. Here sellers under this group earn Rs.250/- Rs.300/- per day (approx.) or more than that. Every collector/seller brought *B. bengalensis* in the market (stated above) not less than 50 kg or even 80 kg to 1 quintal (approx.) (Plate no. 15 to 21).

Gr. D-III (Table 4 and Table 5) was found several markets of Bankura (Bankura Sadar, Sonamukhi, Bishnupur, Patrasayar and Balsi Markets) except Mosera and Khatra (Gr. D-I). Here the seller of Mosera and Khatra markets purchased snails from the collectors and sell their product directly to the consumers. They could earn over Rs. 300/- to 350/- (approx.) per day or more than that. The sellers under Gr. D-III were seen to earn Rs.250/- to over Rs. 300/- (approx.) per day or more than that. Every retailers, brought their product every day, ranging from 30 kg to 50 kg (approx.) or even some times more than that (Plate no. 22 to 25).

Both Gr. D-I (Purulia Town Market, Puchar Market, Lalpur Market) and Gr. D-III (only Man Market) are found in Purulia (Table 4). Here per day income of collectors were Rs.200/- to Rs.250/- or more (approx.). Every retailers, brought their product every day, ranging from 50 kg to 80 kg (approx.). Retailers earn about Rs.300/- to Rs.350/- (approx.) per day. The seller of Man Market were observed to earn per day was near about Rs. 300/- or even more (approx.) (Plate no.26 to 29)..

5.1.3 Seasonal Market study during the period of February'10 to January'13

5.1.3.1 Wholesale market

In the seasonal marketing study, it was observed that, “Wholesaling” as well as “Selling” price/rate indicated fluctuation among the three experimental zones (Midnapore Town, Bankura, Purulia) (Table 5).

In Pre Monsoon, Monsoon and Post Monsoon season, the lowest collection rate was observed (aggregating all rates) in Rail gate Market, while it was highest (aggregating all rates) in Miya Market at Midnapore Town zone (Table-5). Whereas

in this experimental period, individually highest collection rates of Midnapore Town zone was observed in Kotwali Market i.e. 5.2 ± 0.51 (Pre Monsoon), Miya Market 6.5 ± 0.79 (Monsoon) and Miya Market 7.3 ± 0.86 (Post Monsoon) (Table 5). The seasonal changes in wholesale selling rate was significant according to the t-test : paired two sample for means ($P < 0.05$) (Table 6 and Table 7).

In Bankura, both the retail sellers of Mosera and Khatra Market bought the snails from collectors of Mukutmanipur dam area. Where the wholesale rate was significantly higher in winter season (4.1 ± 0.51) than other season, according to the t-test : paired two sample for means ($P < 0.05$) (Table 6 and Table 7).

In Purulia, significant ($P < 0.05$), change in wholesale market rate was observed, according to the t-test : paired two sample for means (Table 6 and Table 7). The rate was observed to have highest in Post Monsoon than other seasons. Whereas individually, the highest collection rates of each market places observed in Purulia zone, at Purulia Town Market i.e. 3.6 ± 0.68 (Pre Monsoon), Lalpur Market 4.1 ± 0.31 (Monsoon) and Lalpur Market 4.7 ± 0.77 (Post Monsoon) respectively (Table-5).

5.1.3.2 Retail market

In retail market a significant change ($P < 0.05$) in rate of *B. bengalensis* was observed. In Pre monsoon season the rate was noticed lowest (aggregating all rates) where as in Post Monsoon season the rate was seen highest (aggregating all rates) (Table 5). The changes in rate of *B. bengalensis* in retail market is discussed separately zone wise.

The significant variation, in retail market rate was observed through out the experimental season for Midnapore Town Zone. In all the cases (both for whole and flesh product) and all the seasons, the overall average rate was noticed comparatively higher in Miya Market than other markets (Kotwali market, Raja Market, School Market and Rail Gate Market.). This market was observed individually, the highest

scorer for selling of whole product for three successive seasons i.e. 9.1 ± 0.78 (Pre Monsoon), 9.6 ± 0.81 (Monsoon) and 9.8 ± 0.78 (Post Monsoon). But for selling of flesh product the rate was too some extent significantly highest in School market i.e. 10.7 ± 0.86 (Pre Monsoon), 11.5 ± 0.76 (Monsoon) and 12.0 ± 0.51 (Post Monsoon) (Table-5) than other. According to the t-test : paired two sample for means the changes in rates (both whole and flesh product) were indicated significant difference (Table 8, Table 9, Table 10 and Table 11).

In Pre-monsoon, Monsoon and post Monsoon season, for Bankura zone the significant variations in rate was also observed. In all the cases (both for whole and flesh product), all the seasons, the overall highest avg. rate was noticed in Mosera Market than other markets. Whereas individually, the highest selling rates for selling of whole product, were noticed in Bankura sadar Market for three successive seasons i.e. 7.2 ± 0.26 (Pre Monsoon), 7.6 ± 0.30 (Monsoon) and 8.0 ± 0.16 (Post Monsoon). However, for selling of flesh product the rate was significantly highest in Khatra market i.e. 11.1 ± 0.25 (Pre Monsoon), 11.8 ± 0.90 (Monsoon) and 12.0 ± 0.55 (Post Monsoon), (Table 5). According to the t-test : paired two sample for means the changes in rates (both whole and flesh product) were indicated significant difference (Table 8, Table 9, Table 10 and Table 11).

In Pre-monsoon, Monsoon and Post Monsoon season, for Purulia zone the significant variations in rate was observed. In all the cases (both for whole and flesh product), all the seasons, the overall (both whole and flesh product) highest avg. rate was noticed in Purulia Town Market than other markets. Whereas individually, the highest selling rate also observed in this zone, for selling of whole product in Puncher Market for three successive seasons i.e. 7.3 ± 0.48 (Pre Monsoon), 7.8 ± 0.87 (Monsoon) and 8.1 ± 0.23 (Post Monsoon). However, for selling of flesh product the rate was significantly highest in Lalpur Market i.e. 11.5 ± 0.68 (Pre Monsoon),

Puncher market indicated highest result for next successive seasons i.e. 11.8 ± 0.86 (Monsoon) and 12.1 ± 0.60 (Post Monsoon) (Table-5). According to the t-test : paired two sample for means the changes in rates (both whole and flesh product) were indicated significant difference (Table 8, Table 9, Table 10 and Table 11)

5.2 Livelihood Study

Among the selected families of this two villages named Pakui and Chowksahapur, there were on an average 5-10 people in each family. Among them 75-80 % people (aggregate of all selected families) engaged with snail marketing, rest of percentage was child, school goers and physically disable persons. Within this percentage of people (75-80 %), there were 70-75 % of male and 90- 95% of female (Fig.12) were traced who are actively involved with this profession. Rest of percentage (both for male & female) were engaged with the agriculture, pisciculture, 100 days of work etc. Among the family member of seller (age group 6-16), there were 73% of school goers, rest of them either did not continue their study (19%) and others were completely illiterate (8%). There were few percentages of school goers who frequently involved in this profession (selling of snail) with their parents. Both collector and seller were noticed between these two villages .The daily income of collector was noticed 250/- to 300/- (approx.), whereas wholesaler and retailer could earn 300/- to 350/- (approx.). But, as it was a availability dependent market, the fluctuating in daily income was observed. It was observed, in every year they can able to continue this profession up to October to November. Because after the November they could not able to collect *B. bengalensis* sufficiently, due to lack of availability of this snail. In this off season (December to February) they engaged with the agriculture, dam construction, making of basket (used in mainly dam constructional work),100 days of work, the project work under MGNREGA etc. Beside these, it was realised that road facilities (towards the rail station and bus stop) between these two

villages were not so strong enough. That is why, it generated problem mainly in rainy season. There were no problems in edible water sources (tube well etc) between these two villages. Most of the families were Devoid of electricity facilities. There an interesting profession was seen between those two villagers, some time they caught “Monitor Lizard, (*Varanus* sp)” and sale their flesh @ Rs 80-100/- per kg.

Table 4 : Zone wise Market name and their Collection centers

Name of Zone	Market Name	Collection place
Midnapore Town	Rail gate Market	East Midnapore, Howrah etc
	Miya Market	Railgate Market
	School Market	Railgate Market
	Kotwali Market	Railgate Market
	Raza Market	Railgate Market
Bankura	Bankura Sadar Market	Near by ponds, swamps, wet lands, lacks etc.
	Sonamukhi, Market	-do-
	Bishnupur Market	-do-
	Patrasayar Market	-do-
	Balsi Market	-do-
	Mosera Market	Collectors of Mukutmanipur dam area
	Khatra Market	-do-
Purulia	Purulia Town Market	Collectors of Ponds, Swamps, Wet lands, lacks, Mukutmanipur dam etc
	Punchar Market	-do-
	Lalpur Market	-do-
	Man Marker	Near by ponds, Swamps, Wet lands, lacks etc

Table 5 : Wholesale and retail market rate of *Bellamyia bengalensis* at the selected market zone of Midnapore Town, Bankura and Purulia district during Pre-monsoon , Monsoon and Post-monsoon seasons during the period of Feb.'10 to Jan.'13

Name of Zone	Market Name	Wholesale Rate (For WS/W) (Rs./Kg)			Retail Rate (For Consumers)					
		Pre Monsoon	Monsoon	Post Monsoon	Whole (Rs./Kg),			Flesh Rs./100 gm		
					Pre Monsoon	Monsoon	Post Monsoon	Pre Monsoon	Monsoon	Post Monsoon
Midnapore Town	Rail gate Market	3.0 ± 0.47	4.0 ± 0.42	4.6 ± 0.73	6.8 ± 0.81	7.2 ± 0.97	7.0 ± 0.92	9.0 ± 0.36	10.0 ± 0.30	11.2 ± 0.37
	Miya Market	5.0 ± 0.41	6.5 ± 0.79	7.3 ± 0.86	9.1 ± 0.78	9.6 ± 0.81	9.8 ± 0.78	10.3 ± 0.33	11.5 ± 0.37	12.0 ± 0.51
	School Market	5.0 ± 0.46	6.3 ± 0.83	6.9 ± 0.88	8.7 ± 0.53	9.0 ± 0.35	9.6 ± 0.55	10.7 ± 0.86	11.2 ± 0.61	11.3 ± 0.21
	Kotwali Market	5.2 ± 0.51	6.2 ± 0.62	7.0 ± 0.79	8.6 ± 0.59	9.0 ± 0.38	9.5 ± 0.51	10.5 ± 0.89	11.5 ± 0.76	11.2 ± 0.27
	Raza Market	5.0 ± 0.39	6.2 ± 0.73	7.0 ± 0.76	8.7 ± 0.57	9.0 ± 0.36	9.5 ± 0.51	11.2 ± 0.18	11.6 ± 0.35	11.8 ± 0.92
Bankura	Bankura Sadar Market	N.A.	N.A.	N.A.	7.2 ± 0.26	7.6 ± 0.30	8.0 ± 0.16	9.8 ± 0.82	10.2 ± 0.91	10.8 ± 0.89
	Sonamukhi, Market				6.3 ± 0.54	6.6 ± 0.52	7.0 ± 0.68	8.8 ± 0.76	9.0 ± 0.62	9.5 ± 0.91
	Bishnupur Market				6.9 ± 0.93	7.3 ± 0.31	7.6 ± 0.88	9.6 ± 0.81	10.2 ± 0.82	10.7 ± 0.93
	Patrasayar Market				6.1 ± 0.56	6.8 ± 0.78	7.3 ± 0.77	9.3 ± 0.78	9.8 ± 0.88	10.5 ± 0.77
	Balsi Market				6.2 ± 0.21	6.5 ± 0.33	6.8 ± 0.89	8.9 ± 0.39	9.5 ± 0.75	10.1 ± 0.84
	Mosera Market	6.8 ± 0.76	7.7 ± 0.88	8.0 ± 0.29	10.8 ± 0.44	11.7 ± 0.88	11.9 ± 0.91			
	Khatra Market	3.2 ± 0.45	3.8 ± 0.92	4.1 ± 0.51	6.5 ± 0.66	7.2 ± 0.78	7.8 ± 0.87	11.1 ± 0.25	11.8 ± 0.90	12.0 ± 0.55
Purulia	Purulia Town Market	3.6 ± 0.68	4.0 ± 0.26	4.5 ± 0.74	7.0 ± 0.15	7.6 ± 0.71	8.0 ± 0.89	11.0 ± 0.28	11.3 ± 0.47	11.8 ± 0.87
	Punchar Market	3.5 ± 0.61	3.9 ± 0.29	4.3 ± 0.58	7.3 ± 0.48	7.8 ± 0.87	8.1 ± 0.23	11.3 ± 0.46	11.8 ± 0.86	12.1 ± 0.60
	Lalpur Market	3.2 ± 0.30	4.1 ± 0.31	4.7 ± 0.77	7.1 ± 0.22	7.8 ± 0.89	8.2 ± 0.26	11.5 ± 0.68	11.7 ± 0.83	12.0 ± 0.12
	Man Marker	N.A.	N.A.	N.A.	6.8 ± 0.91	7.2 ± 0.41	7.8 ± 0.89	9.0 ± 0.11	9.8 ± 0.95	10.2 ± 0.88

** Abbreviations: WS-Whole seller, R- Retailer, N.A.-Not Applicable, W-Whole, F-Flesh (Values are mean ± SD, P< 0.05)

Table 6 : t-test : paired two sample for means representing significance of difference in seasonal “**Wholesale selling rate**” (Pre-Monsoon and Monsoon) among the three marketing zones (Midnapore Town, Bankura and Purulia) [P< 0.05]

Parameters	Pre-Monsoon	Monsoon
Mean	4.077777778	5
Variance	0.884444444	1.535
Observations	9	9
Pearson Correlation	0.436631389	
Hypothesized Mean Difference	0	
df	8	
t Stat	-2.336638003	
P(T<=t) one-tail	0.023832597	
t Critical one-tail	1.859548033	
P(T<=t) two-tail	0.047665194	
t Critical two-tail	2.306004133	

Table 7 : t-test : paired two sample for means representing significance of difference in seasonal “**Wholesale selling rate**” (Monsoon and Post-Monsoon) among the three marketing zones (Midnapore Town, Bankura and Purulia) [P< 0.05]

Parameters	Monsoon	Post-Monsoon
Mean	5	5.6
Variance	1.535	1.9325
Observations	9	9
Pearson Correlation	0.507309795	
Hypothesized Mean Difference	0	
df	8	
t Stat	-1.372487133	
P(T<=t) one-tail	0.103577965	
t Critical one-tail	1.859548033	
P(T<=t) two-tail	0.20715593	
t Critical two-tail	2.306004133	

Table 8 : t-test : paired two sample for means representing significance of difference in seasonal “Retail selling rate for Whole” (Pre-Monsoon and Monsoon) among the three marketing zones (Midnapore Town, Bankura and Purulia) [$P < 0.05$]

Parameters	Pre-Monsoon	Monsoon
Mean	7.25625	7.74375
Variance	0.943958333	0.870625
Observations	16	16
Pearson Correlation	0.982524834	
Hypothesized Mean Difference	0	
df	15	
t Stat	-10.7073919	
P(T<=t) one-tail	1.0092E-08	
t Critical one-tail	1.753050325	
P(T<=t) two-tail	2.0184E-08	
t Critical two-tail	2.131449536	

Table 9 : t-test : paired two sample for means representing significance of difference in seasonal “Retail selling rate for Whole” (Monsoon and Post-Monsoon) among the three marketing zones (Midnapore Town, Bankura and Purulia) [$P < 0.05$]

Parameters	Monsoon	Post-Monsoon
Mean	7.74375	8.125
Variance	0.870625	0.951333333
Observations	16	16
Pearson Correlation	0.979578904	
Hypothesized Mean Difference	0	
df	15	
t Stat	-7.726266056	
P(T<=t) one-tail	6.59287E-07	
t Critical one-tail	1.753050325	
P(T<=t) two-tail	1.31857E-06	
t Critical two-tail	2.131449536	

Table 10 : t-test : paired two sample for means representing significance of difference in seasonal “**Retail selling rate for Flesh**” (Pre-monsoon and Monsoon) among the three marketing zones (Midnapore Town, Bankura and Purulia) [P< 0.05]

Parameters	Pre-monsoon	Monsoon
Mean	10.175	10.7875
Variance	0.927333333	0.929166667
Observations	16	16
Pearson Correlation	0.951971018	
Hypothesized Mean Difference	0	
df	15	
t Stat	-8.204739911	
P(T<=t) one-tail	3.14963E-07	
t Critical one-tail	1.753050325	
P(T<=t) two-tail	6.29926E-07	
t Critical two-tail	2.131449536	

Table 11 : t-test : paired two sample for means representing significance of difference in seasonal “**Retail selling rate for Flesh**” (Monsoon and Post-monsoon) among the three marketing zones (Midnapore Town, Bankura and Purulia) [P< 0.05]

Parameters	Monsoon	Post-monsoon
Mean	10.7875	11.19375
Variance	0.929166667	0.663291667
Observations	16	16
Pearson Correlation	0.947600339	
Hypothesized Mean Difference	0	
df	15	
t Stat	-5.023838037	
P(T<=t) one-tail	7.56129E-05	
t Critical one-tail	1.753050325	
P(T<=t) two-tail	0.000151226	
t Critical two-tail	2.131449536	

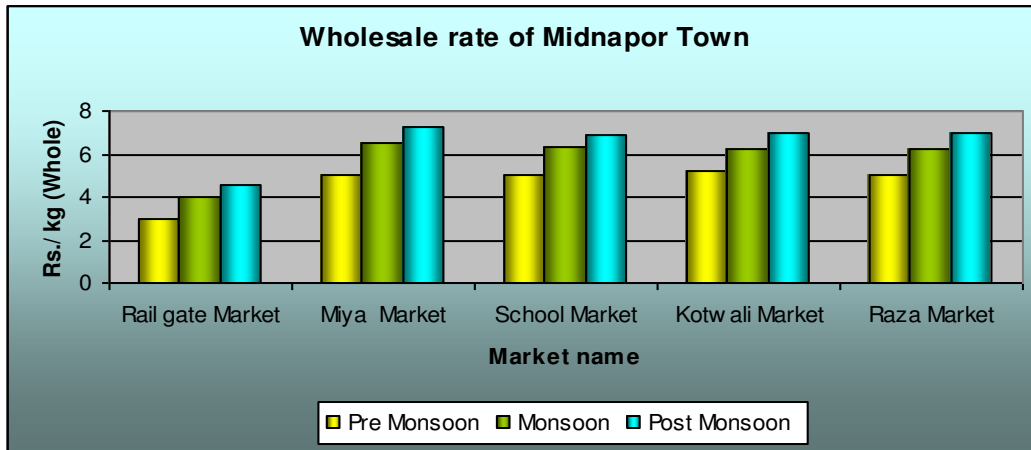


Fig. : 3

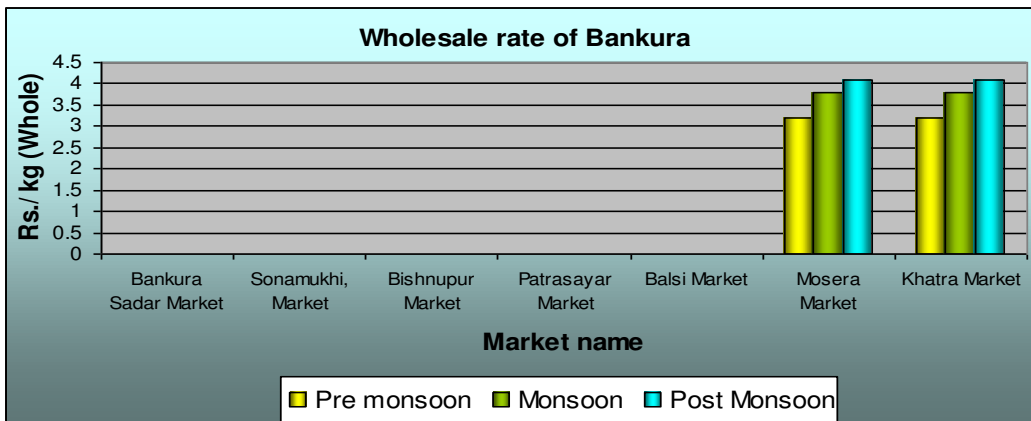


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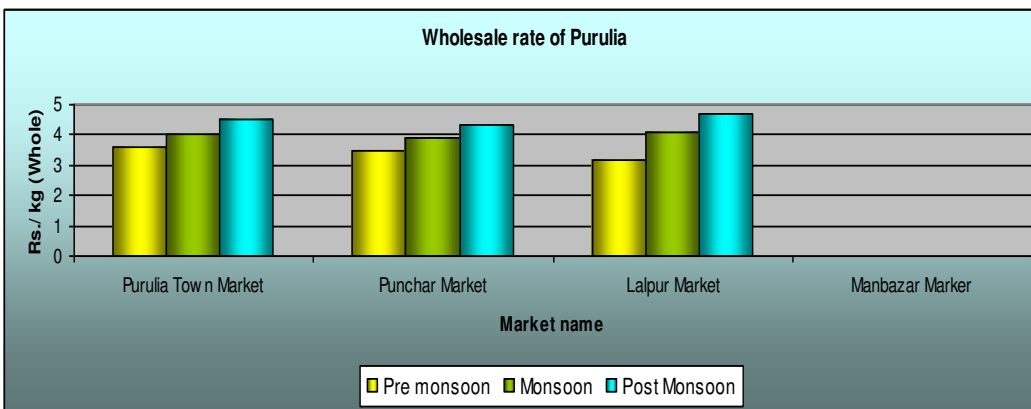


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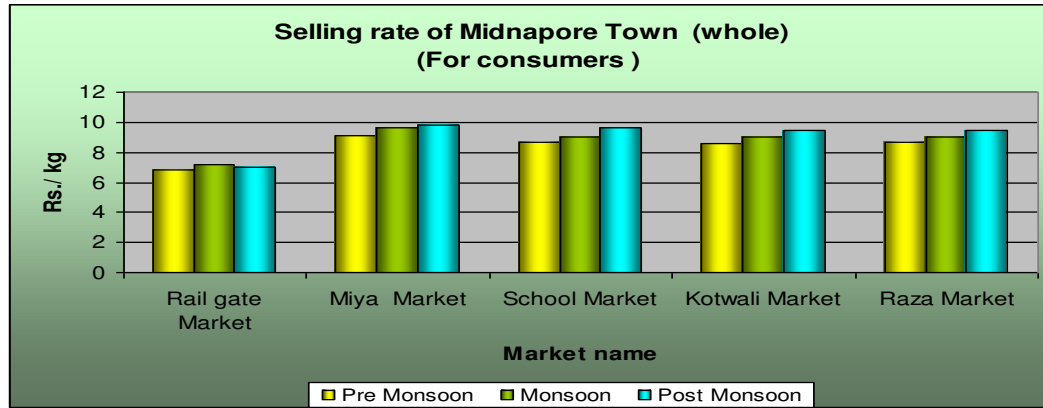


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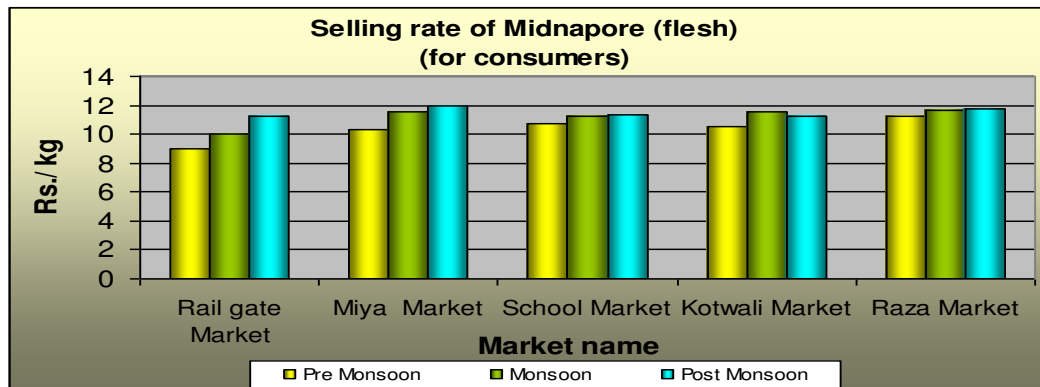


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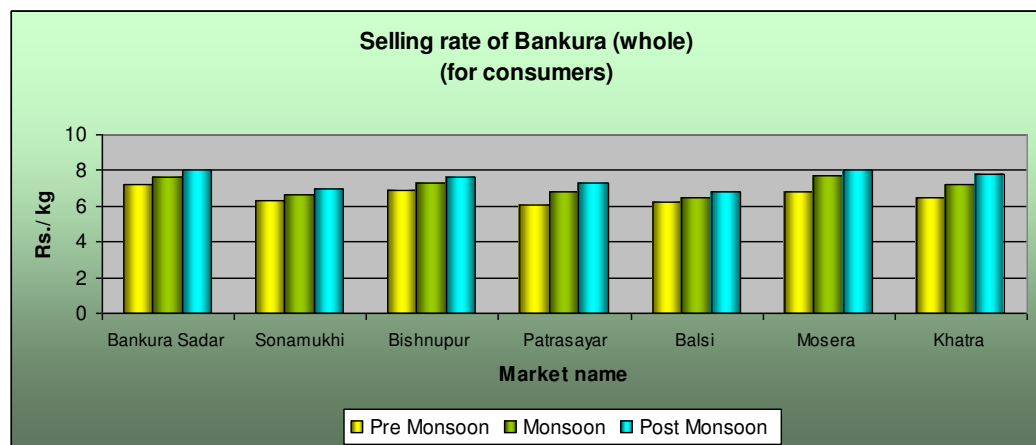


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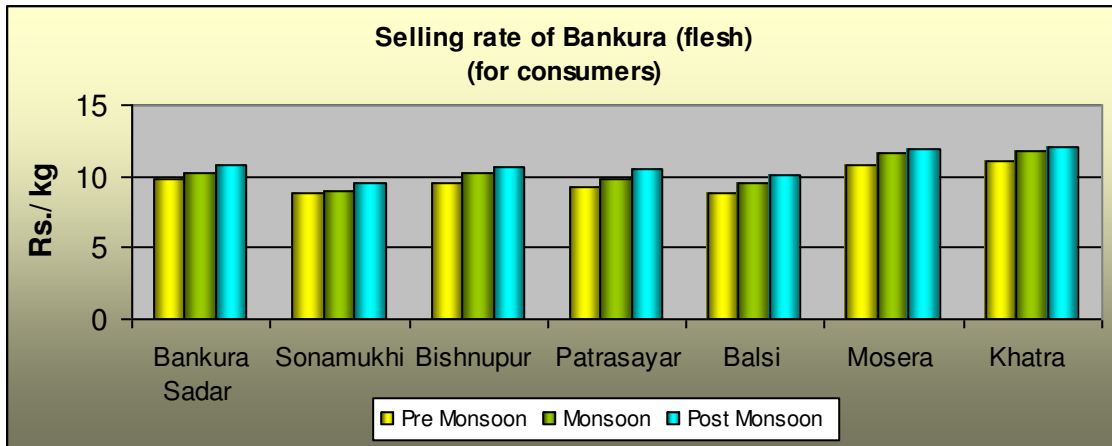


Fig. : 9

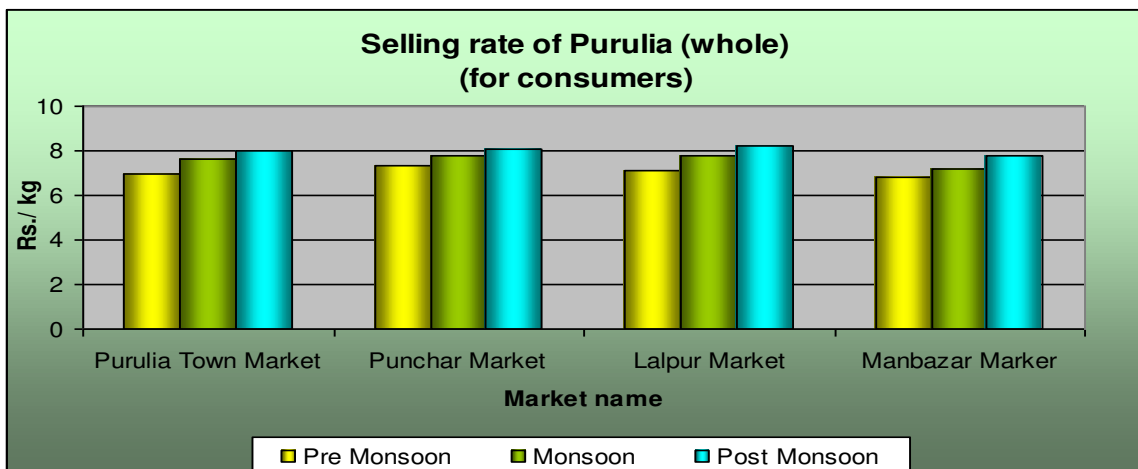


Fig. : 10

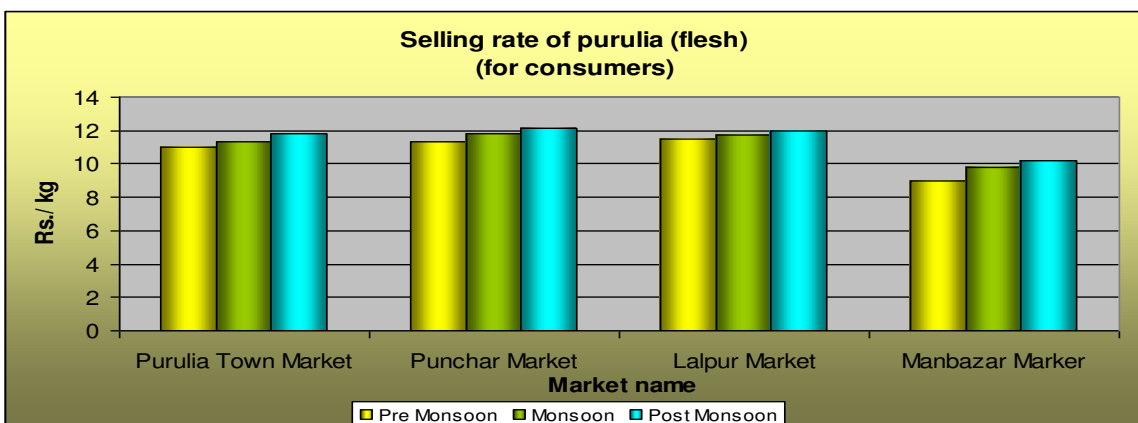


Fig. : 11

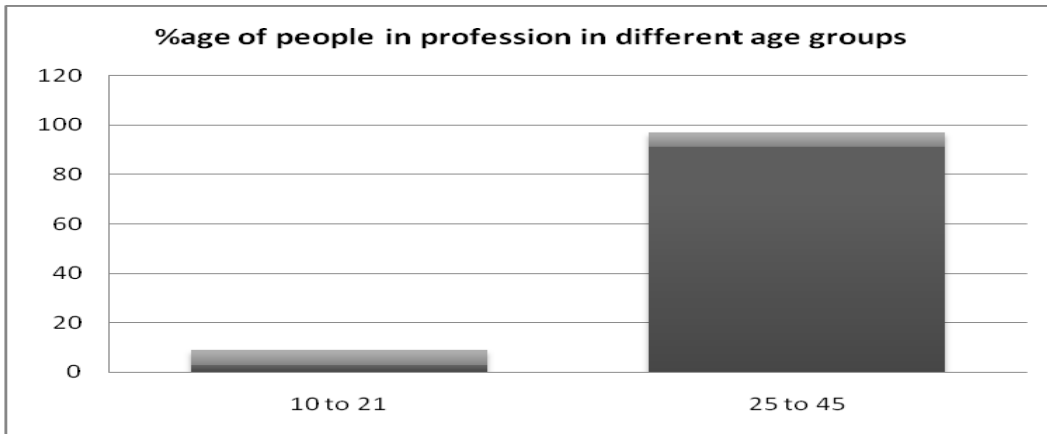


Fig. : 12

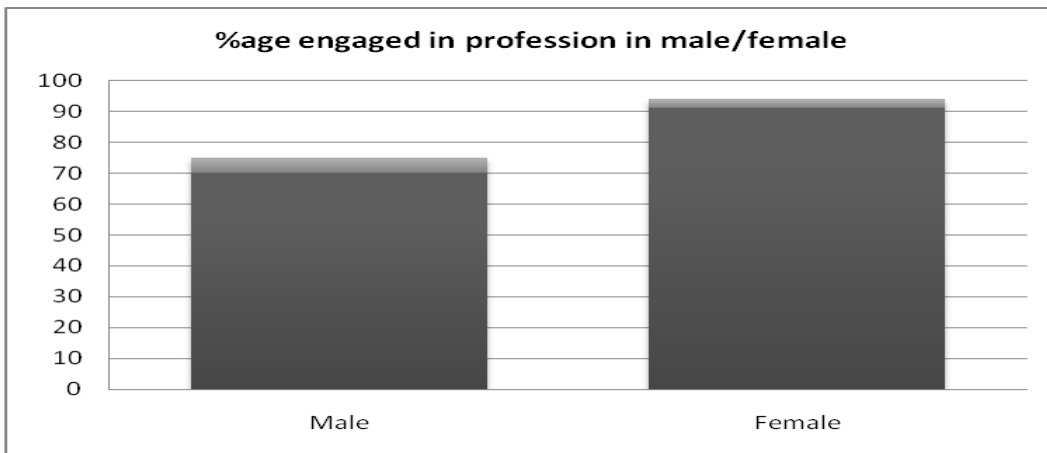


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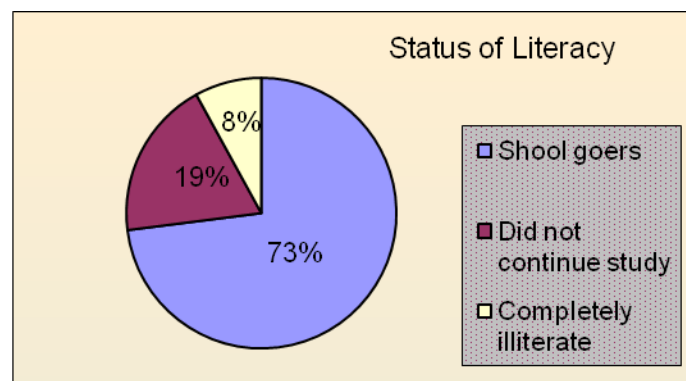


Fig. : 14



Plate No. 14



Plate No. 15



Plate No. 16



Plate No. 17



Plate No. 18



Plate No. 19



Plate No. 20



Plate No. 21



Plate No. 22



Plate No. 23



Plate No. 24



Plate No. 25



Plate No. 26



Plate No. 27



Plate No. 28



Plate No. 29



Plate No. 30



Plate No. 31