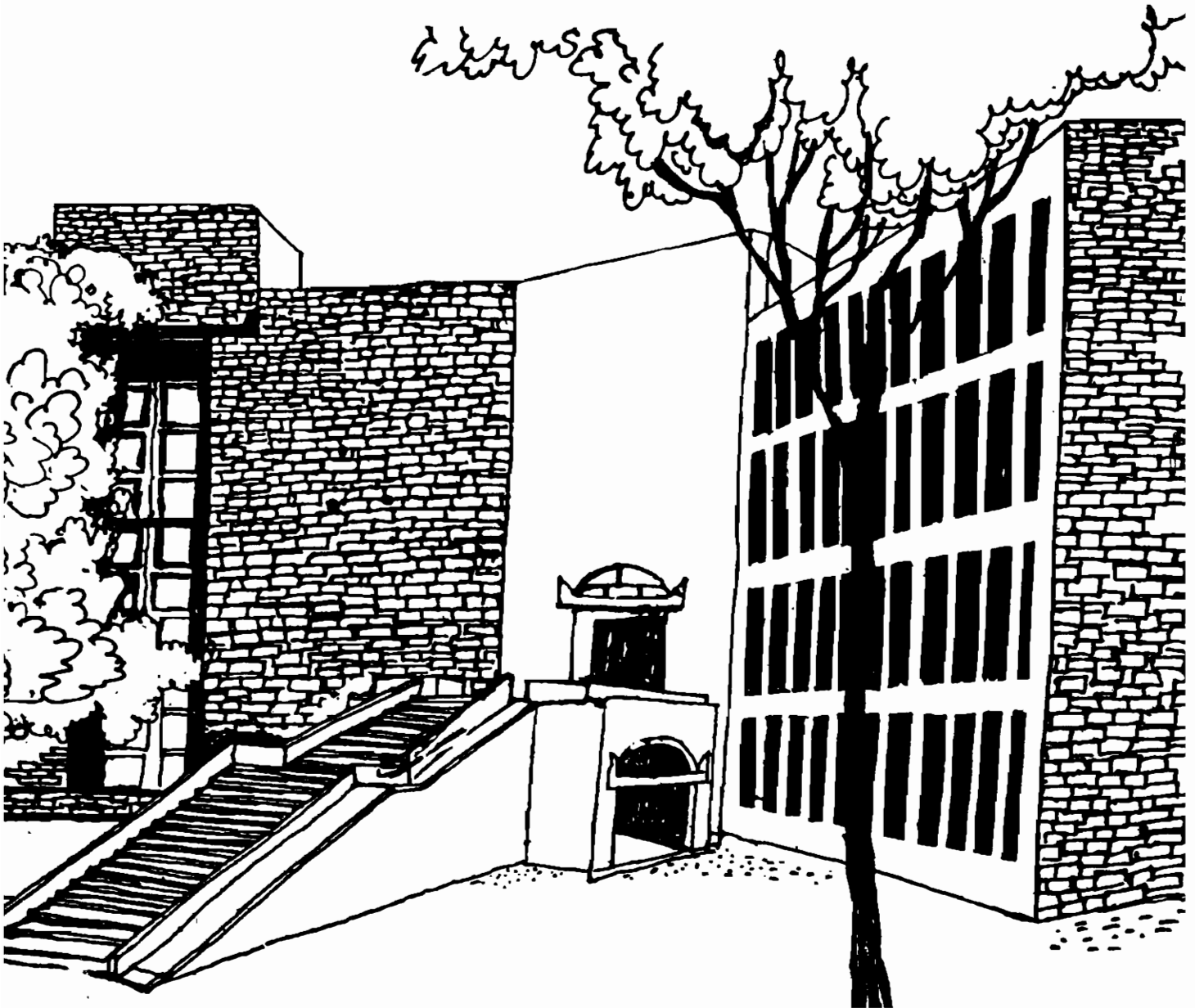




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Working Paper



CAN TARGETING WORK IN FOOD SECURITY
PROGRAMMES? A STUDY OF CONSUMER BEHAVIOUR
AND THE FAIR PRICE SHOP SYSTEM FOR FOOD
IN INDIA

By

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**Can Targeting Work in Food Security Programmes?
A Study of Consumer Behaviour and the Fair Price Shop System for
Food in India**

Vasant P. Gandhi and Abraham Koshy

Abstract

In most major subsidised food distribution programmes, targeting of benefits to the principal beneficiaries is a significant problem. For India's public distribution system for foodgrains which works through an immense network of 433,000 fair price shops, distributing nearly 20 million tons of foodgrains annually, this question of targeting is of great importance. The study examines this issue through primary survey data of consumers and shops from the food-deficit state of Gujarat. The study finds that marketing of consumer goods has undergone substantial expansion in recent years. Examination of the consumer behaviour through a logit model shows that consumer sourcing for essential food staples of wheat and rice at fair price shops is predominantly negatively related to well-being indicators of income, land ownership, irrigation and education. It finds through a tobit model estimation that consumer utilization of the food entitlements at fair price shops is also negatively related to different well-being indicators. A major reason is quality. The targeting of the system for the poor could thus be better than usually assumed. By channelling foodgrains of this kind, the system may be actually providing a reasonably good service for both producers and consumers, especially the poor.

Can Targeting Work in Food Security Programmes? A Study of Consumer Behaviour and the Fair Price Shop System for Food in India

Introduction:

Among the most important components of the food security system in India is the public distribution system for foodgrains. This system operates through a large network of fair price shops (FPS) spread throughout the country. According to norms, a shop proposes to cover a population of about 2000 people. In 1995, there were as many as 433 thousand such shops - about 330 thousand of them in the rural areas (George 1996). The shops are typically licensed private or cooperative outlets. The operations of physical distribution to local godowns, and of monitoring the shops is typically managed through state level civil supplies corporations or food and civil supplies departments. At the national level, procurement of foodgrains and their distribution to the states is managed by the Food Corporation of India.

Wheat and rice are the main commodities distributed through the fair price shop system, with coarse cereals also marginally included in a few states (Bhalla, 1994). Table-1 brings out the massive scale of the operation which reached a peak of nearly 21 million tonnes of foodgrains in 1991 amounting to 13 percent of the net availability (supply) in the country. The growth in the fair price shop network is shown in Table-2. The total food subsidy was estimated to be Rs.52.50 billion in 1995-96 and the share of consumer subsidy in the food subsidy was about 72 percent in 1993-94 (George, 1996). In 1993-94, the procurement cost was Rs.521 and Rs.728 per ton respectively for wheat and rice, and the distribution cost was Rs.1,210 per ton (George, 1996).

With costs of this magnitude, an obvious and frequently asked question is whether the benefits of this operation are going towards the target groups of the poor in the rural and urban areas. This is also often raised internationally, see for instance Pinstруп-Andersen and Alderman (1988), and von Braun (1988). In this context the major criticisms of the system have been that there is a bias towards urban areas, there is a regional bias against backward regions, and an income class

Year (1)	Net Production of Foodgrains (Million Tonnes) (2)	Net availability of Foodgrains [@] (Million Tonnes) (3)	Procurement (Million Tonnes) (4)	Public Distribution (Million Tonnes) [#] (5)	Col.4 as percent of Col.2 (6)	Col.5 as percent of Col.3 (7)
1960	67.5	71.2	1.3	4.9	1.9	6.9
1970	87.1	89.5	6.7	8.8	7.7	9.9
1980	96.0	101.4	11.2	15.0	11.6	14.8
1985	127.4	124.3	20.1	15.1	15.8	12.7
1990	149.7	144.8	24.0	16.0	16.0	11.0
1991	154.3	158.6	19.6	20.8	12.7	13.1
1992	147.3	148.4	17.9	18.8	12.2	12.7
1993	157.5	149.8	28.0	16.4	17.8	10.9
1994	161.2	154.2	26.0	14.0	16.1	9.1
1995	167.2	167.8	22.5	15.3	13.5	9.1

Notes: Neg = Negligible; [@] Net availability = Net production + Net imports - changes in government stocks; [#] includes quantities released under the Food for Work Programme during the years 1978 to 1990.

Source: (1) Ministry of Food; (2) Directorate of Economics and Statistics, Department of Agriculture and Co-operation; (3) George, P.S. (1996).

Year	Number of fair price shops/ration shops at the beginning of the year
1961	50,523
1971	122,038
1981	283,560
1985	315,290
1991	374,799
1992	388,500
1993	408,596
1995	433,000

Source: (1) Ministry of Civil Supplies, Consumer Affairs and Public Distribution; (2) India, Bulletin on Food Statistics.

bias against the poor. Dev and Suryanarayana (1991) do not find much evidence for the urban bias, but Bhalla (1994) and Tyagi (1990) find low distribution in poor states such as Orissa and Bihar. Jha (1991) and Parikh (1994) report that a larger share of the benefit from public distribution system may be accruing to the upper income groups. However, George (1996) finds an absence of good empirical evidence regarding the targeting of the public distribution system

towards the poorer segments. This study examines this issue using primary data collected through a survey in the state of Gujarat, a food deficit state.

Transforming Rural Markets

Marketing of consumer goods in the rural areas is undergoing a tremendous transformation in many parts of India. The impediments to marketing in the rural areas arising from poor roads, poor transportation services, poor storage and banking facilities and inadequate reach of the media are increasingly being overcome. Rural marketing has become easier because of better rail, road, storage and banking facilities. Increasing reach of radio, cinema and television are making it easier to communicate with rural consumers.

The green revolution and broad based rural transformation have increased the incomes and prosperity in the rural areas (Sarma and Gandhi 1990) and as a result the rural markets are widening. Table-3 shows the distribution of the households across income groups is changing over the years (Rao and Natarajan, 1996). The household shares in the upper-middle and high income groups in the rural areas have expanded considerably. The number of purchasing households in the rural areas ranges from 50 to 70 percent for a large number of consumer products. As a result, very substantial shares of many consumer products find their markets now in the rural areas (see Table-4), for instance 67 percent of the cooking oil, 53 percent of the tea, 78 percent of the bicycles and 64 percent of the sewing machines.

Income Class	Rural		Urban		Rural Share (%)	
	1987-88	1993-94	1987-88	1993-94	1987-88	1993-94
L	67,162	74,736	14,769	15,804	74.18	82.54
LM	25,173	26,457	13,021	14,228	61.87	65.03
M	4,207	8,618	3,820	7,345	52.41	53.99
UM	718	2,864	1,818	3,378	28.31	45.88
H	352	1,622	1,119	2,272	23.93	41.65

At 1993-94 prices. L = Below Rs.20,000 annum per household; LM = Rs.20,001 to 40,000 per annum per household; M = Rs.40,001 to 62,000 per annum per household; UM = Rs.62,001 to 86,000 per annum per household; H = Over Rs.86,000 per annum per household

Source: Rao & Natarajan (1996).

Products		1993-94
I. Non-Durables		
1.	Toilet Soaps	57
2.	Washing Cakes	53
3.	Cooking Medium Oils	67
4.	Biscuits	45
5.	Tea	53
6.	Casual Footwear	69
II. Durables		
1.	Bicycles	77.75
2.	Motorcycles	49.09
3.	B&W TV (S&R)	57.11
4.	Radios (Portable)	78.61
5.	Table Fans	61.98
6.	Sewing Machines	64.29
Source: Rao & Natarajan (1996).		

Associated with this growth, there has been a substantial expansion of private marketing outlets in the rural areas in recent years. The IIM-GSCSC survey in the State of Gujarat shows that more than 60 percent of the private retail shops in the rural areas are less than 10 years old and 33 percent are less than 5 years old (see Table-5). Food and other consumables constitute their main shelf items. Private urban markets have also seen considerable expansion. Corresponding numbers for urban private retail shops are 55 percent and 35 percent. The average ages are 11.4 years for rural private retail shops, 14.1 years for urban private retail shops. In comparison, the fair price shops have an average age of over 21 years.

	Rural Shops	Urban Shops
Number of Years in Operation		
Mean	11.44	14.13
< = 5 years	32.8%	35.48%
< = 10 years	60.7%	54.83%
Sample size	61	31
Number of Shops		
Mean	8.2	14.14
More than 3	75%	90%
Source: IIM-GSCSC Survey.		

The mean number of private shops per village in the IIM-GSCSC survey comes to 9.2 and more than 3 in 75 percent of the villages. These observations indicate that the private marketing channel has undergoing tremendous expansion in recent years. This may have implications on targeting for food security.

Data : Survey Structure

A survey was carried out in the State of Gujarat by the Indian Institute of Management (IIM), Ahmedabad in 1995-96 for developing a new organizational strategy for the Gujarat State Civil Supplies Corporation (GSCSC)

(the IIM-GSCSC survey), the main implementing agency for the fair price shop and the public distribution system for food in the State of Gujarat. Gujarat is a deficit state in food and depends

on food supplies from other states. Non-staple and cash crops dominate the agricultural economy (rice and wheat hold only 3 to 8 percent area - Gujarat 1996). The state has a large variety of industries and has over 12,000 fair price shops.

The survey covered 6 districts (Junagadh, Rajkot, Banaskantha, Ahmedabad, Vadodara and Surat), two each from each of its major agro-climatic zones of Saurashtra, North Gujarat and South Gujarat. Through random sampling across 3 blocks in each district, the survey covered 300 consumers (180 rural and 120 urban), 60 fair price shops and about 90 private shops. The survey covered about 54 locations - which included 36 villages, 12 towns and 6 cities.

In this paper only the consumer survey information is primarily used - other surveys will be used only occasionally.

Shop Sourcing by Consumers

An important aspect to understand on how targeting is working would be to examine the consumer behaviour with respect to shop sourcing. Where do the consumers look for the food commodities they buy and who sources where? This pattern is examined for the main staples, wheat and rice, with respect to the sourcing at fair price shops by the sample of 300 consumers.

This has been examined separately for the rural and urban consumers using the dependent variable of sourcing or not sourcing at the fair price shops. The model is specified as:

$$SF = a_1 + b_1 YF + b_2 MEMB + b_3 SO + b_4 DF + b_5 DT + b_6 LAND + b_7 IRRG + b_8 EDUC + e$$

where,

SF = sourcing at fair price shops; YF = family income; MEMB = number of family members; SO = own farm source available; DF = distance from fair price shop; DT = distance from town/city; LAND = land owned; IRRG = irrigated land owned; EDUC = education; e = error term.

The variable definitions are given in Appendix-1. The model was estimated using the LOGIT model given the binary nature of the dependent variable.

The results for rural consumers are given in Table-6. The results indicate a good degree of automatic targeting in the use of fair price shops as a source of wheat and rice. One striking feature is the negative relationship with family income for both wheat and rice. This is not statistically

significant for the rural sample, possibly because of the difficulties with income estimation/ reporting in rural areas - alternative variables may do better. The relationship with family size is positive and significant for both wheat and rice indicate those with large families and therefore with more need are much more likely to go to fair price shops. The variable of own source of wheat and rice production is positive but not significant. Distance to fair price shops has the expected negative association but is not significant. Distance to nearest town also has a negative association but is also not significant. Land owned which is usually a good indicator of wealth and income in the rural areas has a strong and significant negative association in the case of wheat indicating a high degree of self targeting - those who own much land are unlikely to go to fair price shops for wheat. The association is negative but not significant for rice. The association with irrigated area, another indicator of wealth/income, is also negative for both wheat and rice. The association with education which is another indicator of well-being through human capital is also negative for both and significant for rice indicating that more educated people are less likely to go to fair price shops. Thus, significant targeting is indicated.

The results for urban areas are given in Table-7. Variables such as own source, distance to town, land and irrigation are not applicable here and so are not used. The results for urban areas indicate an even more clear self targeting at work. Income figures are more reliable here and the results indicate that the relation is clearly negative and highly significant for both wheat and rice. Those with high incomes are very unlikely to use fair price shops as a source. The relationship with family size, on the other hand, is positive and significant for both wheat and rice indicating that those with a greater family need are more likely to use fair price shops. The relationship of distance to fair price shops is not significant in both cases. The relationship with education is clearly negative in both cases, and very significant for rice -indicating that those with a higher human capital are unlikely to use fair price shops as a source.

Utilization of Entitlement

Each customer has an entitlement for essential commodities at the fair price shop. A useful measure of targeting would be to examine the utilization of this entitlement. How is the utilization

Variable	Wheat			Rice		
	Coef.	Wald	Signf.	Coef.	Wald	Signf.
YF	-0.000006	0.0021	0.9634	-0.00005	0.1087	0.7416
MEMB	0.1416	3.2746	0.0704	0.2810	6.7919	0.0092
SO	1.6619	2.7531	0.0971	5.9103	0.1358	0.7125
DF	-0.0698	0.3770	0.5392	-0.1647	1.7380	0.1874
DT	-0.0159	0.3231	0.5697	0.0135	0.1573	0.6917
LAND	-0.1234	4.2507	0.0392	-0.0017	0.0008	0.9779
IRRG	-0.0380	0.0632	0.8015	-0.1686	1.0741	0.3000
EDUC	-0.1432	1.2056	0.2722	-0.2941	3.8560	0.0496
Constant	0.7626	1.1681	0.2798	0.6980	0.7349	0.3913
% Correct Pred.	65.34			78.41		
N	180			180		

Variable	Wheat			Rice		
	Coef.	Wald	Signf.	Coef.	Wald	Signf.
YF	-0.0005	8.6004	0.0034	-0.005	7.5549	0.0060
MEMB	0.3129	7.8506	0.0051	0.2958	6.8450	0.0089
DF	0.1379	0.9157	0.3386	-0.0184	0.0157	0.9001
EDUC	-0.2664	2.5873	0.1077	-0.3966	4.9556	0.0260
Constant	0.1672	0.8386	0.8386	0.6468	0.5830	0.4451
% Correct Predi.	70.09			75.21		
N	120			120		

of the entitlement related to different characteristics of the consumer? This is examined through the following model:

$$EU = a_1 + b_1 YF + b_2 MEMB + b_3 SO + b_4 DF + b_5 DT + b_6 LAND + b_7 IRRG + b_8 EDUC + e$$

EU = the utilization (%) of the entitlement. The rest of the variable definitions are the same as for the shop source model.

The model is estimated using a TOBIT model with censoring at both ends - since the dependant variable varies strictly between 0 and 100. The results for rural consumers are given in Table-8. The relationship with family income is not significant - possibly because of the unreliability of this information in rural areas. However, the sign for rice is negative indicative of targeting at work. The family size variable is positive for both wheat and rice and highly significant for rice - indicating that the larger the family need, the higher the utilization. The own farm source variable is not significant possibly because this is mainly a non-staple growing food deficit region. The distance from the fair price shop variable has the expected negative sign and is significant for rice. The distance from town/city variable is negative but not significant in both cases. The land owned variable which is a good indicator of income/wealth has a negative sign in both cases and is highly significant for wheat. It indicates that people who are better off utilize less of their FPS entitlement - indicating self targeting. The irrigation variable too has a negative sign on the same lines but is not significant. The education variable is clearly and strongly negative for both wheat and rice, indicating that those with better human capital clearly utilized less of the entitlement.

The results for urban consumers are given in Table-9, and more clearly bring out the targeting. Strikingly, the coefficient for family income is negative and highly significant for both wheat and rice, indicating targeting to the poor. The family size variable is positive and significant for both wheat and rice indicating that family food need is strongly related to utilization of entitlement. The distance from fair price shop does not come out to be significant. However, education once again comes out to be negative and high significant for both wheat and rice - indicating that those with better human capital automatically utilize less subsidised food entitlement showing self targeting.

Reasons Behind the Self-Targeting Behaviour

What factors contribute to this self-targeting away from the rich/better-off and towards the poor? It is difficult to fully answer this, but some clues can be obtained from a few of the consumer responses in the survey. Table-10 gives the distribution of some of these responses. The responses indicate that the customers are satisfied/happy with the weighing at the fair price shop. They are

also happy with the behaviour/service/appearance at the fair price shops. Therefore, these might not be major reasons behind targeting. However, when it comes to quality, a majority of the consumers feel that the quality of items available at the fair price shop is poor. This appears to be one major reason behind the targeting. Those better-off may not go to fair price shops because they perceive the quality of items at the fair price shop to be poor even though the prices are lower. It is also

Variable	Wheat			Rice		
	Coef.	t-Stat	Signf.	Coef.	t-Stat	Signf.
YF	0.00073	0.286	0.77520	-0.00147	-0.822	0.41112
MEMB	0.97999	0.694	0.48794	2.0937	2.109	0.03497
SO	10.755	0.737	0.46086	-3.2798	-0.228	0.82003
DF	-3.8587	-1.581	0.11391	-3.3997	-1.978	0.04789
DT	-0.53136	-0.930	0.35249	-0.57701	-1.419	0.15589
LAND	-3.9926	-2.845	0.00444	0.16082	-0.230	0.81810
IRRG	-4.1882	-1.194	0.23248	-2.2211	-1.014	0.31058
EDUC	-10.823	-3.880	0.00010	-8.6263	-4.450	0.00001
Constant	108.05	7.510	0.00000	105.43	10.449	0.00000
Log-Likelihood		-740.39			-777.68	
N	180			180		

Variable	Wheat			Rice		
	Coef.	t-Stat	Signf.	Coef.	t-Stat	Signf.
YF	-0.0269	-4.844	0.00000	-0.0169	-4.036	0.00005
MEMB	8.6795	2.664	0.00773	9.5787	3.638	0.00028
DF	0.0344	0.008	0.99378	1.5867	0.419	0.67488
EDUC	-10.888	-2.079	0.03760	-11.096	-2.540	0.01107
Constant	77.066	2.939	0.00329	61.389	2.845	0.00444
Log-Likelihood		-356.71			-403.33	
N	120			120		

found that the quality perception is negatively related to income levels - higher the income, more negative the quality perception.

1)	What is your opinion regarding weights and measures of commodities you get at the fair price shop?	<u>Percent Response</u>
	- Mostly Correct	94.6
	- Mostly Incorrect	5.0
	- Don't know/Don't bother	0.3
2)	What is your overall satisfaction with respect to behaviour, services, cleanliness and appearance of the fair price shop?	
	- Quite Satisfied	93.0
	- Some what Satisfied	5.0
	- Not very Satisfied	2.0
3)	What is your opinion regarding quality of items that are available at the fair price shop?	
	- Quality Satisfactory	36.5
	- Sometimes poor quality	17.4
	- Mostly sub-standard	46.2
Source: IIM-GSCSC Survey (1996).		

Conclusions

To provide food security for its huge population, India has developed a large public food distribution system through an immense network of "franchised" fair price shops which cover the urban and rural areas. In 1995 there were 433 thousand fair price shops, 330 thousand of them being in rural areas. The system, though expensive to maintain, provides a deep reach for making food supplies available throughout the country and keeping food prices under control.

One of the major criticisms of the system is that it is unable to effectively target supplies to the poor, and therefore much of the benefit may

be getting syphoned by the well-to-do and rich. This study examines this question using primary data collected through a fairly large sample of consumers, fair price shops and private shops in the State of Gujarat.

The study finds that the private rural markets have expanded substantially in the recent years due to improving infrastructure, services and incomes in the rural areas. A huge number of outlets have developed for making consumer goods widely available in the rural and urban areas. The new context has implications for the public food distribution system.

The study finds that there is good evidence that the consumer behaviour is itself at the first level leading to self targeting of fair price shops as a source of supply of wheat and rice away from the better-off people. This is seen through a largely negative association of sourcing at fair price shops with well-being indicators of income, land ownership, irrigation and education in the rural areas. The association is negative with income and education in the urban areas. Thus, the better-off people tend not to go to fair price shops.

At the second level, it is seen that targeting is working also in the utilization of the entitlement of wheat and rice at the fair price shop. This is seen through a negative association with income, land ownership, irrigation and education, and a positive association with family size in the rural areas. The association is negative with income and education, and positive with family size in the urban areas. These indicate that the better-off and the less needy automatically tend to utilize less of their entitlement at the fair price shop. Thus, self targeting is working and the leakage from the system may be considerably less than otherwise expected.

Among the reasons for the targeting it is found that the customers are largely satisfied with the weighment at the fair price shop - as well as the behaviour/service they receive there. However, a majority perceive the quality of goods to be poor at the fair price shop and this may be a major reason which makes self-targeting work. By channelling foodgrain of this kind and making them available at a lower price to the poor people, the public distribution system may be actually doing an important service both to the producer and the consumer. For the producers it provides an outlet and minimum price support, and for the consumers it prevents sharp food price increases and an economical source of food, particularly for the poor.

References

- Bhalla, G.S., 1994. Policy for food security in India, in G.S. Bhalla (ed.) Economic liberalization and Indian agriculture, ISID:New Delhi.
- Dev, S.M. and M.H. Suryanarayana, 1991. Is PDS urban biased and pro-rich, an evaluation. Economic and Political Weekly.
- George, P.S., 1996. Public distribution system, food subsidy and production incentives", Economic and Political Weekly, September 28.
- Gujarat, Directorate of Agriculture, 1996. Districtwise area, production and yield per hectare of important food and non-food crops in Gujarat State, 1992-93 to 1994-95, Government of Gujarat, Gandhinagar.
- India, Directorate of Economics & Statistics, 1995. Bulletin on food statistics, 1992-93. Ministry of Agriculture, GOI, New Delhi.
- Indian Institute of Management-Gujarat State Civil Supplies Corporation (IIM-GSCSC), 1996. Survey data-base, Indian Institute of Management, Ahmedabad.

- Jha, Shikha, 1991. Consumer subsidies in India: Is targeting effective, Discussion paper No.64, IGIDR, Bombay.
- Parikh, Kirit S., (1994). Who gets how much from PDS - How effectively does it reach the poor?, Sarvekshana, January-March.
- Per Pinstrup, Andersen and Harold Alderman, 1988. Effectiveness of consumer-oriented food subsidies in reaching rationing and income transfer goals, in Per Pinstrup-Andersen (ed.), Food subsidies in developing countries, costs, benefits and policy options, IFPRI-Johns Hopkins, Baltimore.
- Rao, S.L. and Natarajan, I., 1996. Indian market demographics-the consumer classes, NCAER: New Delhi.
- Sarma, J.S. and Gandhi, Vasant P., 1990. Production and consumption of foodgrains in India: Implications of accelerated economic growth and poverty alleviation, Research Report 81, IFPRI: Washington, D.C.
- Tyagi, D.S. 1990. Managing India's food economy : problems and alternatives, Sage Publications, New Delhi.
- von Braun, Joachim 1988. Food subsidies in Egypt: Implications for the agricultural sector, in Per Pinstrup-Andersen (ed.), Food subsidies in developing countries, costs, benefits and policy options, IFPRI-Johns Hopkins, Baltimore.

Appendix-1: Notes on variables and data used

- SF = Sourcing by consumer at fair price shop for wheat/rice, yes=1, no=0.
- YF = Total family income in rupees per month, class intervals taken at mid-points: 0-500:250, 500-1000:750, 1000-1500:1250, 1500-2000:1750, 2000-3000:2500, above 3000:5000.
- MEMB = family size (equil.) calculated as number of adults (> 18 y) + number of youth (12-18 y) + half the number of children (< 12 y).
- SO = Availability of own farm source of wheat/rice, yes=1, no=0.
- DF = distance in km to fair price shop in kilometers, at range mid-points: 0-1:0.5, 1-2:1.5, > 2:5.
- DT = distance from nearest town in km.
- LAND = Land owned in hectares.
- IRRG = Land irrigated in hectares.
- EDUC = Education of head of household coded as illiterate:1, < 5 std:2, 5-9 std:3, 10 std:4, > 10 std but not graduate:5, graduate:6, post-graduate:7.
- EU = Percent utilization of entitlement of wheat/rice.

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