

Disposal And Price Behaviour Of Paddy In Chitwan Valley, Nepal.

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INTRODUCTION

Nepal, a developing country, has mountainous topography with a fragile environment. Nepal's plain areas, which account for 13 percent of the Nepal's total land area, contain over 55 percent of the arable land found in Nepal. The agriculture sector dominates the over all economy of the country which provided about 45 percent of GDP in 1991/92. In addition, this sector provided employment to about 81 percent of the people in 1991. The agricultural holdings are very small. In 1991/92, about 70 percent of the holdings were having less than one hectare of land. The population growth is high, which in 1981-91 period was recorded to be 2.5 percent per annum. Because the economy is driven by the agriculture sector, which is dominated by crops and livestock mixed farming systems, this setor has been recognised as the prime driving force for economic development and therefore, received important priority in every past development plan. Despite all efforts, the increase in food grain production has been feasible only because of the increase in cropped area rather than productivity (Chitrakar 1990). Thus a paradox has existed in the agriculture sector and past efforts towards agriculture development have not created enough of a multiplier effect for the economic development of the country. This is well documented by the Nepal Agriculture Perspective Plan (NPC 1995).

The volume of marketable surplus produced is repted to be decreasing with respect to growth of population. This is evidenced by the decrease in rice export to zero since 1987/88 (Thapa and Rosegrant 1995). Also, the trend of food grain import is increasing as compared with the volume of export (Koirala and Thapa 1997). Koirala and Thapa (1997) also report a widening gap between food grain production and its requirement in the country. Thapa and Rosegrant (1995) report that one of-

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the many problems responsible for the poor performance of the agriculture sector is the neglect of marketing in governmental agricultural programmes.

In addition, fluctuations in price and production pattern are more severe in developing countries (Mellor 1966). Nepal is no exception to this. At the macro level, Wallace (1987) reports a very high seasonal variation in prices with annual high points proceeding and low points following harvests. These seasonal fluctuations affect farmers who are forced to sell their produce immediately after harvest. Quasem (1987) reports that small farm owners and medium farm owners are the ones most affected by such price fluctuations in Bangladesh. A similar situation is reported by Bhuyan et al. (1990) and Rao and Subbarao (1979) in India. Moreover, these farmers are also affected by higher prices during the scarce seasons when they buy back food grain for consumption as well as for seed.

Researchers have reported that farmers are bound to sell their produce immediately after harvest. A similar situation has been reported by Shivakoti and Pokharel (1989) in Chitwan, Nepal. They dispose during this time to repay loans, to invest for the next crop, to purchase daily necessities, to purchase clothes, and because of the lack of storage (Bhuyan et al. 1990; Quasem 1987; Mellor 1966). However, such information is scant in Nepal at the micro level. This could be because of paucity in agricultural marketing studies, which according to Shivakoti and Pokharel (1989) started only recently.

Considering the facts, we aim to empirically examine the disposal and price behaviour of agriculture produce with reference to paddy crop at the micro level. In addition, to strengthen the findings, we aim to assess (a) the level of production, consumption and marketable surplus, (b) the quarterly disposal of produce, (c) the reasons behind disposing paddy during different quarters, and (d) seasonal price behaviour.

THE SETTING

For this study, we provide evidence from Western Chitwan, an inner-terai region of mid-western Nepal. The population is fast growing in the valley and is inhabited by varied ethno-cultural groups or communities. Once inhabited only by aboriginal communities such as the *Tharu*, *Darai*, *Kumal*, and *Majhi*, at present, the valley is dominated by other ethnic groups such as *Brahmin*, *Chhetriya*, *Newar*, *Gurung*, *Magar* and others. Most

of these dominating ethnic communities are in-migrants of the mid hill and high hill districts of Nepal.

The total land area in the district is 219 thousand hectares. Of the total, 64.9 percent has been estimated to be covered by forest, which was about 86 percent in 1927 (Pradhan 1992). About 21.3 percent of the land is under agriculture and the rest is covered by water bodies, roads, settlements, and two airports. The valley is characterised by and renowned for its fertile soil, its agricultural productivity, and its central location in the country. The alluvial plain deposited by the river with a combination of sand, silt and clay makes a good soil texture which is suitable for agricultural purposes. The drainage capacity is very good except in the *ghol* (lowland) area where the water level is very high, in most cases at the surface, and therefore, not suitable for any crop except paddy. The *ghol* areas of Gitanagar and Patihani are renowned for their best quality paddy production.

Paddy, maize, and wheat among the cereals and mustard, potato, and sesame among the non-cereal cash crops, are the major crops grown in the valley. In the *kharif* season, paddy and maize dominate the overall cropping pattern. In the *rabi* season mustard and wheat dominate the overall cropping pattern. The District Agriculture Development Section (DADS) reported paddy as one of the most important and dominant cereal crops in terms of both area and production (DADS 1991).

Narayagarh, Parsa and Tandi are the main market centers in the district which act as large assembly markets. Besides these, there are many small rural markets scattered throughout the district. The commodities are either collected at these centres or parcelled directly, to Kathmandu, Pokhara, Birganj. Private traders mainly operate markets, however, the agricultural cooperatives and Nepal Food Corporation provide alternative marketing channels (Bhandari 1993; Bhandari et al. 1997). Millers and processors are also scattered across the valley. Transportation and communication networks are also available to a certain extent.

METHODOLOGY

The study area includes the paddy growing areas near the vicinity of Narayagarh Bazar, Gitanagar and Patihani. Farming households were the major sources of primary information such as level of production, consumption, marketable surplus and the quarterly disposal of the main

season medium quality *mansuli* paddy that is cultivated in the *kharif* season. Information was collected from a total of 172 sample households that were identified by using Simple Random Sampling. Structured questionnaire was used to collect the information. Similarly, information on fortnightly wholesale prices for ten years beginning 2040/41 BS (1983/84) were collected from the Agricultural Statistics Sub-section established at Bharatpur which were then averaged monthly during analysis.

During analysis, the farming households were categorised into three different groups by farm size. The groups are (a) small farmers having less than 1.5 *bigha* (1 hectare), (b) medium farmers having between 1.5 *bigha* and 3.75 *bigha* (1-2.5 hectares), and (c) large farmers having more than 3.75 *bigha* of land. Dividing a year into four different quarters assessed the quarterly disposal of paddy by the farmers. The first quarter was considered the first three months after harvesting, the second quarter was the fourth, fifth and sixth months after the harvest, the third was the seventh, eighth and ninth months after the harvest and the fourth or last quarter was considered the tenth, eleventh and twelfth month after harvesting. Since the peak month of paddy harvesting is *Mangsir* (November), it has been considered as the beginning month of the first quarter. Thus by month, the quarters are (a) Quarter I: *Mangsir* to *Magh* (November-January), (b) Quarter II: *Falgun* to *Baisakh* (February - April), (c) Quarter III: *Jestha* to *Shrawan* (May - July), and (d) Quarter IV: *Bhadra* to *Kartik* (August - October).

Since the study period was 2048/49 B.S. (1991/92), the wholesale price of paddy of this year was used to assess the relationship between the average quarterly price and the disposal behaviour of the farmers. The average prices by quarters were calculated as the averages of the monthly prices included within the specified quarter.

$$\text{Quarterly Average Price} = \frac{\text{Sum of monthly prices}}{\text{Number of months included in quarter}} \times 100$$

To assess the seasonal price index (SI), the prices of ten years beginning in 2040/41 B.S. (1983/84) were used. The seasonal price index was calculated as follows:

$$\text{Seasonal Index (SI)} = \frac{\text{Monthly average price}}{\text{Average of monthly averages}} \times 100$$

Similarly, to assess the trend and the seasonal effect on price, multiple regression analysis was used. Because the price of *Mangsir* month

is lowest during a year it was taken as the base or intercept for the purpose of analysis. Dummy variables "1" for the "yes" effect and "0" for the "no" effect were used. While assessing the price trend for ten years, the starting month *Shrawan* 2040 B.S. has been denoted by serial number 1 and the last month *Asar* 2050 B.S. has been denoted by the serial number 120.

FINDINGS

Production, Consumption and Marketable Surplus of Paddy

Table 1 depicts the level of production, consumption and volume of marketable surplus available in the study area. The share of total production increases with the size of land holding. The share of total production that large farmers hold is over 42 percent followed by medium, 33 percent, and small farmers, 25 percent. As far as the level of consumption is concerned, in total 57 percent of all farmers' total produce was consumed in the household. If the total quantity bought back is accounted for consumption increases to 68.5 percent of the total production. This consumption requirement is less than that of the national level requirement that was over 96 percent in 1990/91 (Koirala and Thapa 1997). This provides evidence that there is a higher marketable surplus in the study area than in the country in general. The proportion of consumption decreases as the size of holding increases. By farm size categories, small farmers consume almost 80 percent of the produce followed by medium farmers with 61 percent and large farmers with only 42 percent.

Table 1
Production, Consumption And Marketable Surplus Of Paddy By Farm Size Categories In Chitwan

Production, Consumption and Surplus	Farm Size Categories			
	Small	Medium	Large	Total
Total Production (Qt.) (n=155)	1065 (100)	1417 (100)	1818(100)	4300(100)
Total Consumption (Qt.)(n=155)	847 (80)	862 (61)	763 (42)	2472 (57)
Marketable Surplus	218 (20)	555 (39)	1065 (58)	1828 (43)
Total Marketed Volume (Qt.) (n=89)	209 (20)	557 (39)	1020 (56)	1786 (43)
Total Quantity Bought Back (Qt.) (n=172)	373 (35)	77 (05)	27 (02)	476 (11)
Net Marketed Surplus	-164(-15)	480 (34)	993 (55)	1309 (30)

Source: Computed by the Authors based on the data collected by them during their study period.

Note: Figures in parentheses indicate percentages of the total production.

In Table 1, the marketed volume is 42 percent of the total output. Because quantity bought back is 11 percent of the total produce, the net marketed surplus is only 30 percent. This suggests only 30 percent of total production available to the non-producers. Both marketable as well as marketed surplus increases with the increase in farm size. The volume of net marketed surplus for small farmers was negative i.e. -15 percent of the total production. However, the net marketed surplus for medium farmers, 34 percent and large farmers, 55 percent, it was a positive.

Disposal of Paddy

Table 2 presents the disposal of paddy in different quarters by farm size categories. The table clearly depicts the assumption that post harvest sales would be higher. Overall, 64 percent of the paddy was disposed within three months after harvest, whereas about 18 percent sold during the third quarter, followed by the fourth quarter 11 percent. The lowest sale volume was recorded during the second quarter. The results show that the post-harvest sale is supply driven thus causing low prices, whereas the sales in rest of the quarters are price driven, i.e. the disposed amount increased because of the higher price.

Sales were highest during the first quarter for all categories of farmers. It is consistent with the findings of Shivakoti and Pokharel (1989) in Chitwan. However, the quarterly disposal pattern was found to be associated with the size of holding. In the first quarter, small farmers disposed the highest proportion, 95 percent of total produce. It was 76 percent and 50 percent for medium and large farmers, respectively. The marketed volume of small farmers was almost negligible in other quarters. Medium farmers sold the second highest amount of paddy during the last quarter, whereas for large farmers second highest quarter of sales was the third quarter.

Table 2
Quarterly Disposal Of Pady By Farm Size Categories In Chitwan

Farm Size Categories	Sale of Paddy (Qt.) by Quarters				Total (Qt.)
	I Quarter	II Quarter	III Quarter	IV Quarter	
Small (n=32)	198 (95)	3 (01)	3 (01)	5 (03)	209 (100)
Medium (n=36)	425 (76)	45 (08)	32 (06)	55 (01)	557 (100)
Large (n=21)	510 (50)	98 (10)	285 (28)	127 (13)	1020 (100)
Total (Qt.)	1133 (64)	146 (08)	320 (18)	187 (11)	1786 (100)
Quarterly Average Wholesale Price(Rs.)	688.8	739.2	857.5	855.0	

Source: As of the Table 1

Note: Figures in parentheses indicate row percentages.

The second highest total sales were observed in the third quarter. This could be because of higher prices. On the one hand, this period is short of paddy, on the other, its cultivation starts in this quarter. In some cases where early paddy is cultivated, harvesting starts during this quarter. Therefore, some farmers sell during this period to clear the storage for the next paddy harvest.

Figure 1
Quarterly Disposal By Farm Size Categories And Average Wholesale Price Of Paddy In Chitwan (2048/49 B.S. or 1991/92)

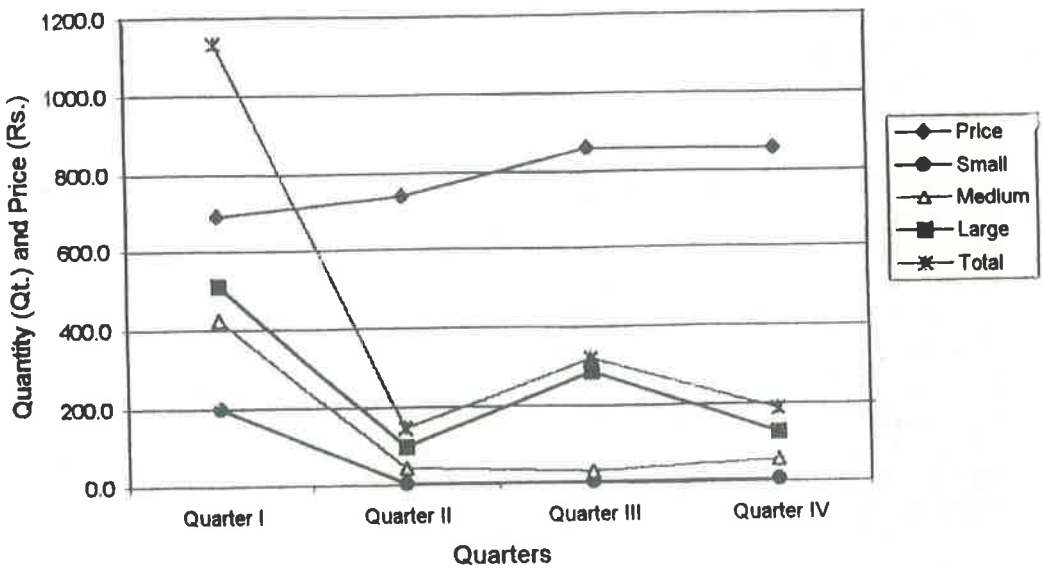


Figure 1 shows the relationship between quarterly disposal of paddy and the quarterly average wholesale price of medium quality paddy. It shows the inverse relation ($r = -0.674$) between the quarterly disposal and average wholesale price of the produce. The average price is lowest during first quarter when quarterly disposal is higher for all categories of farmers. The average price increased with the advent of scarcity seasons and reached to its maximum level during third quarter. In this quarter, the disposed amount is second highest. Then the average prices were found almost stagnant during fourth quarter. It could be because of the competition with *Chaite* paddy, which is also commonly grown in the area and harvested during this quarter. By size of holding, large farmers were

the ones to fetch advantage of the higher prices. The lowest volume of sale was reported during second quarter.

Reasons for Selling Paddy During Different Quarters

The following closed options were given to the respondents to mention the reasons behind selling paddy during different quarters. The options were (i) for loan or credit payment, (ii) purchase of essential commodities, (iii) lack of storage facilities, (iv) for fetching higher prices and (v) others (specify). Table 3 depicts the information in aggregate.

Table 3
Reasons For Selling Paddy In Different Quarters In Chitwan

Reasons	Responses on by Quarter			
	I (n=72)	II (n=11)	III (n=10)	IV (n=6)
Loan Payment	53 (74)	4 (36)	-	2 (33)
Purchase of Commodities	30 (42)	5 (46)	2 (20)	-
Lack of Storage	16 (22)	-	2 (20)	-
Higher Price	5 (07)	4 (36)	2 (20)	2 (33)

Source: As of the Table 1.

Note: Figures in parentheses indicate percentages of total sellers in the respective quarter.

The highest sale proportion in the first quarter is mainly due to credit repayment, 74 percent. The farmers borrowed money especially for crop production. The credit was also borrowed for the purchases of clothes, daily needs, schooling of students and purchase of other commodities. Most of the farmers borrowed money from the village traders with the promise that they would sell their produce to traders after harvest. In Patihani and Gitanagar, farmers reported that the *Fagu Purnima* festival is regarded as the debt closing date that compelled them to sell their produce during the first quarter. This finding can be related with the relatively lower amount sold by the large farmers and the higher sales by small and medium farmers during the first quarter. This finding is consistent with the findings of Shivakoti and Pokharel (1989) in Chitwan, Nepal and Bhuyan et al. (1990) in India, however, contrasts with that of Bangladesh. Quasem (1987) reported credit repayment as the third factor and purchase of daily necessities and purchase of clothes were the first and second factors, respectively in Bangladesh.

The second reason expressed is to purchase essential commodities of household needs. Lack of storage as one of the important reasons, as reported by many, it stood as the third reason in the area. Only 22 percent of the respondents who sold their produce during this quarter expressed this reason. Farmer's logic behind this was that if there was a guarantee of

fetching a reasonable price in future, they would build storage structures and store their produce for a longer period. This reason is also consistent with the findings of Bhuyan et al. (1987) in India and Quasem (1987) in Bangladesh. Similarly, the reason for fetching higher prices was expressed by very few, 7 percent, farmers in the first quarter, whereas the proportion was relatively more in other quarters.

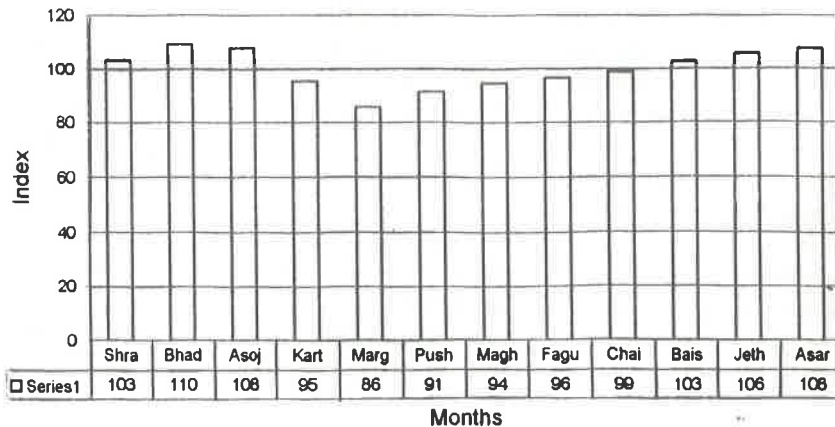
Price Behaviour of Paddy

Seasonality in the production behaviour of the crops and low level of substitution, income effect, and rigidity in elasticity of demand are some of the major reasons why the price of food grain is low immediately after harvest and high during times of scarcity or in the off season (Muto 1976). Both the producers and consumers are adversely affected by these seasonal variations in prices.

The Seasonal Price Behaviour and The Price Trend

Index of monthly variations in wholesale prices and the seasonal index (SI) for ten years beginning 2040/41 to 2049/50 B.S. (1983/84-1992/93) are presented in Appendix 1. Similarly, Figure 2 presents the index of average monthly variations in prices. This figure clearly shows that the paddy price is lowest during peak harvest sale in the market. It is also supported by the findings of Figure 1, where the highest sale amount is during the first quarter. The price increases over time and reaches a peak during *Bhadra* (SI=110), a most scarce season in the year. The increase in price could be because of the storage loss, storage cost as well as the increased demand for paddy. A relatively lower index during *Shrawan*, seasonal index 103, could be because of the supply of *Chaite* paddy that is harvested during this month in the area. After *Aswin* the price starts declining which could be because of the arrival of early paddy.

Figure 2
Seasonal Indices Of Wholesale Prices Of Paddy In Chitwan
(2040/41 - 2049/50 B.S.)



So far the variations in prices during ten years period are compared, the coefficient of variance (CV) figures show a minimum variance of 7.3 percent in 2041/42 B.S. (1984/85) to a maximum of 12.4 percent in 2040/41 B.S. (1983/84), the next higher CV was 12.1 percent in 2042/43 B.S. (1985/86). In general the price behaviour seems to be almost consistent with a minimum rise or fall. Even during the popular political movement of 2046/47 B.S. (1990), the variation is not that higher as generally expected, 9.3 percent, as compared to the other years.

Figure 3
Price Trend Of Paddy In Chitwan (2040/41 - 2049/50 B.S.)

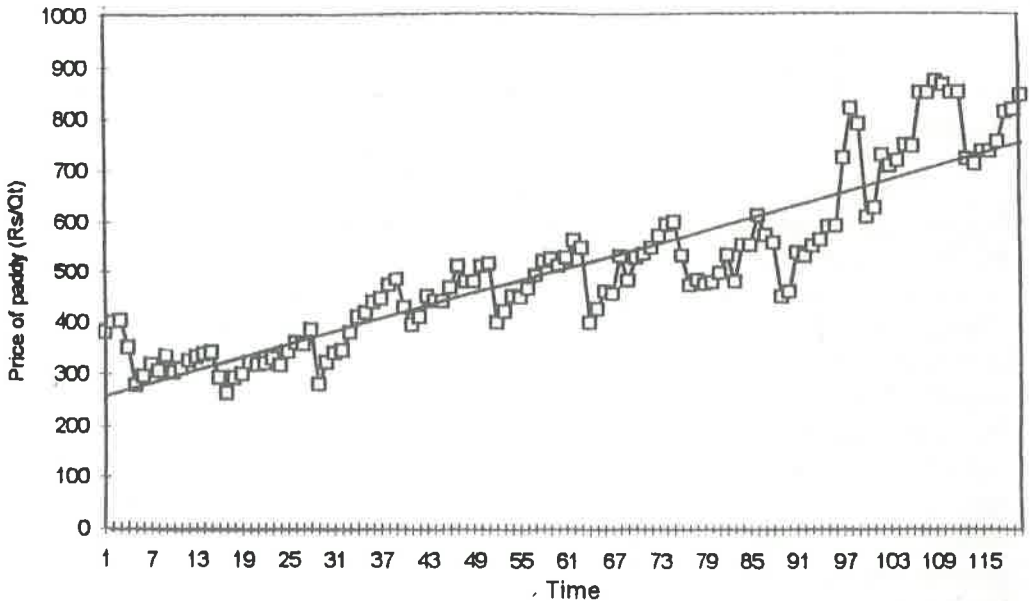


Figure 3 shows the trend of paddy prices for ten years as mentioned earlier. It clearly depicts that there is seasonality in price behaviour, lower prices during post-harvest seasons and high during off seasons. The model depicting the trend and the seasonal effect, monthly effect, on price of

paddy is given in Box 1. The results show that the model is significant (F-ratio = 62.74) and the fit is good (Adj. $R^2 = 0.86$).

Based on the model, it is be inferred that for the the given period of time, the trend of price increment for paddy is 4.22.

Box 1

Model: Trend and Seasonal Effect on Price of Paddy in Chitwan (2040/41-20 49/50 B.S.

$$WpP = 184.35 + 4.22T + 107.17S + 133.41B' + 122.14A' + 51.77K + 24.03P + 35.56 M + 41.99F + 50.23C + 66.96B + 78.89J + 83.63A$$

P Value = <0.000 <0.000 <0.000 <0.000 0.05 0.37 0.18 0.12 0.06 <0.05 <0.01 <0.01

Adj. R^2 : 0.86 F ratio: 62.74 (P-value: <0.000) N: 120

Where,

WpP = Wholesale Price of Paddy; T = Trend; S = Shrawan; B' = Bhadra; A' = Aswin;

K = Kartik;

P = Poush; M = Magh; P = Poush; M = Magh; F = Falgun; C = Chaitra; B = Baisakh; J = Jestha;

A = Asar

The seasonal effect on the wholesale price of paddy, taking *Mangsir* month's price as base price, is significant in all the months except *Push*, *Magh*, *Falgun* and *Chaitra*. The model shows that the seasonal effect, coefficient value, is low during harvesting seasons which increases over seasons ,months, but with a varying degree of magnitude. It ranges from a minimum of 24.03 in *Poush* month to a maximum of 133.41 in *Bhadra* month. The lower coefficient during the harvesting seasons could be because of the higher supply of paddy during these months. Figure 1 clearly supports this finding. The reasons behind increasing coefficients over time, season, could be because of the scarcity resulting into higher demand, inclusion of storage cost as well as storage loss. The model also shows the decreasing seasonal effect after *Aswin* and *Kartik* that could be because of the harvesting and supply of early season paddy in the market.

CONCLUSION

Seasonality in production behaviour of agricultural commodities has influence on the seasonal variations in their prices. This seasonality behaviour is characterised by large immediate post-harvest sales especially in developing countries. It is elsewhere reported and well accepted fact that the prices are generally low during harvesting season and high during scarce season. However, such informations are scanty at the micro level in

countries like Nepal. We have presented empirical evidence of the disposal behaviour of farmers of various farm size categories and the seasonality in prices with particular reference to paddy crop.

It can be inferred from the findings that the association between size of holding and the amount disposed during various quarters within a year could be an important guideline for developing producer oriented marketing policies, if the policy is to provide production incentives and relief measures to the farmers. Although all categories of farmers dispose the majority of their produce during first quarter when the price is low, the small and medium farmers with low marketable surplus are those disposing most of their produce in this period. However, the quantity bought back increased with the decrease in farm size, which generally takes place during scarcity season.

The most common reasons expressed by all categories of farmers for selling paddy are loan payment and purchase of essential commodities. Therefore, the government should focus its efforts towards increasing easy accessibility of credit to the farmers. Since many farmers disposed their commodities for repayment as well as consumption purposes, the government should focus its attention to facilitate them by providing production and consumption loans. Further, it can be concluded that small and medium farmers are more affected by the seasonality based on the findings of quarterly disposal of paddy. In this regard, as NPC/NAPP (1995) emphasises, size of holding is an important basis for designing policies to disburse loans. Given these production incentives, farmers would be able to increase their level of production thus increasing the marketable surplus that would ultimately meet Nepal's aim to be an exporter of food grains.

We also conclude that the prices are low during harvesting season and high during the scarce season. This is mainly due to the seasonality in production behaviour of agricultural commodities and their large immediate post-harvest supply in the market, which lowers prices to a lower level than in the scarce seasons. Moreover, while paddy price during harvesting season is supply dominated, in reverse, the supply during scarce season is price oriented. Therefore, since the government, particularly the Nepal Food Corporation (NFC), is involved in procuring and distributing foodgrains, such variations in prices indicate the optimum periods for government purchases during harvesting season and release of buffer stocks during scarce seasons in order to break the production consumption deficit cycle. However, in the present context of growing realisation of market led economic growth and privatisation, it is not good for the

government sector to intervene the market, which is already in the hands of private sector. Yet the government should provide production incentives to the farmers by developing a competitive market situation.

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Appendix 1

Indices of Monthly Average Wholesale Prices And Seasonal Index Of Paddy In Chitwan (2040/41-2049/50 B.S. or 1983/84-1992/93*)

S.N.	Month 1	Monthly Index by Year 2										Seasonal Index
		040/ 41	041/ 42	042/ 43	043/ 44	044/ 45	045/ 46	046/ 47	047/ 48	048/ 49	049/ 50	
1	Shrawan	114	106	94	98	100	106	109	101	97	109	103
2	Bhadra	120	108	99	105	107	113	114	112	110	108	110
3	Asoj	121	109	98	107	108	110	115	105	106	106	108
4	Kartik	105	93	106	95	84	80	102	102	82	106	95
5	Mangsir	83	84	77	87	88	85	90	82	84	91	86
6	Push	89	93	88	91	94	92	92	84	98	89	91
7	Magh	95	96	93	100	93	91	91	98	95	92	94
8	Fagun	92	103	95	97	97	106	92	97	97	92	96
9	Chaitra	101	101	104	97	103	96	95	101	101	95	99
10	Baisakh	91	102	112	103	109	106	102	103	100	102	103
11	Jeth	93	105	114	113	110	107	92	108	114	102	106
12	Asar	98	101	120	106	107	110	106	108	114	106	108

Descriptive Statistics

Avg. Price (Rs.)	333.3	313.8	364.8	454.8	452.1	479.0	501.4	523.3	549.0	744.1	798.1
Minimum (Rs.)	277.5	262.5	280.0	395.0	400.0	400.0	472.5	450.0	610.0	712.5	433.3
Maximum (Rs.)	402.5	341.0	437.5	512.5	527.5	564.5	601.0	612.5	850.0	872.5	554.0
Range (Rs.)	125.0	78.5	157.5	117.5	127.5	164.5	128.5	162.5	240.0	160.0	120.8
SD	41.44	22.92	44.01	33.23	42.54	54.73	48.58	49.52	76.43	60.62	38.42
CV (%)	12.4	7.3	12.1	7.4	8.9	10.9	9.3	9.0	10.3	7.6	7.6

Source: Agricultural Statistics Sub-Section, HMG/N, Chitwan, Nepal.

Note: 1: 2040/41BS is 1983/84 A.D. and so on.

2: Name of the months according to Nepali and Gregorian Calendar

Shrawan = Jul - Aug	Marg = Nov - Dec	Chaitra = Mar - Apr
Bhadra = Aug - Sep	Poush = Dec - Jan	Baisakh = Apr - May
Aswin = Sep - Oct.	Magh = Jan - Feb	Jestha = May - June
Kartik = Oct - Nov.	Fagun = Feb - Mar.	Asar = June - July

3: Prices of 2048/49 BS (1991/92) were used for quarterly average wholesale price analysis.