

# Wheat Milling

## **SUMMARY**

Wheat milling is a relatively liberalised sector. It has few regulatory constraints and its assets are not government-owned. As a result, the players perform close to their current potential and the productivity improvement potential of the sector is relatively modest. Chakkis, a transition format which accounts for over 98 per cent share of the sector, operate at 2.2 per cent of US levels. They could reach 4.4 per cent of US levels at current factor costs but are constrained by low utilisation of labour and the lack of alternative employment opportunities. Industrial mills, a small but rapidly growing modern format, already have a productivity of 7.3 per cent of US levels. This could reach a maximum of 9.5 per cent of US levels.

The only significant distortion in the sector is the lack of a level playing field. Not only is there a higher tax burden on mill atta relative to chakki atta, food subsidies given through wheat also favour the chakkis. This non-level playing field slows down the rate at which industrial mills, the more productive format, capture share from chakkis.

Over time, the utilisation of chakki labour is expected to rise as output increases and chakkis diversify into other activities. If the non-level playing field issues are addressed and the economy grows by 10 per cent – which is possible if the recommended reform programme is carried out – the average productivity in the sector could grow at 6.5 per cent. Output will grow at 2.7 per cent (the expected rate of growth of wheat output) and employment will decline by 3.7 per cent a year. Industrial mills will capture share from chakkis and, by 2010, will account for more than a third of the output of the sector.

## **Productivity performance**

Overall, wheat milling productivity in India is 2.2 per cent of that in the US. The productivity of chakkis is 2.2 per cent of the US level whereas the productivity level of industrial mills is 7.3 per cent. The overall productivity is growing by 3.5 per cent a year. Overall productivity is increasing as industrial mills, the more productive format, are gaining share: Their output is growing at 30 per cent a year, and productivity in chakkis is improving at 3.2 per cent a year.

## **Operational reasons for low productivity**

At current factor costs, India can raise its wheat milling productivity to 4.6 per cent of US levels. The gap between current productivity and potential productivity is explained by the idle hours at chakkis, low utilisation and small scale of industrial mills, and the lower than potential share of industrial atta. The difference between Indian productivity potential and US average productivity is explained by the output mix favouring chakkis as well as constraints on industrial atta in the form of bagged movement of grain, consumer packaging of flour and low viable automation.

## **Industry dynamics**

One of the reasons for the lower than potential share of industrial atta (1.5 per cent versus a potential of 5.6 per cent) is the differential tax on flour and wheat paid by industrial mills relative to chakkis. Further, poor segments of the population have no option but to rely on chakkis to grind the subsidised wheat that they receive.

## **External factors responsible for low productivity**

The immediate impediments to productivity growth are on two fronts: The barriers to transition from direct chakki atta to mill atta, and the barriers to productivity growth within each of these formats. The barriers to transition from chakkis to industrial atta are the differential taxes paid by mills and the inefficiencies in downstream distribution and retail. Transition is also hampered by the negligible cost attributed to the time spent by housewives at chakkis, the distribution of subsidised wheat to low income households and zero wheat tax for rural consumers.

Limited employment opportunities for chakki owners are the key barrier to the growth of chakki productivity. Industrial atta productivity is restricted primarily because most automation is unviable given the low labour costs.

## **Industry outlook**

If status quo is maintained, the current growth in the industrial format will lead to average annual productivity growth of 3.7 per cent over the next 10 years. The share of employment in the industrial format will reach 1.4 per cent by 2010.

If, however, barriers such as differential taxes and inefficiencies in distribution and retailing are removed and GDP per capita continues to grow at 4 per cent a year, productivity in wheat milling will grow by 4.6 per cent a year over the next 10 years. This can increase further to 6.5 per cent a year if the GDP per capita growth rate over the next decade increases to 8.6 per cent. In this scenario, the

penetration of industrial atta will increase to 34 per cent, from the current low of 1.5 per cent, and the share of employment in the industrial format will touch 8.3 per cent by 2010.

### **Policy recommendations**

To ensure rapid productivity growth in the sector, we recommend that the government:

- ¶ Equalise taxes on flour and input wheat for mills and chakkis: This will make the industrial mills more competitive and expedite their growth.
- ¶ Remove barriers to growth of large retail formats: Growth of large retail formats is constrained by land market barriers, restrictions on FDI and SSI reservations in upstream industries (*see* Volume III, Chapter 3: Retail). Removing these barriers will help large retail formats to develop, thereby allowing the industrial atta mills to grow faster.
- ¶ Ensuring regular power supply by privatising distribution (*see* Volume III, Chapter 2: Electric Power): This will reduce the labour requirements of industrial mills by eliminating the need to maintain back-up power facilities.
- ¶ Replacing wheat subsidy with food stamps: This will allow consumers to choose between industrial and chakki atta. Currently, consumers have to use chakkis, as subsidies are given only on wheat and only chakkis can process the small amounts of wheat that individual consumers need.

# Wheat Milling

Wheat milling is important to the study as it represents the food processing sector as a whole. Food processing is an important sector in most countries as it is one of the biggest manufacturing sectors and has close linkages to, and impact on, agriculture. In India, food processing constitutes 1.1 per cent of employment and 1.4 per cent of GDP. In particular, wheat milling contributes to 0.3 per cent of employment and 0.5 per cent of GDP. Further, an average Indian household spends 51 per cent of its income on food (opposed to 8 per cent in the US), of which 12 per cent is on wheat products.

Wheat milling is a relatively liberalised sector. It has few regulatory constraints and its assets are not government-owned. Hence, a comparison of this sector with other more regulated sectors provides interesting insights about the impact of market deregulation.

The rest of this chapter is divided into seven sections:

- ¶ Industry overview
- ¶ Productivity performance
- ¶ Operational reasons for low productivity
- ¶ Industry dynamics
- ¶ External factors responsible for low productivity
- ¶ Industry outlook
- ¶ Policy recommendations.

## INDUSTRY OVERVIEW

Of the 70 million tons of wheat produced per year in India, about 60 million tons is milled into two broad product categories: 53 million tons into whole-wheat flour (atta) and 7 million tons into non-atta products, such as refined white flour (maida), semolina (suji) and bran (**Exhibit 7.1**). In this study, we have focused on atta milling since it constitutes more than 85 per cent of total consumption. Most atta is consumed directly by households to prepare unleavened Indian bread (chapatis).

Atta is milled in two formats: About 98 per cent is milled in a traditional format called chakkis and the remainder is milled in modern industrial mills (**Exhibit 7.2**). A third format, manual grinding at home, is now almost obsolete.

¶ **Chakkis:** A chakki is a relatively primitive, two-person operation with a simple, electrically operated grinder. Chakkis are widespread in residential and commercial areas, both in rural and urban India. There are approximately 300,000 chakkis in India mostly in the north and east – the main wheat producing and consuming regions. A typical chakki has a milling capacity of up to 2 tons of wheat per day and is run by workers who have migrated from agriculture.

¶ **Flour mills:** Industrial mills are the modern format for milling wheat. The base technology is similar to that of wheat milling plants in the US. India has approximately 70 industrial mills for atta, most of which are located near large urban centres. A typical mill has a milling capacity of 50-100 tons of wheat per day and employs over 50 workers.

Atta consumers can be broadly classified into those who use chakki atta and those who buy industrial atta. The industrial atta consumers belong primarily to upper income, urban households that value convenience and branding. They buy packaged, branded atta in 5-10 kg bags from grocery stores. The atta bought by chakki consumers, on the other hand, is unbranded and loose. Chakki atta consumers can be classified into four major segments based on their wheat and flour buying pattern (**Exhibit 7.3**):

¶ **Self-consumption:** For this segment of consumers, wheat is not intermediated through markets and no tax is paid. This segment includes the large majority of rural consumers such as farmers, their relatives and friends and agricultural labourers who are paid their wages in the form of wheat: 67 per cent of atta consumption is in this segment.

¶ **Public Distribution System (PDS):** This segment consists of low- and middle-income households that purchase subsidised wheat through the PDS: 10 per cent of atta consumption is in this segment.

¶ **Open market wheat:** This segment comprises primarily urban consumers who purchase wheat in the open market, clean it at home and then get it milled at a chakki: 14 per cent of atta is consumed by this segment.

¶ **Direct chakki flour:** This segment of consumers does not procure wheat but buys loose atta directly from the chakkis. These are mainly urban consumers who value convenience and yet are cost conscious: 7.5 per cent of atta is consumed by this segment.

## **PRODUCTIVITY PERFORMANCE**

The overall productivity of atta milling is only at 2.2 per cent of US levels (**Exhibit 7.4**). This is because chakkis, which have an employment share of over 99 per cent and output share of 98.5 per cent, are at 2.2 per cent of the US. The modern industrial mills are at 7.3 per cent of the US with a 1.5 per cent share of the output and a negligible share of the employment. In the US, there is no counterpart of the chakki format. All US wheat is milled in large-scale industrial plants, which have an average output of 440 tons per day.

The productivity in atta milling is estimated to be growing at 3.4 per cent a year (**Exhibit 7.5**). Productivity is increasing as industrial mills, the more productive format, gain share and productivity in chakkis improves. Industrial atta output has been growing at 25-30 per cent a year for the last 3 years with several large foreign and Indian players such as Unilever, Conagra and Pillsbury entering the branded atta market. Chakki productivity is increasing at about 3.2 per cent every year due to increased capacity utilisation of chakkis in rural areas and better labour utilisation in urban areas. Many chakkis in urban areas are now diversifying into semi-retail stores, thereby improving their labour utilisation.

We have calculated labour productivity in wheat milling in physical terms as kilograms of flour per hour worked. For calculating productivity for different segments, we conducted over 50 interviews with players in both chakki and industrial milling segments. The overall sector productivity was then obtained by averaging individual format productivity weighted by the format's share of employment.

## **OPERATIONAL REASONS FOR LOW PRODUCTIVITY**

This section is divided into two parts. First, we discuss the reasons for the gap between the current productivity of 2.2 per cent of US levels and the potential productivity of 4.6 per cent of US levels India can achieve at current factor costs. Then, we discuss the reasons for the difference between the Indian productivity potential and the US average.

### **Reasons for difference between current and potential productivity**

At current factor costs, India can achieve a productivity level of 4.6 per cent of the US, whereas its current productivity is only 2.2 per cent of the US (**Exhibit 7.6**). The main reasons for the difference between current and potential productivity are low chakki utilisation, low utilisation and scale of industrial mills and low output share of industrial atta.

- ¶ **Low capacity utilisation in chakkis:** At present, chakkis are idle 50 per cent of the time. A combination of higher capacity utilisation and diversification of chakkis into non-milling activities such as retailing can double the productivity of chakkis to 4.4 per cent of the US level from the current level of 2.2 per cent.
- ¶ **Low scale and utilisation in industrial mills:** The productivity in atta mills can only increase from the current 7.3 per cent of the US level to 9.5 per cent at current factor costs. Most mills are close to their potential with high uniformity between different plants. This increase in productivity can be achieved by increasing capacity utilisation and expanding the scale of operations. In addition, a regular supply of power will help reduce the labour employed in operating captive power generation facilities.

Most Indian mills run at an average capacity utilisation of about 70 per cent. This can increase to at least 84 per cent, the average in the US. In terms of scale, the average Indian mill has an output of 50 tons per day. The minimum efficient scale today is about 100 tons per day and most new mills are being designed accordingly. This is still much less than the average US scale of 440 tons per day.

- ¶ **Low share of industrial atta:** Today, the output share of industrial mills is less than 1.5 per cent, which translates into a share of less than 5 per cent of urban consumption. This share could be as high as 20 per cent at current factor costs (**Exhibit 7.7**). Differential taxes on flour and high downstream distribution and retail costs increase the consumer price of packaged industrial atta and thus limit its share of consumption. In Delhi, where there is no flour tax, this share is already about 13 per cent. With the growth of larger retail formats and the consequent reduction in downstream distribution and retail costs, the share of packaged industrial atta in urban areas can easily be about 20 per cent, which translates into an overall share of about 5.6 per cent.

### **Reasons for difference between potential Indian and average US productivity**

The main reason for the difference between the Indian productivity potential and the US average productivity is investment in technology that is economically unviable in India at current factor costs. Since labour costs will need to increase substantially for such investment to become viable, we do not expect to see these technologies in India for several years. Besides the low share of the more productive industrial format, the other reasons for low industrial mill productivity are the bagged movement of grain, consumer packaging of output flour into small-sized packs and low automation and scale.

- ¶ **Bagged movement of grain:** Bagged movement of grain in India leads to a productivity penalty of 1.2 per cent on mill productivity. In the US, all grain is stored and transported in a loose form while in India it is bagged in 90-100 kg bags, stacked in warehouses and transported in this bagged form in trucks or railway wagons. Bagged movement of grain increases labour intensity in the mill since extra labour is required to unload and stack the bags as well as to open them.

At current factor costs, loose movement of grain is not viable because the higher capital cost of storing loose grain in silos far outweighs the benefits of lower handling and bagging costs and lower storage losses (**Exhibit 7.8**). Real labour costs in handling will have to increase four-fold before the loose movement of grain becomes economically viable.

- ¶ **Consumer packaging of flour:** In India, almost all atta is packed in small (1-10 kg) bags directly for household consumption, leading to a productivity penalty of 6.1 per cent (**Exhibit 7.9**). In the US, where downstream players such as bakeries further process flour, only 50 per cent of flour is packed, and even this, in large bags (greater than 100 kg). Due to this product mix penalty, Indian mills require more labour both for packaging and loading.

- ¶ **Low automation and scale:** An average US mill is far more automated and has a higher scale of operation than an economically viable mill in India. While an average US mill has a capacity of 440 tons per day, the minimum efficient scale in India is only 100 tons per day. US mills are also far more automated in milling, packaging, loading, supervision and control and in sundry operations such as providing refreshments. At current factor costs, automation is not viable in India for any of these operations. For example, packaging is done manually in India. Labour costs would need to double for automated packaging to be viable (**Exhibit 7.10**).

## INDUSTRY DYNAMICS

Wheat milling is a fairly competitive industry with a large number of domestic and foreign players. It is, however, characterised by a significant non-level playing field in terms of unequal taxes on flour and effectively differential prices of wheat, which ensures that the more productive industrial mills do not gain higher market share.

Both in the chakkis and industrial mills, there is significant domestic competition with a large number of players having low capacity utilisation. In the industrial mills segment, foreign players are also active either directly, as in the case of

Cargill, or indirectly through contract milling, as in the cases of Unilever, Pillsbury and Conagra. The technology used by different companies is fairly uniform, leading to a similar productivity performance across players.

In comparison with chakkis, industrial mills are discriminated against in two ways: unequal flour taxes and higher wheat prices. Almost 75 per cent of chakki consumers, particularly the self-consumption and PDS segments, receive wheat at an effective price that is much lower than the price for mills.

## **EXTERNAL FACTORS RESPONSIBLE FOR LOW PRODUCTIVITY**

The external deterrents to achieving potential productivity can be classified into two categories: Factors that hinder productivity improvements in individual formats – both chakkis and industrial mills – and those that affect the migration of consumption from the less productive format of chakkis to the more productive format of industrial mills.

### **Factors hindering improvement in chakki and mill productivity**

The key external factor impeding improvement in chakki productivity is the limited alternative employment opportunities for chakki owners. This is a macro-economic barrier and should gradually correct itself with overall growth in the economy.

Similarly, the lower scale of operation and low capacity utilisation in industrial mills is a legacy effect and should correct itself given the current growth in industrial atta output of over 30 per cent a year. However, the productivity penalty due to the lack of regular power supply is the result of government ownership of state-owned electricity utilities.

### **Factors preventing migration from chakki atta to industrial atta**

Migration from chakki atta to industrial atta is limited primarily by the higher consumer price for industrial atta. The price for industrial atta in north India is Rs.11.2 per kg compared to Rs.9.50 per kg for loose atta bought directly from the chakki. This price difference is due to three factors: 1) Unequal taxes on flour favouring chakkis; 2) distortions in input wheat price due to higher taxes on wheat for the industrial format and subsidised wheat for the PDS segment; and 3) high downstream costs in distribution and retail.

- ¶ **Non-level taxes on industrial atta:** In most states, industrial mills incur a flour tax of 4 per cent that is not applicable to chakkis. This increases the cost of industrial atta by about Rs.0.4 per kg.

- ¶ **Distortions in input wheat price:** The majority of chakki consumers, particularly the self-consumption and PDS segments, receive less expensive wheat than do the industrial mills. The self-consumption segment does not pay any tax on input wheat and the PDS segment obtains subsidised wheat from the government at prices much below the market level (**Exhibit 7.11**). The tax on input wheat varies from 2 to 10 per cent in various states. This introduces a penalty of up to Rs. 0.60 per kg.
- ¶ **High downstream costs in distribution and retailing:** An analysis of the overall cost difference between direct chakki and industrial atta shows that while the latter is more economical in terms of milling and input wheat costs, the downstream costs are higher by Rs.2.8 per kg. This is because of higher packaging, sales and marketing expenses and downstream distribution costs (**Exhibit 7.12**).

While the packaging and other sales expenses are unavoidable, downstream distribution costs can be reduced by over Rs.0.3 per kg, which amounts to 10 per cent of downstream costs (**Exhibit 7.13**). This can be achieved through the growth of large-scale retail formats, which usually disintermediate the chain and increase scale to reduce the working capital cycle, handling costs, intermediary margins and losses. In addition, they reap economies of scale in retailing and transportation.

However, even if taxes were equalised and distribution costs came down, we expect the transition format to continue for a long time. Atta from chakkis will continue to be cheaper in rural areas where modern retail formats are unlikely to appear soon. However, in urban areas, industrial atta is likely to gain share as its price competitiveness with chakki atta improves.

## INDUSTRY OUTLOOK

Productivity growth in wheat milling can increase from the current 3.5 per cent to an average of 6.5 per cent over the next 10 years if all the barriers to productivity growth are removed. This will result in a steady, qualitative improvement in the nature of employment from low productivity chakkis to the more organised, high productivity mills.

To evaluate the outlook on output, productivity and employment, we consider three possible future scenarios for the competitive environment: status quo, reforms in wheat milling alone and reforms in all sectors (*see* Volume 1, Chapter 4: Synthesis of Sector Findings).

- ¶ **Status quo:** In this scenario, India's per capita output and productivity will continue to grow by 2.7 per cent and 3.7 per cent a year respectively. As a result, employment will decrease by 1 per cent a year. There will be 20 per cent growth in milled atta output and labour wages will go up by 4 per cent, in line with GDP per capita<sup>1</sup> growth. By 2010, the output share of milled atta will be 7.1 per cent and the share of industrial employment 1.4 per cent (**Exhibit 7.14**).
- ¶ **Reforms in wheat milling alone:** This scenario envisages all external barriers in this sector being removed while GDP per capita continues to grow at the current rate of 4 per cent a year equivalent to GDP growth of 5.5 per cent a year. In this scenario, we expect milled atta output to grow at 30 per cent a year and capture share from chakki atta. We expect the share of milled atta to increase from the current 1.5 per cent to over 15 per cent. Productivity in the sector will increase at 4.5 per cent a year. Labour wages will grow at 4 per cent a year and the output and employment share of milled atta will increase to 15.9 per cent and 3.3 per cent respectively (**Exhibit 7.15**).
- ¶ **Reforms in all sectors:** In this scenario, the mill atta segment will experience very rapid output growth of around 40 per cent a year in milled atta as GDP grows at about 10 per cent. Labour wages too will go up by 10 per cent a year. Overall productivity in the sector will increase at 6.5 per cent a year reaching 4.1 per cent of US levels by 2010. The share of the traditional format will go down substantially in urban areas where industrial atta prices will compete with the price of chakki atta. In rural areas, however, chakkis will continue to dominate. Overall, industrial atta mills will account for over one-third of the output and over 8 per cent of the employment in the sector (**Exhibit 7.16**).

## POLICY RECOMMENDATIONS

To remove the external barriers to productivity growth, we suggest the following measures: Equalise taxes on flour and wheat, replace subsidies on input wheat with food stamps, remove barriers to the emergence of large-scale retail formats and ensure a continuous power supply.

- ¶ **Equalise taxes on flour and wheat:** Differential taxes can be equalised either by removing the tax on industrial flour and wheat purchased or by imposing a fixed tax on chakkis. While the first option is easier to

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<sup>1</sup> Throughout this section we refer to growth in GDP per capita in PPP terms. This differs from the growth in GDP per capita according to National Accounts statistics because each measure uses different relative prices to aggregate sectors to obtain the overall output. See the chapter 5, Volume 1: India's Growth Potential.

implement, it leads to a revenue loss for the government. This revenue loss is estimated to be Rs. 412 crore – Rs. 400 crore in wheat tax collections and Rs.12 crore in flour tax collections.

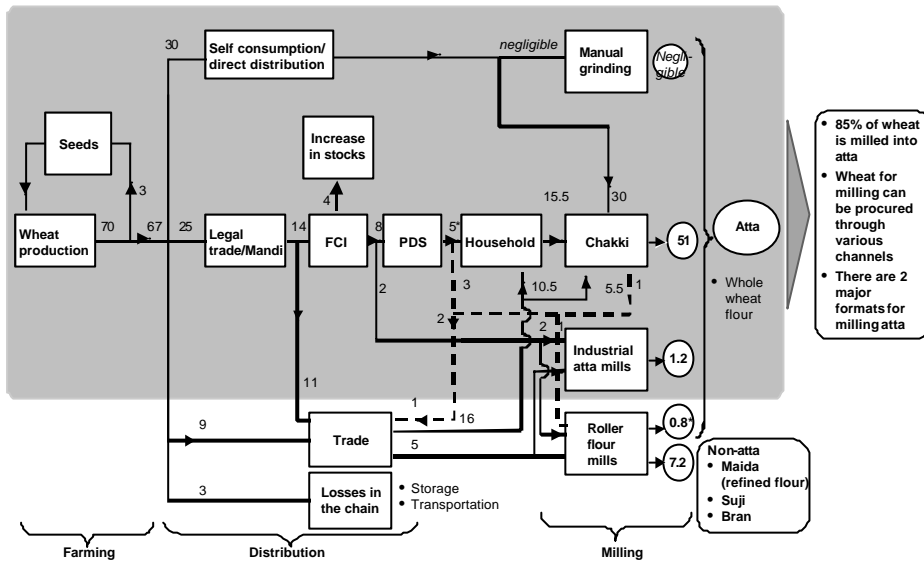
- ¶ **Replace the subsidy on wheat with food stamps:** Food stamps will allow the subsidised consumers to exercise their choice on atta rather than wheat and thus leave them free to choose milled atta, if they find it more cost effective.
- ¶ **Remove barriers to the emergence of large-scale retail formats:** Land market regulations, foreign direct investment controls, antiquated labour laws and other barriers to the growth of large scale retail formats should be removed. This will help reduce downstream costs and make industrially milled atta more competitive (*see* Volume III, Chapter 3: Retail).
- ¶ **Ensure a consistent power supply by enforcing payment:** A regular power supply is dependent on the overall viability of the electricity sector for which disciplined tariff collection is crucial. One solution for this is the privatisation of the power sector, which we discuss in the power case study (*see* Volume III, Chapter 2: Electric Power).

Exhibit 7.1

# WHEAT CHAIN

Million tons, 1999

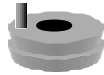


Focus of the case



\* Residual atta produced by Roller flour mills  
Source: Interviews

Exhibit 7.2

## MILLING SEGMENTATION – ATTA



	Segment	Atta/wheat milled annually Million tons	Number of units Nos.	Average installed capacity Tons/day	Comments
	Manual	Negligible	–	–	<ul style="list-style-type: none"> <li>• More or less extinct</li> </ul>
	Chakki	51.0	300,000	2	<ul style="list-style-type: none"> <li>• 2 person operation</li> <li>• High idle capacity (25% utilisation)</li> </ul>
	Industrial atta plants	0.8	70+	50 - 100	<ul style="list-style-type: none"> <li>• Growing at 30-35% per year</li> <li>• 60-70% utilisation</li> <li>• Large players such as Pillsbury, Conagra and Unilever entering the market</li> </ul>

Source: Interviews

2

Exhibit 7.3

## CONSUMER SEGMENTATION

	Segments	Sub segments	Description	Share	Price
				Per cent	Rs per kg
		Self consumption	<ul style="list-style-type: none"> <li>• Consumers: Mainly in rural areas                             <ul style="list-style-type: none"> <li>– Farmers and farmers' families</li> <li>– Labourers paid in kind</li> </ul> </li> <li>• Channel: Non-intermediated wheat</li> </ul>	67	6.8
		PDS*	<ul style="list-style-type: none"> <li>• Consumers: Low and middle income households</li> <li>• Channel: PDS* outlets selling subsidised wheat</li> </ul>	10	5.2
		Open market wheat	<ul style="list-style-type: none"> <li>• Consumers: Mainly urban households who value quality and are cost conscious</li> <li>• Channel: Wheat purchased in retail stores and taken to chakkis for milling</li> </ul>	14	8.5
		Chakki flour	<ul style="list-style-type: none"> <li>• Consumers: Mainly urban households who are cost conscious and value convenience</li> <li>• Channel: Loose atta sold by chakkis</li> </ul>	7.5	9.5
			<ul style="list-style-type: none"> <li>• Consumers: Urban, higher income consumers who value convenience and branding</li> <li>• Channel: Packaged, branded atta sold at retail stores</li> </ul>	1.5	11.2

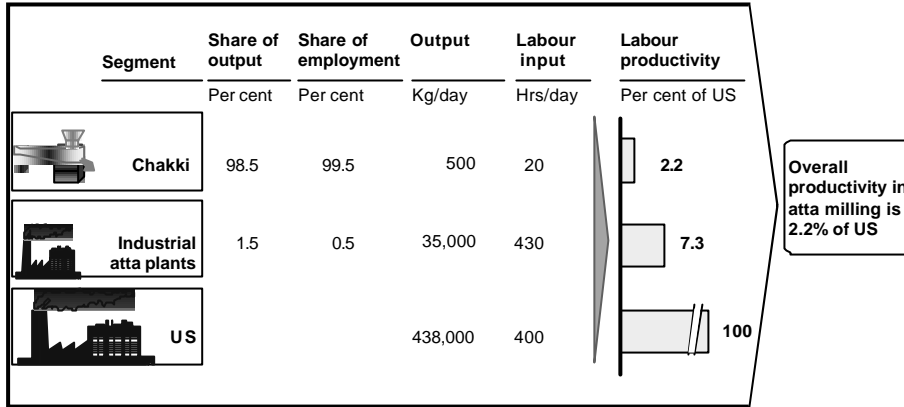
\* Public Distribution System

Source: Team analysis

3

Exhibit 7.4

### SEGMENT-WISE PRODUCTIVITY ESTIMATES



\* Average output of players in the segment  
Source: Interviews; Team analysis

Exhibit 7.5

### PRODUCTIVITY GROWTH RATE ESTIMATES

#### Productivity growth drivers

##### Increase in output share of industrial format

- Growth in packaged atta at 25-30% per year

##### Increase in chakki productivity

- Urban areas: Decrease in labour intensity (5% per year\*) due to diversification into other activities such as retailing and non-atta milling
- Rural areas: Utilisation of existing chakkis is improving as no new chakkis are being set up and larger wheat output is being processed through existing chakkis

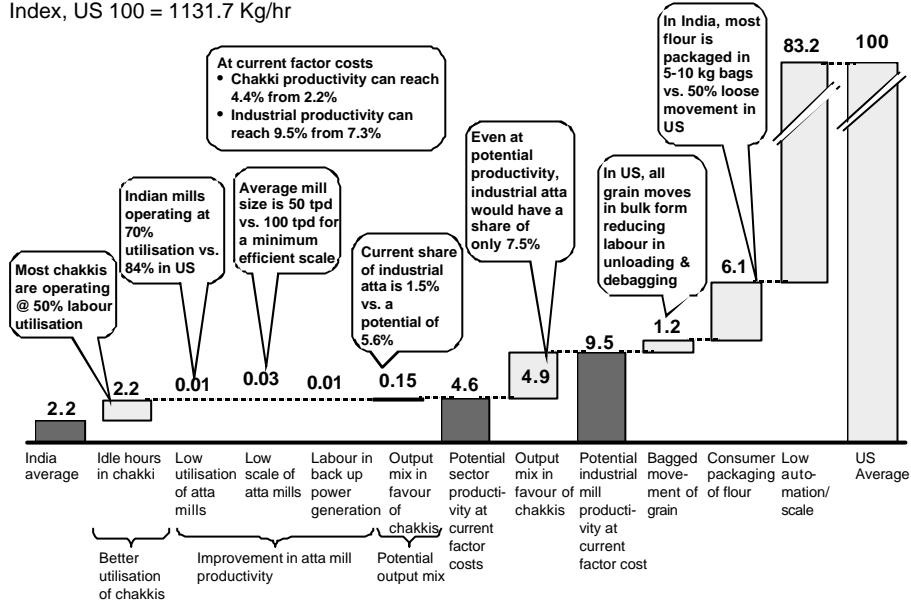
Productivity in  
the sector  
growing at  
3.4% a year

\* Estimated as a lower bound  
Source: Interviews; Team analysis

Exhibit 7.6

### OPERATIONAL REASONS EXPLAINING THE PRODUCTIVITY GAP

Index, US 100 = 1131.7 Kg/hr



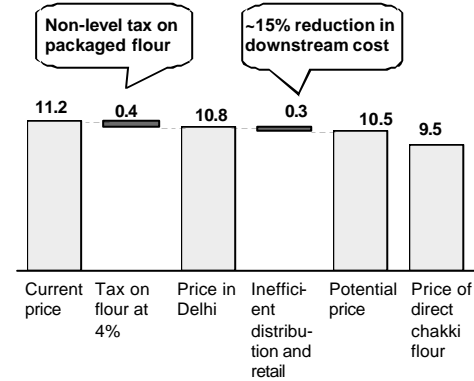
Source: Interviews; Team analysis

Exhibit 7.7

### POTENTIAL PENETRATION OF INDUSTRIAL ATTA

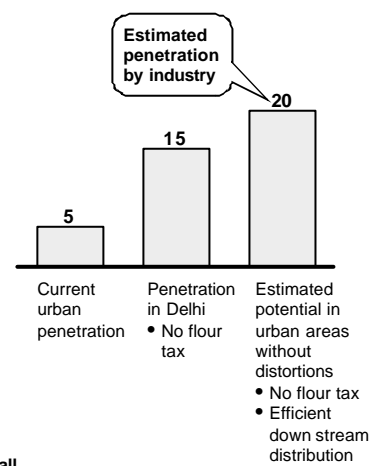
#### Price of industrial atta

Rs per kg



#### Share of urban consumption

Per cent



Overall share of industrial atta (%)

1.5

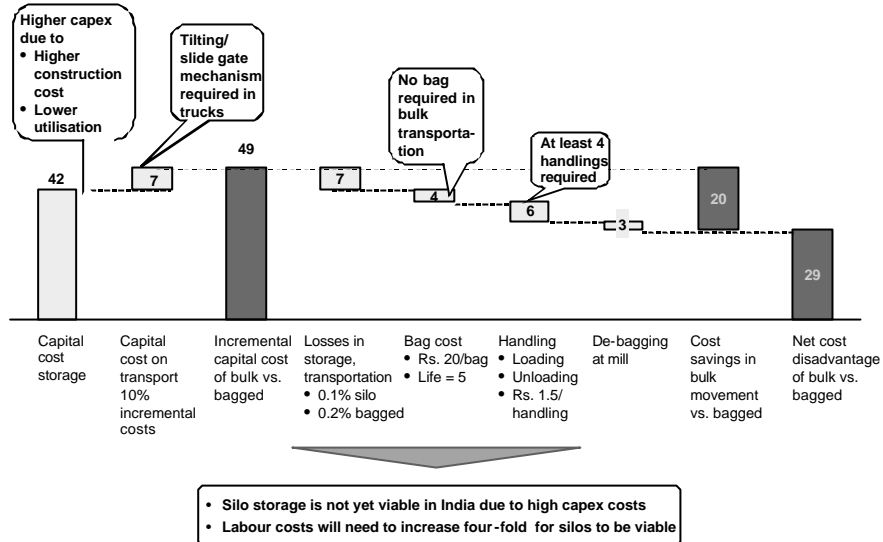
5.6

Source: Interviews; Team analysis

Exhibit 7.8

### COST DIFFERENCE BETWEEN BULK AND BAGGED MOVEMENT OF GRAIN

Rs. per bag of 100 kg



Source: Interviews; McKinsey analysis

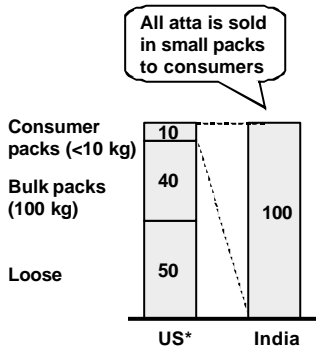
Exhibit 7.9

### CONSUMER PACKAGING OF FLOUR

100 tpd ATTA MILL

**Product mix**

Per cent



**Impact of large pack and loose sales on labour requirement**

- Packaging labour falls by 75%
  - No packaging for loose flour
  - 50% time required for bulk packaging
- Loading time falls by 50% since loose flour is aspirated directly

**Overall industrial mill productivity would increase from 10.7% to 16.8% of US levels if atta was sold largely to bulk consumers**

\* Estimates from interviews

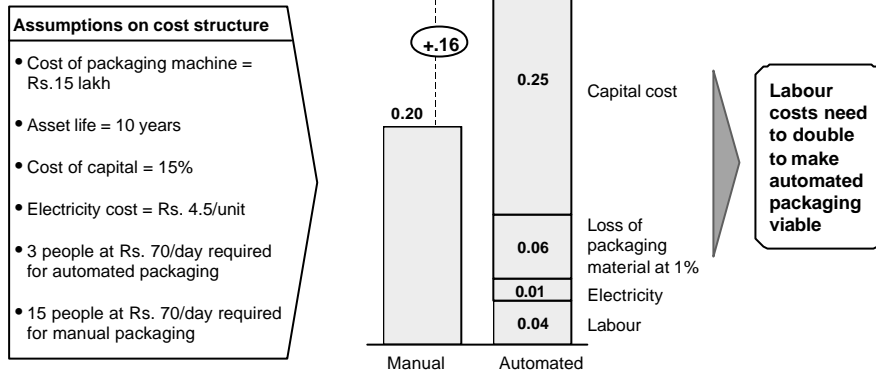
Source: Team analysis

Exhibit 7.10

## AUTOMATION IN PACKAGING

Rs. per 10 kg bag

50 TPD EXAMPLE

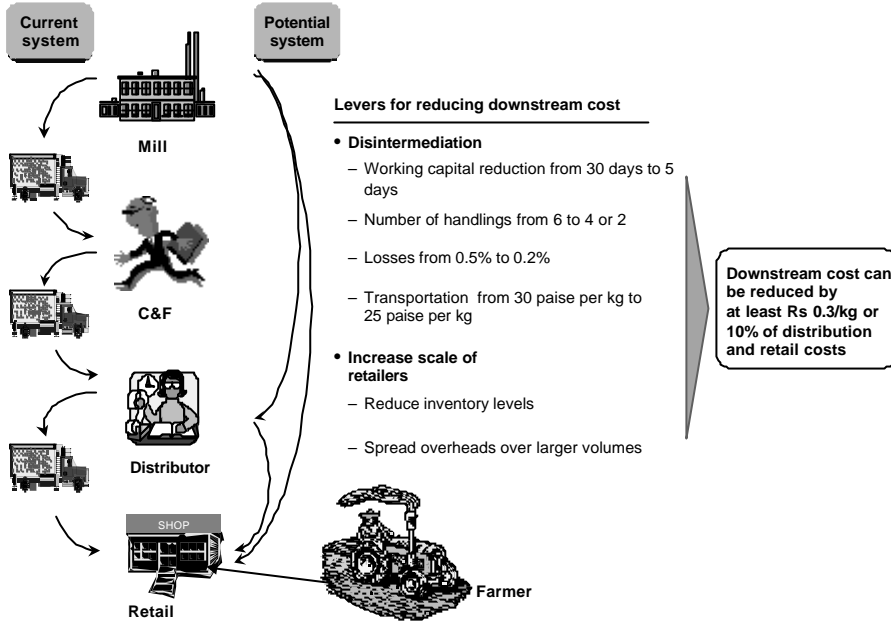


Source: Interviews



Exhibit 7.13

### DOWNSTREAM DISTRIBUTION AND RETAIL

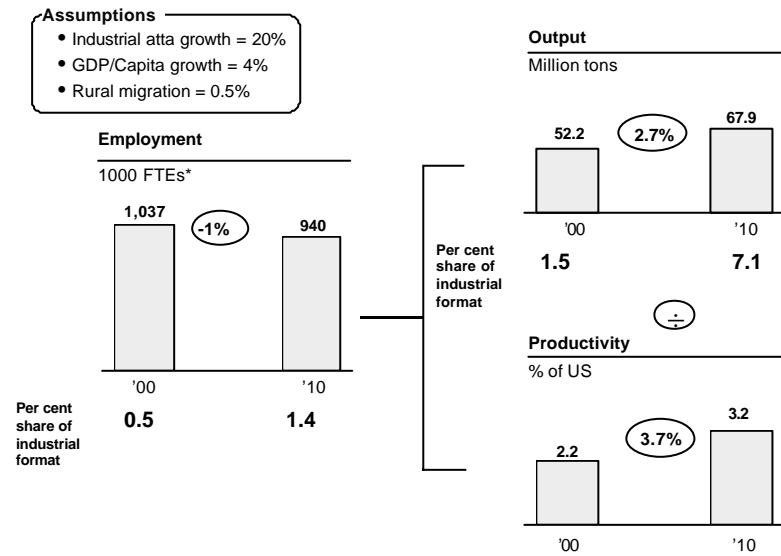


Source: Interviews; Team analysis

Exhibit 7.14

### FUTURE OUTLOOK – STATUS QUO

(X%) - CAGR



\* FTE = 2,000 hrs/annum

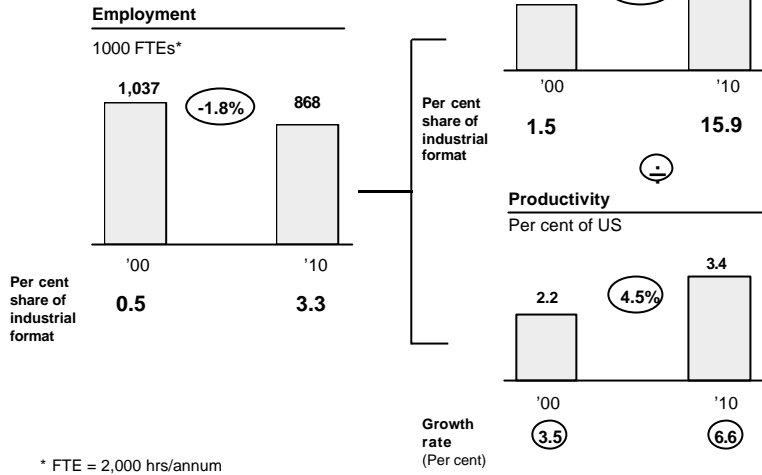
Source: Team analysis

Exhibit 7.15

### FUTURE OUTLOOK – REFORMS IN WHEAT MILLING ALONE

(X%) - CAGR

- Assumptions**
- Industrial atta growth = 30%
  - GDP/Capita growth = 4%
  - Rural migration = 0.5%



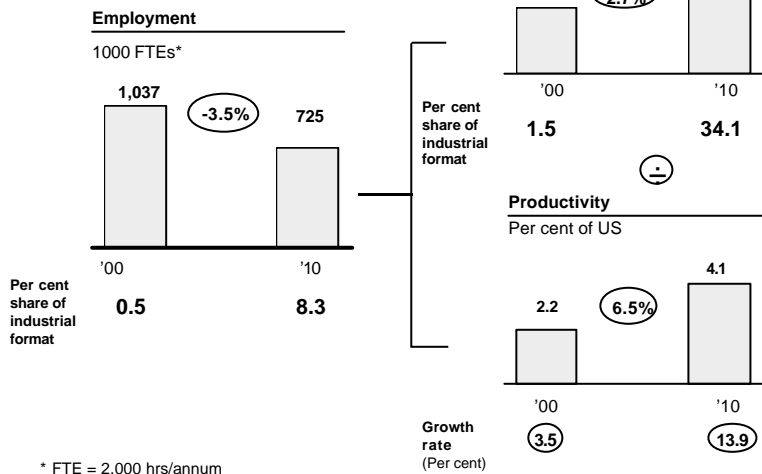
\* FTE = 2,000 hrs/annum  
Source: Team analysis

Exhibit 7.16

### FUTURE OUTLOOK – REFORMS IN ALL SECTORS

(X%) - CAGR

- Assumptions**
- Industrial atta growth = 40%
  - GDP growth = 10%
  - Rural migration = 1%



\* FTE = 2,000 hrs/annum  
Source: Team analysis