Graphically Observed Price Patterns in Phase-I Agricultural Marketing Data of District Sultanpur

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Abstract

The marketing data of Sultanpur of 51 commodities gathered during the period of October 1997 to August 2002 when they were transmitted to Lucknow by Senior Agricultural Marketing Inspector (SAMI) office through NICNET, have been consolidated in a suitable format showing them date as well as month wise. The monthly arrivals and retail prices of some sample products have also been depicted graphically to have a quick view of the pattern and tendency of price hike or decline at Sultanpur and Jafarganj markets. A brief observation of inflation rates for the months has been made too by plotting the values against time. In addition, the correlation coefficients (r), a measure of relationship between two sets of parameters are also calculated for improved numerical study of the market data. Results obtained show some important features such as missing of any strong relation between sales prices of agricultural commodities of daily needs and prevailing inflation. It is further observed that Sultanpur cereals' market is little bit costlier than the Jafarganj. The work is done to provide an instantaneous view of the markets of Sultanpur and Jafarganj to the persons involved in agricultural business to provide them quick accessibility to the past data for reference. This may also prove useful for local administration to make future planning to maintain the demand and supply of various commodities in balance.

1. Introduction:

Agriculture has played a great role in the development of great civilizations of the world. This is mainly due to fact that unless the nation produces more food than the required for fulfilling the needs of its members there would be no spare time for them to work in other non-agricultural scholastic areas like study of medicines, astronomy, science, art, philosophy, spiritualism etc. making it a great one.

India being one of the most advanced civilizations of its time has always been a country predominantly of agricultural farming and related activities. The scriptures inherited by us over the last thousands of years describe a system where oblations in the fire were offered with grains like *jav* mixed with milk products, specially purified butter, the *ghee*, to the gods for blessing the populace with sufficient rains resulting into plenty of farm produce and abundance of cattle, in addition to leading us towards higher spiritual realms. The other occupations for livelihood were also undertaken by people those days but these were assigned to some specialized artisans now categorized generally under *kutir uddyog*. The aforementioned prayer known as *yajna* for adequate rains also indicates that the agriculture was always an occupation full of uncertainty to the farmers due to occasional unfavorable weather phenomena of nature causing great hardships some times. This finally made them, in due course of time, tremendously hard working, highly resilient and astoundingly innovative [1]. Thus the agriculture in India was and still continues to be a crucial sector contributing to the overall development of the nation on the one

hand and for economic well being of its citizens on the other who are directly or indirectly dependent on this sector. Now the contribution of agriculture is around 27 percent in the Gross Domestic Product at current prices. The large industries like food processing, milk, textiles, jute, sugar etc. are by and large dependent on the raw material produced in this sector.

Keeping in view these facts, the Govt.of India in coordination with various state governments has come out with different innovative programmes for providing extensive financial and other support to the people working in this sector. The rural areas, which are to be brought at per with modern and advanced urban areas in terms of facilities and comfort, are being extended aids for their multi pronged development. In addition to emphasis on education and research, electrification, construction of canals, digging of bore wells etc. for irrigation, provisions for insecticides/pesticides, fertilizers supply and building of all weather transport-worthy roads for smooth movement of agricultural products are the key areas being given priorities. The stress on the later is needed most if the farmers are to get appropriate return for their investment and labor by selling the produced commodities in a suitable market of higher profit margin without involving local middlemen. Despite this, to maintain the market equilibrium the government also employs price controls policies such as price ceiling and floors so that the interests of farmers are not jeopardized and level of demand and supply is maintained effectively.

However, in the current era of liberalized market system where globalization is taking a new dimension, the main concern of people involved in agriculture is to improve the market competitiveness and retain it. To transport their products for sale to the market where they can avail maximum benefit would gradually become their lifestyle in coming times instead of need. This will further require rapid flow of information regarding the demand, supply, prevailing prices and other spatially and temporally varying information related to agricultural marketing. The government recognized this facet of Indian agricultural marketing way back and the National Informatics Centre (NIC) took a decision with concerned departments in 1996-97 to use information technology for prompt flow of marketing information from various *mandis* to their state head offices for its use by concerned interested people in general. This resulted into transmission of agricultural commodities marketing data from important marketing centers located at districts to state head office directly through NICNET, a nationwide computer communication network of NIC. This Phase-I continued till the third quarter of year 2002 when a new Internet based system was adopted countrywide for the same purpose using the latest technology. This new system known as AGMARKNET is described in short in the next section.

The present paper deals with the results obtained from the analysis of the Phase-I data (1997-2002) of some important agricultural commodities maintained in a database at NIC Sultanpur. The objective behind this work is to consolidate all these data in appropriate format and analyze the samples graphically to see their price patterns during different months of the year vis-à-vis their supply/arrival. We also wished to see the existing correlation among these parameters where it appeared meaningful. An attempt has also been made to trace the relation of local prices with monthly inflation rates, if exists.

1.1. The Agricultural Marketing Information Network (AGMARKNET):

As mentioned in previous section, the knowledge of the quantity of arrival of different commodities, their local consumption, prices quoted etc. at particular market helps significantly to a trader/farmer in deriving the profit from his produce and taking suitable decision for future planning. As the individual markets earlier did not have any organized system to disseminate such information publicly, the farmers always depended on their own knowledge and generally sold their commodities at the nearest local market at lower prices. Now, the same information are now being collected, collated and disseminated, employing advanced technology where all the important marketing centers of the country directly store the latest information of daily arrival, consumption, retail and wholesale prices etc. of agricultural commodities into a centralized computer/server connected to a wide area network of NIC through AGMARKNET project. Suitable required computer and communication infrastructures have been made available to the local marketing offices to carry out this task at their end. The data are accessible by any producer, trader or consumer from any place by linking his machine through Internet. This project also caters software related and other professional requirements of over 800 nodes at important Agricultural Produce Markets, State Agricultural Marketing Boards/Directorates [2]. The implementation of this programme has put to an end whatever bottlenecks were remaining regarding the flow of marketing information to the interested parties, specially farmers.

2. Data and Method of Analysis:

We have marketing data of the agricultural commodities comprising of their arrival and consumption quantities (primary and secondary) and wholesale and retail prices for the days of markets at Sultanpur and Jafarganj for the duration of Oct.1997 to Aug.2002. Sultanpur being the main market in the district has the transaction of larger number of commodities (51 in number) in comparison to the Jafarganj market (with 10 commodities listed) where the fruits and vegetables arrival is rare. Date and item wise lists of the available data are provided separately in Appendix-A*. However, for the purpose of the analysis only some important commodities are chosen with criteria of their belonging to different groups representing cereals, pulses, fruits and vegetables and their significance for the mass population (Table-1).

*Kindly note that the units mentioned in Appendix-A & B are different for few items like banana, eggs etc. .

Table-1

The sample commodities selected for the analysis	
1.Cereals	(i) Wheat-Improved (ii) Rice-III/Other
2.Pulses	(i)Arhar (iii)Gram-Small
3.Fruits	(i)Apple (ii)Mosambi
4.Vegetables	(i) Potato-White (ii)Onion-Red

It is to be noted that the transactions at Sultanpur market take place

twice a week and Jafarganj once a week. The data for individual dates of the months are used to calculate monthly average of wholesale and retail prices for the commodities under consideration. Similarly total monthly arrivals and consumptions are also obtained by summing the corresponding values for the month. Simple computer programs are developed to get the values listed in Appendix-B. The correlation coefficient (r), which is a measure of actual linearity of the two sets of data and their interdependence, is also calculated. This is statistically expressed as:

$$r = \Sigma xy / (\Sigma x^2 \Sigma y^2)^{1/2}$$

It has maximum value of +1 for perfect positive relationship, 0 for no relationship and -1 for perfect negative relationship. So, closer the correlation coefficient to value 1 (either positive or negative), stronger the relationship between parameters x and y is [3, 4].

In addition, we have also used monthly inflation rates (based on wholesale and consumer price indexes) for the duration Apr.1999 to Aug.2002 (given in Table-2) for the comparison purpose and other analysis wherever appeared suitable [5, 6].

Table-2

Monthly Average Rate of Inflation

Month	WPI based (1993-94)	CPI (IW) based 1982
Apr-1999	4.3	8.4
May-1999	3.8	7.7
Jun-1999	3.1	5.3
Jul-1999	2.3	3.2
Aug-1999	2.2	3.1
Sep-1999	2.7	2.1
Oct-1999	2.9	0.9
Nov-1999	3.1	0
Dec-1999	2.8	0.5
Jan-2000	3.5	2.6
Feb-2000	3.5	3.6
Mar-2000	5.5	4.8
Apr-2000	6.5	5.5
May-2000	6.4	5
June-2000	6.5	5.2
Jul-2000	6.5	5
Aug-2000	6.1	4
Sep-2000	6.5	3.5
Oct-2000	7.3	2.8
Nov-2000	7.6	2.7
Dec-2000	7.9	3.5
Jan-2001	8.2*	3§
Feb-2001	8*	4§
Mar-2001	6.5*	5§
Apr-2001	6.5	5.5
May-2001	6.3	5
Jun-2001	6.6	5.2
Jul-2001	6.5	5
Aug-2001	6.1	4
Sept-2001	6.5	3.5

Oct-2001	7.3	2.8
Nov-2001	7.6	2.7
Dec-2001	8.5	3.5
Jan-2002	8.7	3.2
Feb-2002	8.3	3
Mar-2002	6.4	2.5
Apr-2002	5.4	2.3
May-2002	5.6	2.5
Jun-2002	5.3	3.4
Jul-2002	5.2	4
Aug-2002	5.4	5.2

* These are approximate values taken from Monthly Economic Digest, April 2001, ADB India, www.adb.org site).
§ Interpolated values.

3. Results Obtained:

The inflation rates, specially calculated on the basis of prevailing Consumer Price Index (Industrial Workers) are the most useful parameters, which actually determine the Dearness Allowances, provided to the Central government staff. In Figure-1 the WPI (Wholesale Price Index, base year 1993-94) as well as CPI (IW, base year 1982) based inflation values have been plotted. Here we observe that the CPI (IW) based inflation is generally independent of the WPI based with a correlation coefficient (r) being 0.134 for the set of data mentioned in Table-2. This is also in conformity with the fact that wholesale price index do not reflect the increase in retail prices of basic consumer goods. The basket for calculating WPI based inflation contains nearly double items than the number of items used for calculating CPI (IW) based inflation rates.

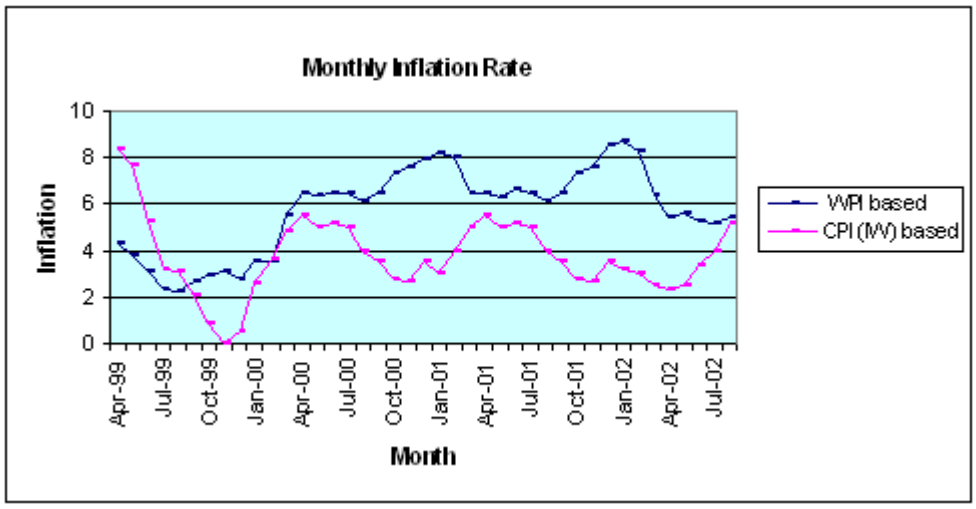

Figure - 1

3.1. Cereals:

Wheat (Improved): This variety of the wheat is the only variety arriving regularly at both the mandis namely Sultanpur and Jafarganj. As

mentioned in previous section, the wholesale prices as well as retail price of cereals are slightly less at Jafarganj than the prices of same commodities at Sultanpur. It is also observed that the price of wheat is generally higher around October and decreases after the harvest season i.e. May-June (interestingly when CPI based inflation increased, Figure-1).

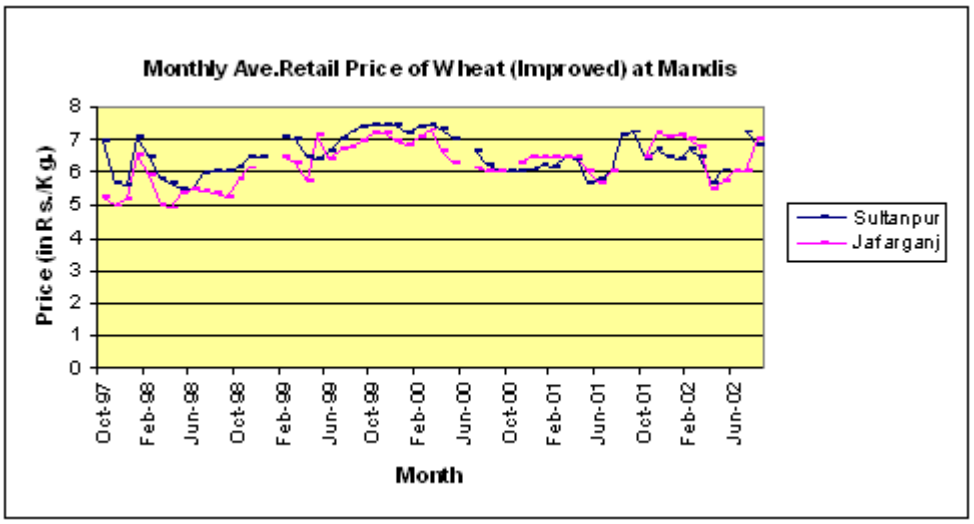

Figure-2

The next illustration (Figure-3) shows the month wise total arrival of this commodity in Sultanpur and Jafarganj mandis. An oscillating pattern in the arrival of wheat is clearly visible here with added fact that arrival in Jafarganj (once a week mandi) is far less than in Sultanpur (twice a week). However, this arrival is not sold all in local market but is transported more to the distant mandis/areas. The value of r being 0.846 for local and 0.910 for outside consumption also indicates same fact.

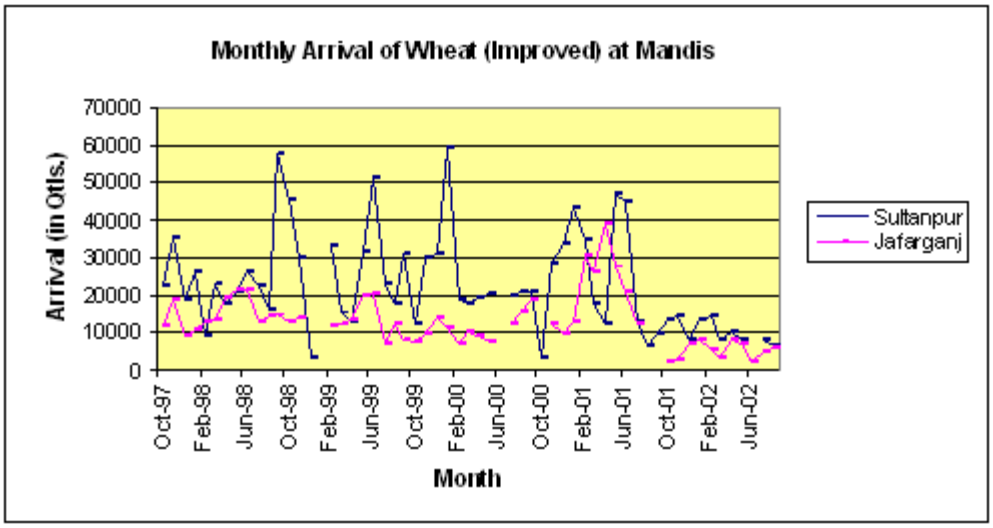

Figure-3

Rice-III (Other): This is one of the other cereals of great significance to the large section of the Indian population. It deserves mentioning

here that rice is a commodity being used since time immemorial as its description has been found in oldest ancient literatures of India. There are different varieties of rice prevailing in the country but the *baansmati* rice is the most illustrious internationally. The variety undertaken here is the common one arriving regularly to both the markets..

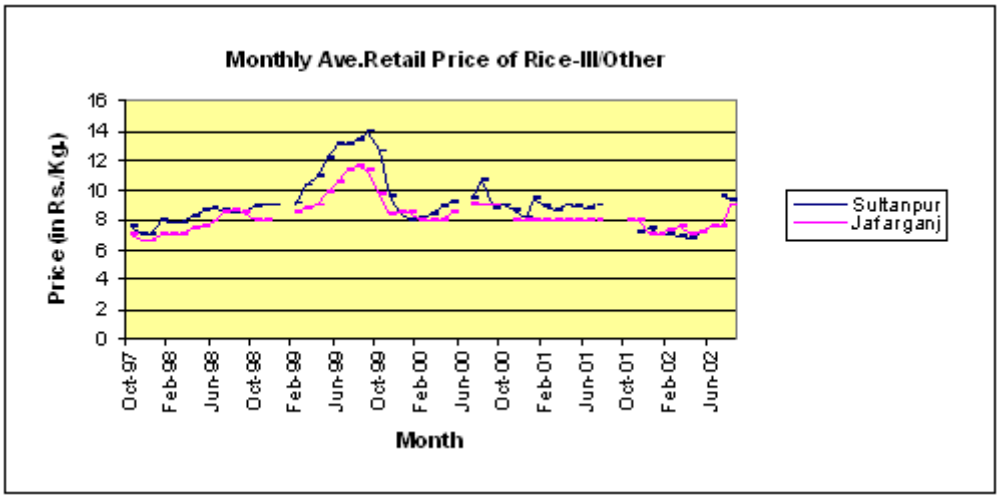

Figure-4

The above illustration (Figure-4) shows the monthly average retail price of rice for these markets. The price at Sultanpur mandi is clearly evident substantially higher than at Jafarganj mandi. The price trend against the phases of the year is not very distinctive in this case but there is an indication of prices rising during the monsoon months of June-September. Figure-5 below depicts monthly arrival to the both mandis. It is further observed that like wheat the arrival in Sultanpur market is much more.

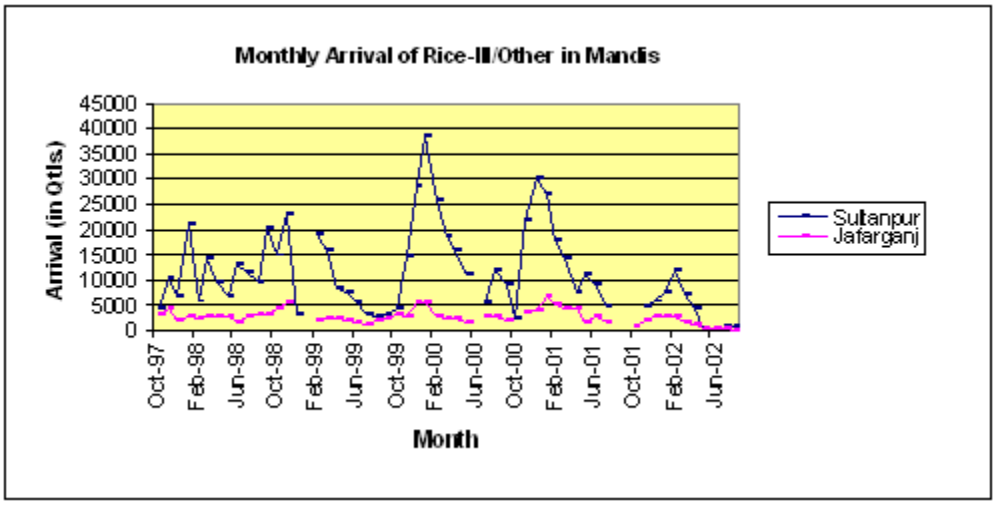

Figure-5

3.2. Pulses:

Arhar pulse: The use of arhar pulse is very common in northern part of India and one of the main ingredients of daily diet. However, the growth in production of pulses has not been to the same proportion as it has been in case of rice and wheat. The figure below (Figure-6) shows the pattern of average monthly retail price at Sultanpur mandi as there is no significant trade of arhar at Jafarganj market. The gradual price increase from Oct 1997 to the end of 1998 is prominently observed in the diagram.

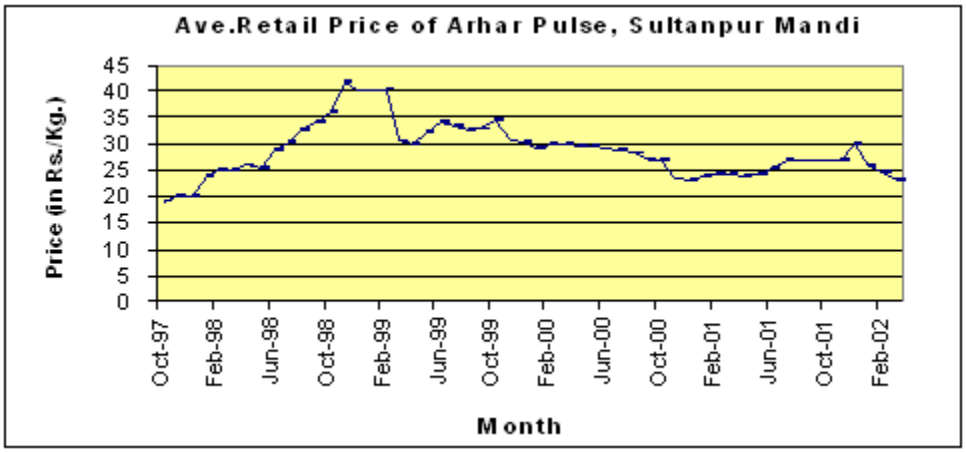

Figure-6

The value of correlation coefficient r between wholesale prices and retail prices of arhar pulse is as expected equal to 0.967.

Gram-Small: We see that the prices of this commodity at Jafarganj mandi are not always less than at Sultanpur (figure-7) as in case of other cereals described above. In fact, gram was always costlier here during Feb.2000 to the end of year 2001. This is despite the fact that the arrival of this variety of gram to this market is far more in comparison to Sultanpur (Figure-8) and consumption is almost local at both the places.

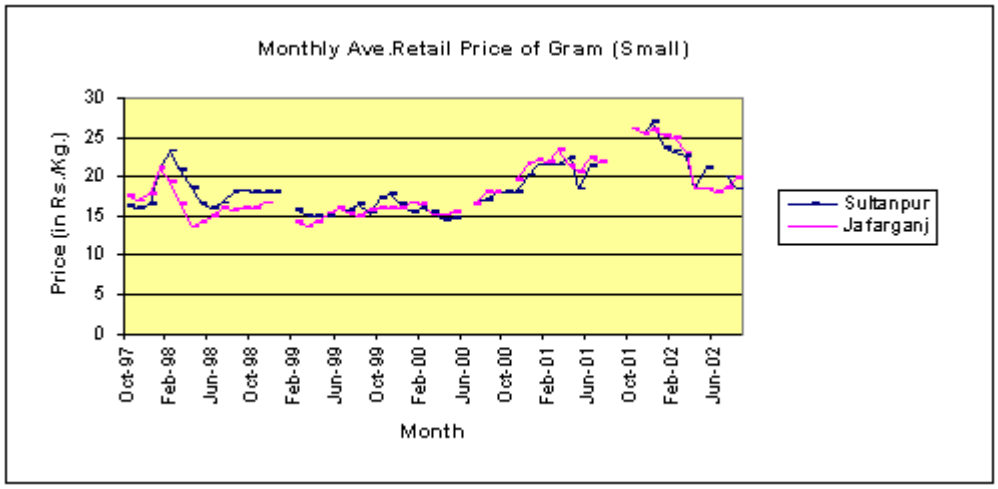

Figure-7

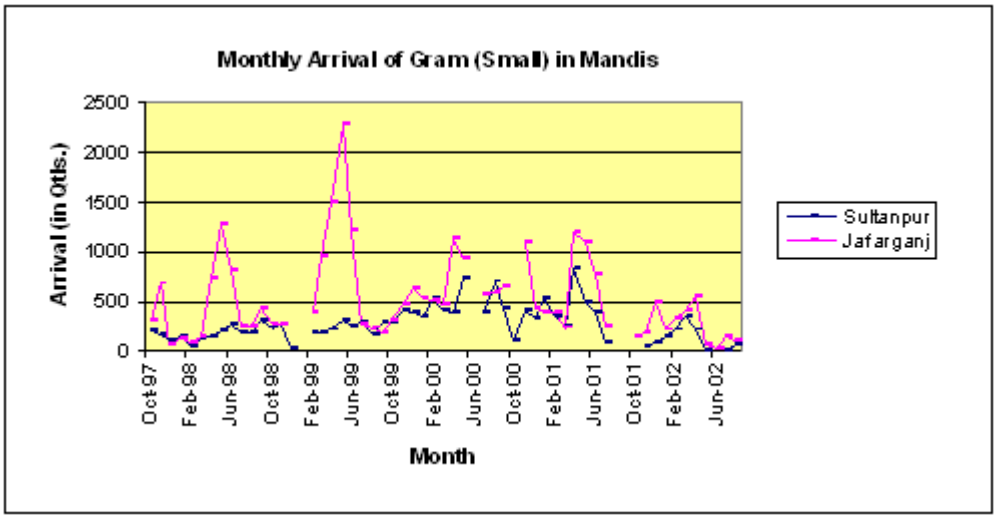

Figure-8

3.3. Fruits:

As mentioned earlier, fruits are not common items of Jafarganj market. However, perennially available (apple, *mosambi*, banana etc.) as well as seasonal fruits (guava, mango, *mahua* etc.) are transacted in Sultanpur mandi round the year. We have shown (Figures-9 & 10) the trends of prices of apple and *mosambi* as people, mainly for health reasons, usually need these. The apple is obviously costlier in July and cheap in winter season and the price has clear pattern of systematic variation in this way. However, the *mosambi* price is generally stable round the year with some rise in summer months largely due to demand.

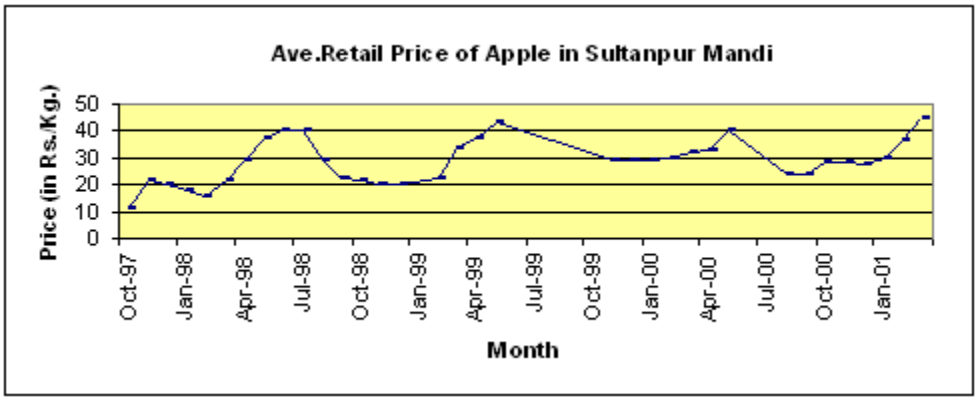

Figure-9

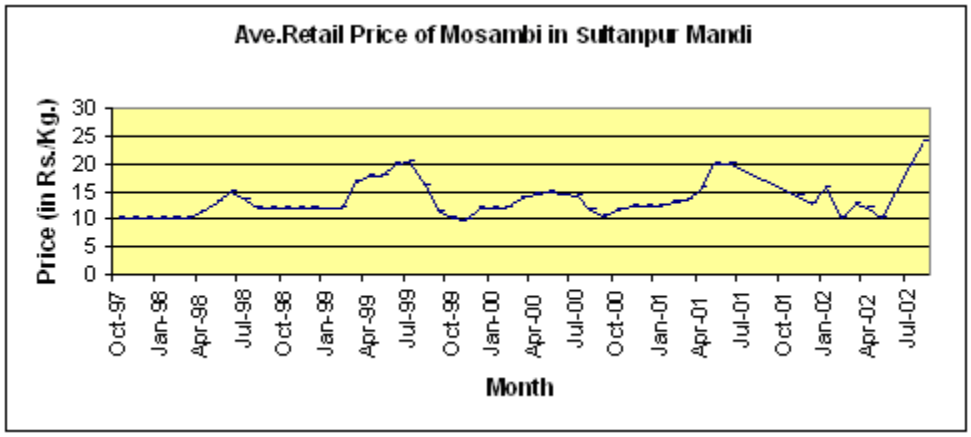

Figure-10

3.4. Vegetables:

Potato (white): We have included white potato and onion (red) in the present study as these varieties are quoted at both mandis. Sultanpur market, however, has business in red potato also. These vegetables being the need of common man are always in demand and their price hike directly affects the mass. The trends are shown graphically in Figures-11 & 12.

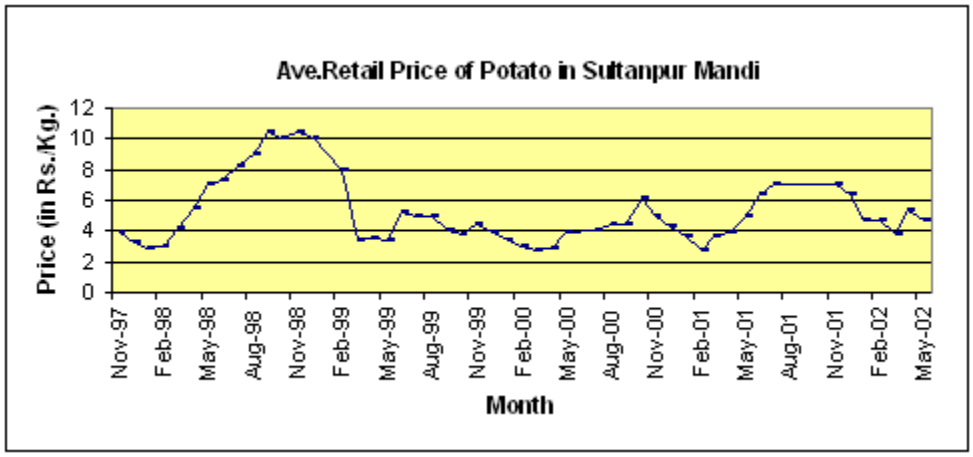

Figure-11

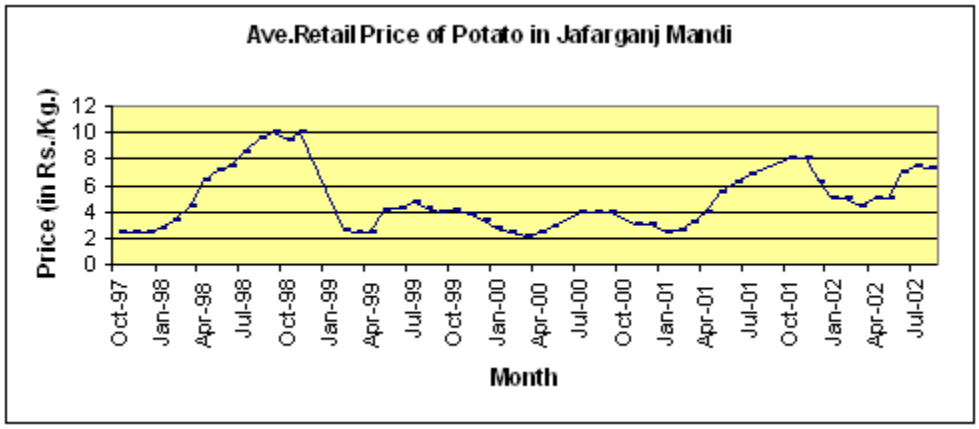

Figure-12

The potatoes are costlier around October-November and there is not any significant price difference at both the mandis, Jafarganj being slightly cheaper. A clear trend, however, in price hike and drop is visible in case of Jafarganj which is not very significant in case of Sultanpur. The price of this item was maximum in the end of year 1998 and never touched that level again.

Onion (red): The Figures-13 & 14 below show the tendency that the price of the onion is more stable at Sultanpur market than at Jafarganj where its variation is more frequent. The sharp increase in price around October 1998 is visible in both the mandis reaching Rs.39.38 per Kg. at Sultanpur and Rs.35.38 at Jafarganj.

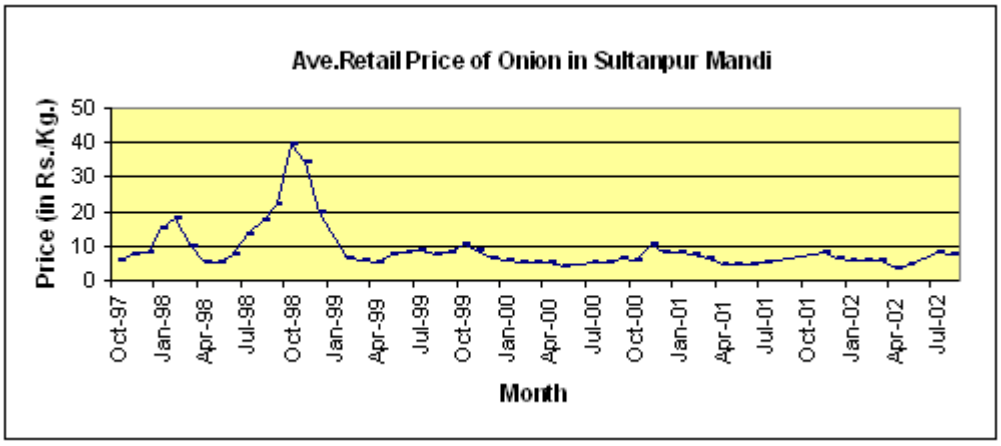

Figure-13

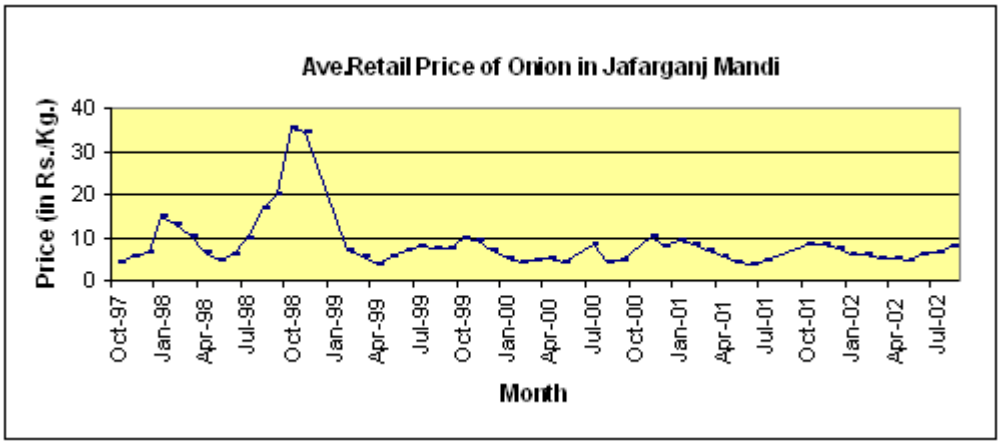

Figure-14

4. Discussion and Conclusion:

The continuous widening of gap between per capita income of farmers and other professionals to around 1:6 [7] is a worrying situation. However, this may be reduced by adopting the policies more favorable and constructive to the farmers. This large income gap is a pathetic situation for a country where not only the whole economy is dependent on agriculture but financial condition of over two third of inhabitants rests on it. In addition to large number of unmanageable poverty alleviation and developmental programmes, emphasis deserves to be given in reforming the policies which concern specially to the agricultural marketing. Few innovative schemes of Andhra Pradesh and Tamil Nadu where farmers directly sell their produce to consumers have proved this fact and they need to be applied elsewhere also. It would be certainly beneficial to the farmers if the markets are on the periphery of cities at the main connecting routes. Moreover the mandies should also facilitate the interests of farm growers instead of becoming taxing mechanism [8].

No doubt that the overall performance of the agriculture sector depends upon various factors but efficient marketing strategy is one of these which again depend upon speedy flow of information for appropriate and effective planning by agricultural traders and farmers and even consumers to enhance their profit. However, it is also noteworthy that the arrival of some of the agricultural products freely to the mandis is restricted by central and state regulations as their movement is not allowed without express permission of administration and the intra-state trade, export, public procurement etc. are limited. This naturally puts a constraint on reducing the price fluctuations and improving the multi faceted productivity of the sector. So, unless these restrictions on trade of such products are reduced or liberalized, as suggested in the approach paper to the tenth five year plan, the flow of market information would not be fully rewarding to the agricultural producers or farmers. The development of degraded land and rainfed areas by implementing schemes like National Watershed Development Program

for Rainfed Areas (NWDPRA), providing better agricultural inputs like high yield variety seeds, fertilizers, plant protection to minimize the losses due to pests and diseases, effective irrigation facilities, rural electrification etc. would definitely help the agriculture to grow faster and ease the prices or lessen the income gap between farming and other occupations. However, the effective marketing still requires more positive steps. The AGMARKNET project would in this direction give a thrust to its qualitative improvement but at the same time it also presupposes the presence of information kiosks or Internet cafes in the rural areas within the painless reach of people. The authorities have to work simultaneously for growth of Internet in required areas apart from looking into other factors.

The consolidation and analysis of the marketing data in this paper covers an era when IT was used in Uttar Pradesh for information flow from marketing center at district to Lucknow for administrative as well for public use, though to a limited extent. The AGMARKNET project is a great step towards globalization of agricultural marketing and needs to be strengthened relentlessly in future.

5. Acknowledgements:

I express my gratitude to Sh.S.B.Singh, Sr.Technical Director and State Informatics Officer, NIC Uttar Pradesh State Unit, Lucknow for his ideas which encouraged me to carry out this type of analytical work. I would also like to thank the marketing officials who were very sincere in doing the data entry despite their office being at a distant place from NIC.

6. References:

[1] J. Carlton Courter, III, Commissioner, 2002, Dept. of Agriculture and Consumer Services, Commonwealth of Virginia, Virginia.
[2] AGMARKNET Project, Agricultural Marketing Division, NIC, New Delhi.
[3] The Mc-Graw Hill Companies, 2003.
[4] Hach Company, 1994 News & Notes, Loveland, Colorado.
[5] Indian Economic Survey, 2000-01, Price Situation during 2000-01.
[6] Indian Economic Survey, 2001-02, Annual Inflation during 2001-02.
[7] Planning Commission, GOI, Mid Term Appraisal-High Lights (1997-2002).
[8] Sectoral Policy Issue, Approach Paper to the Tenth Five Year Plan- 2002-07, Planning Commission, GOI.

Note: The views expressed in the paper are author's and should not be taken as of NIC.