Unemployment and Food Security in India: A Macro-Theoretic Study

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Synopsys

1. Introduction

The objective this Ph.D. thesis is to examine the issues of unemployment and food security in India. For this purpose it develops models incorporating the relevant salient features of the Indian economy. These models belong to the tradition set by Keynes (1936), Kalecki(1954) and structuralist writers such as Rakshit (1982), Taylor (1983), Bose (1989) et al. The thesis has three core chapters: Chapters 2, 3 and 4. Chapter 2 addresses the problem of unemployment in India, while the other two chapters focus on the issue of food security in India. We introduce the main themes of these three chapters below.

2. Chapter 2: High Growth and Stagnant Employment in India

The organized sector, which consists principally of the corporate sector, the large non-agricultural private enterprises and the public sector, has grown at a high rate in India in the post-reform period, but employment in the organized sector has been completely stagnant (see Table 2.4 in Chapter 2). We find from Table 2.1 of Chapter 2 that GDP had grown at a high rate of around 6 percent per annum during 1994-5 – 2014-15. Again, Table 2.6 of Chapter 2 reveals that the share of the organized sector in GDP increased from 36.8 percent in 1993-94 to 43.3 percent in 2003-04 and further to 45.1 percent in 2010-11. There are no reasons to believe that the trend has been reversed since 2010-11. Thus, the organized sector has grown at a higher rate than GDP. We also find from Table 2.3 of Chapter 2 that only 6 percent of the work force was employed in the organized sector in 2004-05. Table 2.5 of Chapter 2 shows that the work force and the labour force had grown at an average annual rate of around 2 percent during 1994-95 – 2004-05. There is no reason to believe that these growth rates have changed since then. Thus, the fraction of the work force employed in the organized sector has dwindled continuously, whereas the share of the organized sector in GDP has steadily increased. Given the steady high growth rate of output of the organized sector and the complete stagnation in its level of employment, the unit labour requirement has gone down steadily and rapidly. Obviously, this has been brought about by labour saving technological and managerial changes taking place in the organized sector. As should be the purpose of labour saving technological and managerial changes, the shares of workers of the organized sector in its output must have gone down along with the unit labour requirement of production even though money wage rate may have increased. A prima facie evidence of this phenomenon is given by the data of Table 2.7 of Chapter 2, which show that the share of wage income in the net value added in the organized manufacturing sector has steadily declined during the period under consideration. This phenomenon of a secular decline in the share of workers' income in the GVA of the organized manufacturing sector in India is quite well documented in the literature (see, for example, Abraham and Sasikumar (2017) and Kapoor (2016)). The objective of this chapter is to examine the implications of the decline in

the shares of skilled and unskilled workers in the organized sector's output on the output levels or the growth rates of the organized and the unorganized sector using a macro model suitable for India. The existing literature on Indian economy, however, does not address this issue. Hence, the present study fills up an important gap in the literature.   It also seeks to suggest policies that may generate employment in both the sectors. ILO(2009) has made an attempt at suggesting a strategy for generating employment in India. It has recommended massive investments in sectors, which are naturally employment intensive. However, it has not derived its strategy from a macro-theoretic model. Hence, it has left the issue of the problem of financing of the required massive investments unexplored. Nor has it examined the issue of the possible conflict between the goal of employment generation and that of providing the masses with the basic necessities of life in adequate quantities at affordable prices. We have shown that, if the government invests in infrastructure in the unorganized sector and finances it by taxing capitalists' income, it will raise employment significantly and heap considerable benefits on the poor. However, if the government, as it normally does, finances the increase in its investment in the unorganized sector by raising indirect tax rates, it is highly likely to lower employment and output levels in both the sectors.

2.1 The Model

The model is developed in line with the tradition set forth by Keynes (1936), Kalecki (1954) and the structuralist writers such as Rakshit (1982), Taylor (1983) and Bose (1989) et al. The economy is divided into two sectors: the organized sector and the unorganized sector. The output of the former is denoted by *Y*. The organized sector is assumed to be an oligopoly. Following Kalecki (1954), it is assumed that the producers fix their prices by applying a fixed mark-up to the average variable cost of production and they adjust their output to meet the demand that comes forth at the prices set. However, for simplicity and without any loss of generality we assume that the price of Y , denoted P, is fixed and it is equal to unity. Had we made *P* an increasing function of the average variable cost of production, our results would have been stronger.Y is demanded for consumption by the workers of the organized sector, the capitalists (producers of Y) and the government It is also used for purposes of investment and for export. Investment demand and capitalists' and government's consumption demand represent demand not only for Y but also for foreign good. The unorganized sector also uses Y as intermediate input in its production.

Accordingly, *Y* is determined by

$$
Y = C_{Wy} \cdot \left[w \frac{l_y}{L_0} Y (1 - t_w) \right] + C_C \cdot \left[\left(Y - w \frac{l_y}{L_0} Y \right)(1 - t) \right] + I\left(\bar{r}, e\right) + I^A\left(\bar{r}, \bar{K}\right) + G +
$$

$$
NX\left(\frac{P^* e}{P}, C_c (1-t)\left(1 - w \frac{l_y}{L_0}\right)Y, I\left(\bar{r}, e\right), G, Y^* \right) + mA
$$

(2.1)

In (2.1), C_{Wy} denotes organized sector workers' fixed average and marginal propensity to consume Y, w is the money wage rate of the organized sector workers which is, as standard in the Keynesian tradition or Keynes-Kalecki tradition, assumed to be fixed in the short run. l_y is the unit labour requirement (measured in terms of labour hours) to produce a unit of Y and L_0 is the amount of labour time given by each worker in the given period. Hence, the number of workers needed to produce Y is given by $\dfrac{l_y Y}{L_0}$. Denoting wage payment to every organized sector worker by w in the given period of time under consideration, total wage payment to labouris $w.\dfrac{l_y Y}{L_0}$, which is also the real wage income of the organized sector workers, since the price of the organized sector output denoted by P is assumed to be equal to unity.

Workers pay taxes at the rate t_w on their income. $c_{Wy}.\left[w\dfrac{l_y}{L_0}(1-t_w) \right]$ is the total consumption demand of the workers for the output of the organized sector and its foreign substitutes. (Since most of the workers are poor, we assume for simplicity and without any loss of generality that it represents demand for the output of only the domestic organized sector). After wage payments, the residue accrues to the producers (whom we refer to as capitalists) as profit, as we have disregarded other factor payments for simplicity, i.e., we have assumed outstanding debt of the capitalists to the workers to be zero for simplicity. This does not matter, as the outstanding debt of the capitalists to the workers is fixed in the short period under consideration. So, the income of the capitalists is $\left[Y - w\dfrac{l_y Y}{L_0} \right]$ and if they pay tax at the rate t on their income, their disposable income is $\left[Y - w\dfrac{l_y Y}{L_0} \right](1-t)$. Therefore, their total consumption demand for Y is $C_c.\left[Y - w\dfrac{l_y Y}{L_0} \right](1-t)$, where C_c is the fixed average and marginal propensity to consume of the producers of Y. We assume that quite a large part of it represents demand for foreign goods. Hence, we have made net export (denoted NX) a decreasing function of capitalists' consumption demand. For the same reason, NX is made a decreasing function of investment (I) and government consumption (G).Signs of other partial derivatives of the *NX* function are quite self-evident. Note that Y^* denotes foreign GDP.

Aggregate investment demand is decomposed into two components: $I(\bar{r}, e)$ and $I^A(\bar{r}, \overline{K})$, which give investment demands of the organized and the unorganized sectors, respectively. Both these investment demands are made decreasing functions of the interest rate denoted r. The RBI through open market operations, liquidity adjustment facility and other means seek to keep r at a target level. Hence, we treat r as RBI's policy variable here and assume it to be given at $\bar{r}$. The organized sector's investment is also made a decreasing function of the

exchange rate, denoted e, for the following reason. India's production and investment are highly import intensive. This point may be illustrated using the following example. Think of the import intensity of teaching economics in India. All the text books used are foreign. All the journals referred to are foreign. All the computers and software used are imported. This is true not only of economics but also of all other subjects. Thus, India is completely dependent on the US and Western Europe for knowledge and technology. Hence, to sustain its production and investment, India has to import on a large scale. Given the price of foreign goods in foreign currency, an increase in the exchange rate makes prices of foreign capital goods higher in domestic currency. This, given investors' expectations, reduces profitability of investment and, thereby, lowers it. Let us now explain why I^A is an increasing function of $\overline{K}$, which denotes the stock of infrastructure capital available in the unorganized sector. Land usage can be increased with investments in agriculture which include investments in irrigation, electrification, flood control facilities, improvement in rural connectivity, land reclamation, agricultural research etc. This kind of investment is land augmenting as it enhances the usage of the same plot of land in a year and enables usage of more land for purposes of production. The infrastructure capital in the unorganized sector is denoted by K. The amount of land available to the unorganized sector is an increasing function of K. As K is given in the short run, we denote it by $\overline{K}$. As an increase in $\overline{K}$ makes possible greater number of cropping on the same plot of land or cultivation of new land leading to larger levels of production and income, it induces (and also makes it possible by relaxing the credit and thereby the resource constraint for) the unorganized sector's producers to undertake larger amount of complementary investment.

m denotes the fixed intermediate input requirement per unit of unorganized sector output. Therefore, total intermediate input requirement of the unorganized sector is given by mA, where A is the total output of the unorganized sector. The unorganized sector has to buy these intermediate inputs from the organized sector.

The Unorganized Sector

The output of the unorganized sector is denoted by A. In what follows we shall seek to identify the factors that determine supply of and demand for A.

Supply of A

The unorganized sector is comprised of small rural and urban enterprises but the most dominant segment of this sector is agriculture. This sector absorbs most of the unskilled workers of the country. Its production function is fixed coefficient and the output of this sector is denoted by A which is produced with land, labour, capital and intermediate inputs bought from the organized sector. The stocks of land and capital used in the unorganized sector are given. In contrast with the tradition set by structuralist writers such as Rakshit (1982), Taylor (1983) et al., we have assumed the production function to be fixed coefficient even in agriculture for analytical simplicity. This assumption will not affect our results qualitatively. This assumption helps us capture in a simple way the fact that how much of

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the fixed amount of land and capital the producers in the unorganized sector can utilize depends crucially on the resources they have in their command to purchase intermediate inputs from the organized sector and labour.

As most of the producers of the unorganized sector are financially weak and, therefore, subject to severe credit constraint, their purchasing power depends crucially on the relative price of their output in terms of the goods produced in the organized sector given by $\frac{P_A}{P}$, where P_A denotes price of the output of the unorganized sector. A ceteris paribus increase in $\frac{P_A}{P}$ enables the producers of the unorganized sector to purchase more intermediate inputs from the organized sector and labour and, thereby, allows them to bring more land under production in agriculture and, in general, to produce more. (This is possible in case of agriculture because of multiple cropping within a given period). Therefore, the supply of output of the unorganized sector is an increasing function of ($\frac{P_A}{P}$).

For reasons we have already specified, supply of A should be an increasing function of $\overline{K}$.

Most of the production in the unorganized sector is carried out with the help of family labour and the unorganized sector workers also supplement their income by working outside their family firms in relatively larger firms that use both family labour and hired labour. There also exists large scale surplus labour in the unorganized sector. Hence, given everything else, if the government provides employment at the wage prevailing in the unorganized sector through employment guarantee schemes, it will augment unorganized sector's producers' income enabling them to buy more intermediate inputs from the organized sector and, thereby, bring more land under cultivation in agriculture, make greater utilization of capital in the non-agricultural enterprises and, in general, produce more. Let l_g be the total amount of employment generated in the unorganized sector through various government employment guarantee schemes. Hence, the supply function of the unorganized sector may be written as

$$A^S = A\left(\underset{+}{\frac{P_A}{P}}, \underset{+}{\overline{K}}, \underset{+}{l_g}\right) \tag{2.2}$$

A part of this supply of A is used for self consumption by the producers of A. Family enterprises keep the part of the produce that they consider absolutely necessary for survival for self consumption. However, for simplicity and without any loss of generality, we do not explicitly consider that part and assume the whole of the supply of A to be the marketable surplus of the unorganized sector.

Demand for A

The unorganized sector supplies principally the mass consumption goods, which belong to the category of necessities. So demand for A of the capitalists and large landlords is likely to be fixed and, therefore, is ignored here for simplicity. The demand for A mainly comes from the organized sector workers and unorganized sector workers who do not have any family enterprises. For simplicity we assume that the latter spend all their income on A, while the former spend a fraction C_{wA} of their income on A.

Most of the output of A is produced in small firms using family labour and only a small fraction of output originates in the large firms. Let β be the fraction of total labour supplied by hired (landless or material means less) workers. Let l_A be the unit labour requirement for producing A. Therefore, the total labour required to produce A is $(l_A A)$. Now, since l_g denotes employment in the employment guarantee program in a given period, total employment in the unorganized sector is $(l_A A + l_g)$ and total wage income of the hired workers is $w_A . \beta .(l_A A + l_g)$, where w_A denotes the money wage rate in the A-sector. So, hired unorganized sector's workers' demand for A is $\dfrac{\beta w_A (l_A A + l_g)}{P_A}$. We assume w_A to be fixed. This assumption is standard in the Keynesian tradition. This also conforms to reality in the short run. On the other hand, total wage income of the organized sector workers is $w\dfrac{l_y Y}{L_0}$ and their consumption demand for A is $C_{wA}.w(1-t_w)\dfrac{l_y Y}{L_0}$. So, the total demand for A is

$$A^D = \frac{C_{wA}.w(1-t_w)\dfrac{l_y}{L_0}Y}{P_A} + \frac{\beta w_A (l_A A) + \beta w_A l_g}{P_A} \qquad (2.3)$$

The producers of the unorganized sector produce as much as they can with the resources they have at their disposal for purchasing intermediate inputs and labour and sell off their output at whatever prices they can do it. Producers do not have any control over either the aggregate output or the price. The price of A is, therefore, market clearing. The unorganized sector, accordingly, is in equilibrium when supply of A and demand for A become equal, i.e., when the following equation is satisfied:

$$\left(1-\frac{\beta w_A l_A}{P_A}\right)A\left(\underset{+}{\frac{P_A}{P}},\underset{+}{\overline{K}},\underset{+}{l_g}\right) = \frac{C_{wA}.w(1-t_w)\dfrac{l_y}{L_0}Y}{P_A} + \frac{\beta w_A l_g}{P_A} \qquad (2.4)$$

The LHS of (2.4) gives the net supply of *A*, which is defined as the supply of *A* net of the internal demand for *A* that production of *A* directly generates. Note that, for (2.4) to be satisfied for positive values of *Y* and l_g, $\dfrac{\beta w_A l_A}{P_A}$ has to be less than unity. We, therefore, assume this to be the case. If this were not the case, no producers would have produced *A*.

Following the structuralist tradition, we assume here that P_A clears the *A*-market. We have also ignored foreign trade in the output of the unorganized sector for simplicity.

The Foreign Exchange Market:

The BOP consists of trade surplus and net inflow of foreign capital. The latter is assumed to be exogenously given for simplicity. The equilibrium in the foreign currency market is given by the following equation:

$$NX\left(\underset{+}{\frac{P^* e}{P}}, \underset{-}{C_c(1-t)\left(1-w\frac{l_y}{L_0}\right)Y}, \underset{-}{I(\bar{r},e)}, \underset{+}{G, Y^*}\right) + \bar{F} = 0 \tag{2.5}$$

Where *NX*, as we have already mentioned, stands for net export and $\bar{F}$ denotes the exogenously given net inflow of foreign capital.

The specification of our model is now complete. It consists of four equations (2.1), (2.2), (2.4) and (2.5) in four endogenous variables *Y*, *A*, P_A and *e*. We solve them as follows:

Solving (2.5) for *e*, given the policy parameters and the exogenous variables, we get

$$e = e\left(\underset{+}{C_c(1-t)\left(1-w\frac{l_y}{L_0}\right)Y}, \underset{+}{\bar{r}}, \underset{-}{G}, \underset{-}{Y^*}, \bar{F}\right) \tag{2.6}$$

Signs of partial derivatives of (2.6) are quite self-evident from (2.5).

Substituting (2.2), (2.5) and (2.6) into (2.1), we get

$$Y = C_{Wy} \cdot \left[\left\{ w \frac{l_y}{L_0} Y \right\}(1 - t_w) \right] + C_C \cdot \left[\left(Y - w \frac{l_y}{L_0} Y \right)(1 - t) \right] +$$

$$I\left(\bar{r}, e\left(\underset{+}{C_c}(1-t)\left(1 - w\frac{l_y}{L_0}\right)\underset{-}{Y}, \underset{+}{\bar{r}}, \underset{-}{G}, \underset{-}{Y^*}, \bar{F} \right) \right) + I^A\left(\bar{r}, \bar{K}\right) + G - \bar{F} + \qquad (2.7)$$

$$mA\left(\frac{P_A}{P}, l_g, \bar{K} \right)$$

We can solve (2.4) and (2.7) for the equilibrium values of Y and P_A. The solution is shown in Figure 2.1, where AA and YY represent (2.4) and (2.7) respectively. The solution corresponds to the
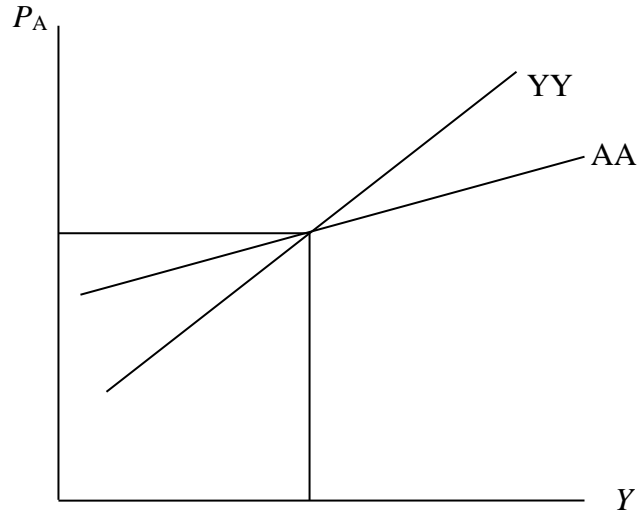
Derivation of the Equilibrium Values of Y and P_A

Figure 2.1

point of intersection of these two schedules.

2.2 Effect of a decline in the share of the organized sector workers in the output of the organized sector measured by $\dfrac{wl_y}{L_0}$

Using the model delineated above, we have carried out a few comparative static exercises. We have first focused on how a decline in the share of the organized sector workers in the output of the organized sector is likely to affect Y and A. We have derived the following result:

Proposition 2.1: Following a fall in the share of the organized sector workers in the output of the organized sector due to technological and managerial changes, if import intensity of consumption of the capitalists and the exchange rate sensitivity of investment are sufficiently

large, conditions that are highly likely to be satisfied in reality in India, both *Y* and *A* will contract. Thus, growth rates of both Y and A will contract under the conditions specified above.

In what follows, we will try to explain the intuition of this result. Following a fall in the share of the workers in the output of the organized sector, their consumption demand for the domestic organized sector's output goes down, while capitalists' consumption demand increases. However, the major part of the latter, if not the whole of it, is likely to represent demand for imported goods. Hence, at the initial equilibrium (Y, P_A, e), consumption demand for the domestic organized sector's output is likely to go down. On the other hand, the increase in consumption demand for imported goods creates a BOP deficit inducing a rise in *e*. The increase in *e* is unlikely to produce much of an impact on the real exchange rate, as the rise in *e* is likely to substantially raise *P*, since India's production is highly import intensive. (To avoid analytical complications, we have not made *P* an increasing function of *e*). In India, the rise in the exchange rate improves net export principally through its dampening impact on investment, which lowers demand for not only domestic investment goods but also imported capital goods. Thus, at the initial equilibrium (Y, P_A), there is likely to emerge a large excess supply of *Y* in countries like India. The decline in the workers' income in the organized sector also reduces demand for unorganized sector's output creating an excess supply of *A* at the initial equilibrium (Y, P_A). Thus, P_A will fall reducing *A* and, thereby, contributing to the excess supply of *Y*. *Y*, will, therefore, also begin to decline. P_A, *A* and *Y* will, accordingly, go on falling until the new equilibrium is reached. The above discussion yields Proposition 2.1.

Let us explain in brief why a fall in the values of *Y* and *A* indicates a decline in the growth rates of *Y* and *A*. The purpose of the kind of static macro models presented here is to explain the actual short period growth rates and inflation rates. The model represents an economy in a given period. Output and price levels of the previous period are given and known in the period under consideration. Hence, determination of the output and price level in the given period amounts to determination of the growth rate of output and the inflation rate from the previous period to the given period. Thus, our model states that, given everything else, following a decline in the organized sector's workers' share in the organized sector's output, growth rates of *Y* and *A* would be less than what they otherwise would have been. One can see in this context Romer (2000, 2012). More precisely, this model identifies the rate of growth in the share of the organized sector's workers in the output of the organized sector as an important determinant of the growth rates of *Y* and *A* and the rate of inflation in P_A. The growth rates of *Y* and *A* and the rate of inflation in P_A have been found to be increasing functions of the rate of growth in the shares of the organized sector workers in the organized sector's output.

2.3 The Effect of an Increase in $\overline{K}$

The organized sector employed only 6 percent of the workforce in 2004-05 in India and it grew since then without generating any employment. The labour force, however, grew at the

rate of almost 3 percent during 1999-2000 – 2004-2005 (see Tables 2.3, 2.4 and 2.5 of Chapter 2). There is no reason to suppose that these trends have changed much since then. Therefore, one can safely presume that almost all the workforce is employed in the unorganized sector. Therefore, the government should strive to step up the growth rate of the unorganized sector to provide everyone with gainful employment. We, therefore, examine here the impact that a given increase in $\overline{K}$ produces on Y and A. Our analysis yields the following proposition:

Proposition 2.2: An increase in $\overline{K}$ in the unorganized sector will bring about an increase in the growth rates of outputs of both the sectors and increase employment levels in both the sectors.

The intuition of the result may be explained as follows. An increase in $\overline{K}$ consists in, for example, electrification of new areas, expansion of irrigation, flood control facilities, larger scale of activities in R&D that yields better seeds, farming practices, better implements etc. Therefore, an increase in $\overline{K}$ induces the unorganized sector's producers to undertake complementary private investment, for example, in new electric connections, implements etc. Import intensities of these investments in India are practically nil. The increase in infrastructure capital enables the farmers and other producers, who are not resource constrained, to bring more land under production and, thereby, produce more *A* and demand more intermediate inputs from the organized sector. Thus, at the initial equilibrium Y, P_A and *e*, there emerges excess supply of *A* and excess demand for *Y*. P_A will fall to restore equilibrium in the A-sector. As P_A falls, supply of *A* falls, while demand for *A* rises (see (2.4). Hence, equilibrium in the A-sector will be restored at a higher level of *A*. Thus, even at this lower P_A, there will still exist excess demand for *Y* at the initial equilibrium *Y*. Hence, *Y* will expand raising demand for *A*. Thus, Y, P_A and *A* will go on rising until the new equilibrium is reached.

Since more than 95 percent of the work force is engaged in the unorganized sector, as follows from our above discussion, raising $\overline{K}$ is the most important way of generating employment.

2.4 The Effect of an Increase in G to Raise $\overline{K}$ Financed by Taxing Capitalists' Income

We examine here the impact that an increase in G to raise $\overline{K}$ financed by taxing capitalists' income will produce on Y, A and P_A. The result we get is the following:

Proposition 2.3 : If the government raises *G* and finances it by taxing capitalists' income, growth rates of both the sectors will go up if marginal propensity to spend on imports of the capitalists is larger than that of the government expenditure on $\overline{K}$, a condition which is highly likely to be satisfied in India. Employment in both the sectors will increase too under the same condition.

The intuition of the above result may be briefly stated as follows. Following an increase in G by dG financed by taxation of capitalists' income, aggregate demand for Y at the initial equilibrium (Y, P_A, e) will go up by $(1 - C_c)dG$. However, the increase in G will be partly spent on imported goods lowering net export, (NX), by $NX_G dG$. On the other hand, the decline in capitalists' consumption will also reduce their demand for imported consumption goods raising net export by $-NX_{cc}C_c.dG$, where $-NX_{cc}$, which measure the amount of increase in capitalists' demand for imported consumption goods per unit increase in their consumption demand, is the import intensity of capitalists' consumption and $-NX_{cc}C_c$ is the capitalists' marginal propensity to spend on imports. It measures the increase in capitalists' demand for imported consumption goods per unit increase in capitalists' income. Since the capitalists constitute a small class of extremely rich people and since India is technologically backward, import intensity of capitalists' consumption may be reasonably taken to be unity. On the other hand, government spending on irrigation, drainage, flood control facilities etc. will be mostly on domestic products. Only the high-tech products will be imported. Moreover, the government can design its spending in such a manner that its import intensity is reduced to the minimum. For all these reasons, net export in the net is likely to rise lowering e. The fall in e will raise investment demand. Thus, at the initial equilibrium (Y, P_A), in all likelihood, there will emerge an excess demand for Y inducing the producers of Y to raise Y. The increase in Y will create an excess demand for A leading to a rise in both P_A and A. This is how Y, P_A and A are highly likely to go on rising until the new equilibrium is reached. This explains proposition 2.3.

2.5 Effect of an Increase in G to raise $\overline{\overline{K}}$ Financed by Means of Indirect Taxation

We will examine here the impact of an increase in G to raise $\overline{\overline{K}}$ financed by raising indirect tax collection. The analysis yields the following result:

Proposition 2.4: If the government raises *G* and finances it with indirect tax revenue, it is highly likely to reduce output and employment levels in both the organized and the unorganized sectors.

The intuition of the result may be explained as follows. Government raises *G* and finances it by raising indirect tax collection. The additional indirect tax revenue comes from both the workers of the organized sector and the capitalists. Since marginal propensity to consume the output of the organized sector of both these classes of people is less than unity, demand for *Y*, at the initial equilibrium Y, e and P_A, goes up. This will have its repercussions in the foreign currency market. A part of the additional government spending may be made on imported goods, while capitalists' demand for imported goods will fall. However, the major impact will come from the hike in the indirect tax rate and the increase in the price of *Y* that it brings about. As close substitutes of Indian products are available everywhere, this price rise will substantially reduce net export and in the net produce a large BOP deficit sending the exchange rate soaring. The increase in the exchange rate will have insignificant impact on the real exchange rate in India. This is because production in India is highly import intensive and

a rise in the exchange rate by raising the cost of production will raise the domestic price level substantially. However, it will also make foreign capital goods costlier. This will reduce investment demand in India significantly as India's investment is highly import intensive. Therefore, the rise in the exchange rate will equilibrate the foreign currency market mainly by reducing investment demand. The rise in the price of Y will also reduce supply of A and create an excess demand in the A-market at the initial equilibrium P_A and Y. P_A will rise to equilibrate the A-market. However, a rise in P_A not only raises supply of A but also lowers demand for A. Hence, in the new equilibrium in the unorganized sector, A will be less, with Y remaining unchanged at its initial equilibrium value. This will also lower demand for Y coming from the A sector. Thus, in the net, demand for Y is likely to fall creating an excess supply of Y at the initial equilibrium Y. Y will therefore fall to equilibrate the Y-sector. However, the fall in Y will reduce government's indirect tax collection inducing it to hike indirect tax rate further. This will again, through the process described above, will lower I and A and bring about a further contraction in Y. This process of contraction in Y and A will continue until the new equilibrium is reached. This explains Proposition 2.4.

2.6 Summary of Chapter 2

The organized sector in India, which contributes about half of India's GDP, grew at a high rate in the post-reform period without generating any employment. In 2004-05, it employed only about 5 percent of the labour force. In all likelihood, the fraction of the labour force employed in the organized sector is falling rapidly since then. For generating employment, therefore, one has to turn to the unorganized sector, which employs most of the labour force. This chapter shows that, if the government augments the stock of infrastructure capital in the unorganized sector, employment in both the sectors will go up. If the government raises its investment in the infrastructure of the unorganized sector and finances it by taxing the capitalists' income, employment and output in both the sectors are highly likely to go up. If, however, the government finances its investment by hiking indirect tax rates, employment and output in both the sectors are highly likely to contract.

3. Chapter 3: Food Security in India under Free Market Conditions: A Macro-Theoretic Study

Food security is an important aspect of economic development in all the countries of the world. The ranking of India in the Global Hunger Index (2019) is 102 among 117 countries. This underscores very strongly the extremely poor performance of the Indian economy relative to the other economies of the world in combating hunger. The data on per capita net availability of food grains in India also give empirical support to this. Table 3.1 in Chapter 3 shows that per capita net availability of food grains (per annum) in India has declined from 186.2 kg per year to 180.5 kg per year from 1991 to 2019. It reveals a food crisis in Indian economy. The National Crime Records Bureau (NCRB) report for 2016 (NCRB(2016)) and the Government of India(2016) report underscore the country's grim agrarian crisis by revealing a high number of suicides of Indian farmers. Adoption of the New Economic Policy (NEP) in 1991 and constant monitoring by WTO since then has eroded the autonomy of the

government in pursuing development policies regarding agriculture starting from input subsidy to the procurement program. This chapter seeks to show how free play of market forces endangers food security of most of the Indians.

Literature Review

The existing literature points to four important features of Indian agriculture: (i) preponderance of small and marginal farmers who own and cultivate 85% of total agricultural land holdings and account for 40 percent of aggregate marketable surplus (NABARD(2020)), (ii) low prices received by the farmers (Ahangar(2013) , Abishek (2016), Mitra & Mookherjee et al. (2018))), (iii) inadequate supply of formal credit ((Mohan (2006) ,Golait (2007),Government of India(2014)), (iv) decline in public investment in agriculture in the post-reform period (Mishra (2006), Godara et. al.(2014)). Along with this, some studies have raised the issue of indebtedness of the farmers and farmers' suicide (Mishra (2006), Jeromi (2007), Sadanandan(2014)) in the context of Indian agriculture. There is, however, no theoretical study that incorporates all these major features of Indian agriculture and examines how India is likely to perform in the sphere of food security under free market conditions. The objective of the present chapter is precisely this.

3.1 The Basic Model

We have developed here a macro model which focuses principally on the food producing sector of the economy. Here we abstract from foreign trade in food for simplicity. We shall explore the implications of foreign trade in food in our future research. We have incorporated in this model all the relevant salient features of Indian agriculture delineated above.

Food sector

The output of this sector is denoted by X. Production of food requires land, labour and industrial intermediate inputs. The farmers have a given amount of land and it is assumed for simplicity that sharecropping is the mode of cultivation for large landowners. Other farmers cultivate their own land with family labour. Sharecroppers also carry out cultivation using family labour. For simplicity hired labour is ignored. The producers require "$1/a$" amount of industrial intermediate inputs to produce 1 unit of X. The assumption of fixed coefficient production function is a simple way of capturing the fact that how much food the farmers can produce depends crucially on how much industrial intermediate inputs they are able to buy. Given the preponderance of small and marginal farmers in the food sector, it may be quite realistic to assume that production of X is constrained by the availability of credit from the financial sector as the producers of this sector have very limited resources of their own to buy the essential inputs of production.

Farmers and sharecroppers cultivate land with family labour and keep α fraction of the total output for self-consumption. It is assumed that they consume only X. As their real income increases, their consumption also increases. So their consumption is an increasing function of X which in the simplest form is given by αX here. Hence, the marketable surplus of X

becomes (1-α)X. In keeping with reality (see Mitra et al.(2018)), we assume that the farmers do not sell their produce directly to the consumers. Instead they sell their produce to the middlemen who are in all likelihood the representatives of the corporate sector. They are enormously mighty financially. The farmers most of whom are small and marginal have a perishable crop to sell after harvest and they have no storage facility of their own. All these factors make the bargaining strength of the middlemen infinitely large relative to the farmers. Accordingly, the middlemen offer the farmers the minimum possible price, denoted by $\bar{P}_X$, at which the farmers are willing to sell their marketable surplus. The determination of $\bar{P}_X$ can be shown with the help of the following equation:

$$\bar{P}_X = \frac{1}{a} P_Y \theta; \; \theta > 1 \tag{3.1}$$

Let us explain (3.1). First, consider the non-food producing sector, which constitutes the rest of the economy. We will refer to it as the industrial sector. We denote by Y the output of industrial goods produced by the industrial sector and P_Y denotes the price of Y. $1/a$ units of Y is required as intermediate inputs to produce 1 unit of X. So, the average variable cost of production of X is $\frac{1}{a} P_Y$. Since farmers on the average do not have any bargaining strength vis-à-vis the middlemen, the middlemen, a la Kalecki (1954) set $\bar{P}_X$ by applying the minimum possible mark-up to this average variable cost of production. This mark-up, denoted by θ, is taken to be exogenously given, and $\theta > 1$. This explains (3.1).

Given the preponderance of small and marginal farmers in India and given their woefully limited purchasing power, to capture, hopefully, a crucial aspect of Indian reality, we assume that food output is constrained by the amount of industrial intermediate inputs the farmers can purchase. The amount of own fund the farmers have in their possession is denoted by S. Using S, they can produce $a\frac{S}{P_Y}$ amount of X and the revenue of the farmers from S, denoted R_S, is given by

$$R_S = \bar{P}_X . a\frac{S}{P_Y}(1-\alpha) = \frac{1}{a} P_Y \theta . a\frac{S}{P_Y}(1-\alpha) = \theta(1-\alpha)S \tag{3.2}$$

In addition to their own fund, the farmers also borrow from both formal and informal credit markets. Given the lending norms of the lenders and the amount of collateral the farmers can offer, they get at the beginning of every period a fixed amount of loan from the lenders, which we denote by L_x. They use L_x to buy industrial intermediate inputs to produce X. They use a part of the sales proceeds from the sale of the output they produce with loan to pay off their outstanding debt along with interest at the end of every given period. They can use the rest either to augment their own consumption or to save in order to increase their own fund of the next period or for both. For simplicity, we assume that they use the rest of the sales proceeds to save to augment their own fund in the next period. We denote the amount of

net revenue the farmers get from the sale of X produced with loan after paying back the loan along with interest by R_L. It is given by

$$R_L = \bar{P}_X a \frac{L_X}{P_Y} - (1 + r_0)L_X = \theta \frac{1}{a} P_Y a \frac{L_X}{P_Y} - (1 + r_0)L_X = [\theta - (1 + r_0)]L_X \qquad (3.3)$$

In (3.3), r_0 denotes the interest rate on the outstanding loans of the farmers. We shall explain it shortly. We assume that $[\theta - (1 + r_0)] > 0$ because otherwise the farmers will not borrow. The sum of R_S and R_L constitutes farmers' own fund in the next period. Therefore, denoting farmers' own funds in periods $t - 1$ and t by S_{t-1} and S_t, respectively, we get

$$S_t = \theta(1 - \alpha)S_{t-1} + [\theta - (1 + r_0)]L_x \qquad (3.4)$$

The RBI regulates interest rates in the formal credit markets. Moneylenders in the informal credit market fix their interest rates by applying fixed mark-ups to the formal lending rates. These mark-ups cover their transactions cost, profit margin and risk premia. The smaller a farmer, the higher the interest rate he faces. We denote the average interest rate faced by the farmers by r_0. We take it to be given. We can solve (3.4) for the steady state value of S. We assume $\theta(1 - \alpha)$ to be less than unity for the sake of existence of a meaningful steady state and for its stability.

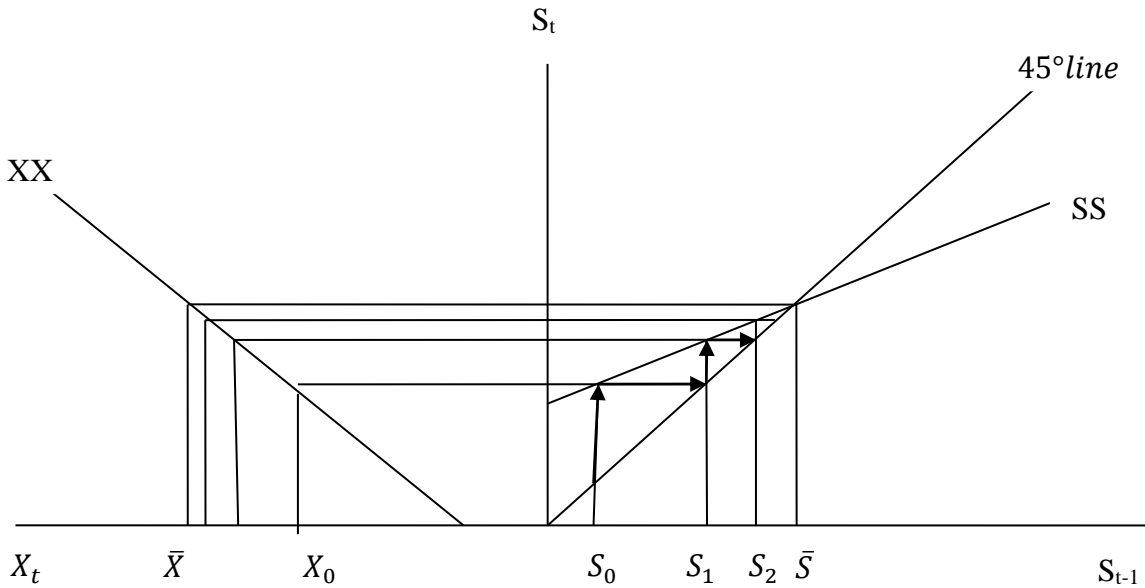**Determination of the Steady State Values of S and X**

Figure 3.1

The output of food in period t is given by

$$X_t = a\frac{S_t}{P_Y} + a\frac{L_X}{P_Y} \tag{3.5}$$

Substituting the steady state value of S in (3.5), we can derive the steady state value of X.

Following Kalecki(1954), we assume that the industrial sector is an oligopoly and producers fix P_Y by applying a fixed mark-up to the average variable cost of production. The only variable input that is used in production is labour. Labour requirement per unit of Y and the money wage rate in industry, as standard, are assumed to be fixed. Hence, P_Y is fixed in (3.5).

Derivation of the steady state value of S:

The steady state value of S, denoted $\bar{S}$, as follows from equation (3.4), is given by

$$\bar{S} = \frac{[\theta - (1+r_0)]L_X}{1-\theta(1-\alpha)} \tag{3.6}$$

Substituting (3.6) into (3.5), we get the steady state value of X, denoted $\bar{X}$. It is given by

$$\bar{X} = \frac{a}{P_Y}\left[\frac{[\theta-(1+r_0)]L_X}{1-\theta(1-\alpha)} + L_x\right] \tag{3.7}$$

The derivation of the steady state values of S and X are illustrated graphically in Figure 3.1.The right-side panel of Figure 3.1 shows the steady state value of S whereas the left-side panel shows that of X. In the right-side panel the SS curve represents equation (3.4) in the (S_{t-1},S_t) plane. The steady state value of S, denoted by $\bar{S}$, is given by the point of intersection of SS and the 45^0 line.

3.2 Results Derived

We will report here the major results this chapter has derived. Eq. (3.7) yields most of the major results of the chapter. Indian food sector is dominated by the small and marginal farmers. On the other hand, the traders are highly likely to be the representatives of the capitalists or the corporate sector. Farmers' crop is perishable and they have no storage facility. Hence, their bargaining strength is nil vis-à-vis the traders. In the absence of any kind of government support, therefore, θ will be at the lowest possible level. From (3.7) and also from (3.4) and Figure 3.1, we find that a fall in θ will bring about a cumulative decline in $\bar{X}$. Accordingly, the value of θ pushed to the lowest possible level will reduce food output to a very low level.

In a free market, financial institutions are profit driven. During the Nehru-Mahalanobis era, financial institutions in India were social organisations. All the interest rates were

administered by the government and the planners dictated the credit disbursal pattern. Thus, financial institutions had to lend to the farmers at very low interest rates as much credit as was necessary to enable the farmers to maximize food output by fully utilizing their land and the available infrastructure. However, following the adoption of the New Economic Policy (NEP) in July 1991 replacing the Nehru-MahalanobisProgramme, the financial institutions of India have become profit driven commercial organizations. They consider it extremely risky to lend to the small and marginal farmers because of their low credit worthiness and also because of the uncertainties associated with production and price of food. Under free market conditions, therefore, the farmers are likely to get substantially inadequate amount of loan at high interest rates. It follows from (3.7) and also from (3.4) and Figure 3.1, that a fall in L_X and a rise in r_0 will lead to a large and cumulative fall in food output.

During the Nehru-Mahalanobis era, the government heavily subsidized industrial intermediate inputs purchased by farmers. Under the NEP, the farmers have to buy these inputs from the corporate sector which has tremendous monopoly power. Hence, P_Y is likely to be quite high under free market condition that the NEP seeks to establish. From (3.7) and also from (3.4) and Figure 3.1, it is also clear that a given rise in P_Y will lead to a large and cumulative decline in food output. The conclusion that these results yield is that under free market conditions food output in India is likely to be quite small relative to its potential or maximum possible level, given the land and infrastructure available to the farmers.

This chapter also examines the impact of a onetime loan waiver and that of a onetime adverse natural shock. We explain them below:

Loan waiver

We have delineated above the kind of terrible exploitation and deprivation farmers are subject to in India under the NEP. They often take to the streets to draw the attention of the government and the people to their plight. They demand government intervention to ensure that they get just prices for their produce, cushion against uncertainties, adequate infrastructure and adequate loans on reasonable terms. Political parties in India often recommend loan waiver to give relief to the farmers. We examine here what kind of impact a one-time loan waiver is likely to produce on the farmers' economic condition and India's food security.
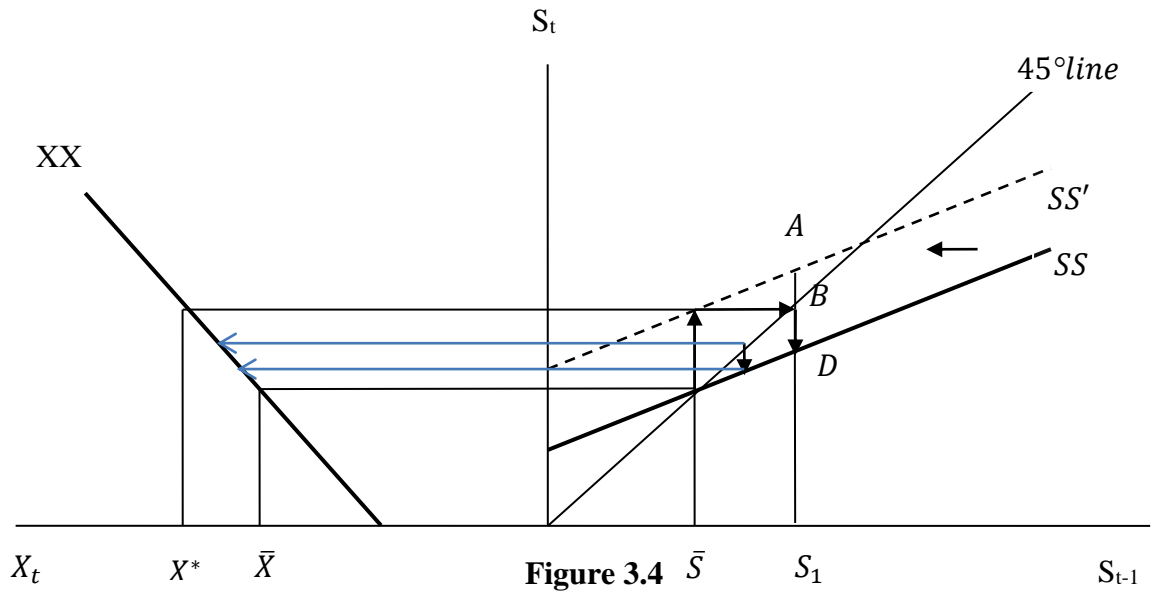
The Impact of a Loan Waiver

Figure 3.4

Suppose in a given period, period 0, $L_X(1+r_0)$ is waived. This waiver is applicable to period 0 only. We shall examine its impact using Figure 3.4 of Chapter 3, where SS represents equation (3.4). With $L_X(1+r_0)=0$, SS, as follows from (3.4) shifts upward by $L_X(1+r_0)$. The new SS is labeled SS'.

In period 1, however, SS' moves back to SS, since the loan waiver here, as is usually the case, a one-time programme. The XX schedule, however, as follows from (3.5), remains unaffected. Suppose in period 0, the economy was in the steady state with $S_0=\bar{S}$. In period 0, there is loan waiver and the farmers' saving of $L_X(1+r_0)$ on account of the loan waiver will be added to their own fund in period 1. In period 1, therefore, S will increase from $\bar{S}$ by $L_X(1+r_0)$ and X by $L_X(1+r_0).(a/P_Y)$ from $\bar{X}$ to X^* see (3.5). However, from period 2 onward S and along with it X will go on falling until they become equal to $\bar{S}$ and $\bar{X}$ again. The time paths of S and X are shown in Figure 3.4 with arrows. Thus, a one-time loan waiver will raise X only temporarily.

Adverse Natural Shock

Food production to a considerable extent depends on the state of nature in India where there is a huge deficiency in infrastructural facilities to combat natural adversities. The scenario has become all the more depressing on account of the drastic decline in public investment in infrastructure in the post-reform period (Mishra (2006), Godara et. al.(2014)). An adverse natural shock drastically reduces food output corresponding to any given stocks of land, infrastructure and the amount of intermediate inputs used. Outputs of many of the small and marginal farmers become so low that they have to use a larger fraction of the outputs for self-consumption for survival. We incorporate the following modifications to capture the impact of natural adversities. We assume that the average productivity of the industrial inputs instead of being a is aN, where N represents the state of nature. It is unity when the state of nature is normal and the worse the state of nature, the smaller is the value it assumes. Similarly, the

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fraction of food output kept for self-consumption is now (α/N) instead of being α. It is now reasonable to rewrite the price setting rule as eq.(3.14) of Chapter 3, since the average variable cost of production is $\dfrac{1}{aN}$.

$$\overline{P}_X = \frac{1}{aN} P_Y \theta \tag{3.14}$$

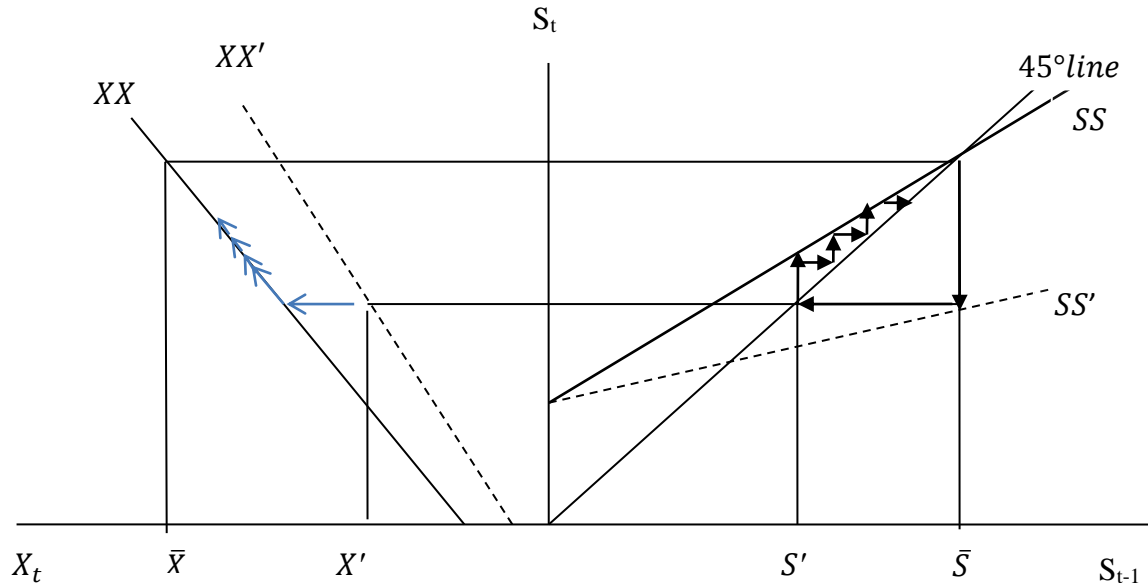**The Impact of a One-Period Adverse Natural Shock**

Figure 3.5

Let us explain (3.14) in detail. N is less than unity when nature is worse than normal. *N* is greater than unity when nature is better than normal. In (3.14), we adhere to the principle that the traders apply a fixed mark-up to the average variable cost of production to determine the price they offer to the farmers. They take into account the value of *N*, while computing the average variable cost of production. Thus, in times of adverse natural shock that depresses output below its normal level, traders' offer price becomes higher than its normal level and conversely. To induce farmers to undertake production for the market, they should be assured of some minimum profit. To ensure that, the traders have to take into account the value of N for computing the average variable cost of production and they have to fix θ in such a manner that this condition is fulfilled.

Incorporating all the changes noted above in (3.4) and (3.5), we get eq. (3.15) of Chapter 3:

$$S_t = (1 - \frac{\alpha}{N})\theta.S_{t-1} + [\theta - (1 + r_0)]L_X \tag{3.15}$$

Note that the revenue from the sale of marketable surplus of food produced with farmers'

own fund is $\overline{P}_X\left(1 - \frac{\alpha}{N}\right)\frac{S_{t-1}}{P_Y}aN = \theta\left(1 - \frac{\alpha}{N}\right)S_{t-1}$. Again, net revenue from the sale of food

produced with loan is given by $\overline{P}_X \frac{L_X}{P_Y}aN - (1 + r_0)L_X = [\theta - (1 + r_0)]L_X$. This explains

(3.15).The food output as follows from equation (3.5) now becomes eq. (3.16) of Chapter 3.

$$X_t = aN\frac{S_t}{P_Y} + aN\frac{L_X}{P_Y} \tag{3.16}$$

The impact of a one-period fall in N

Let us examine the impact of a one-period fall in *N* from unity on the production of food and farmers' economic condition. We shall do this with the help of Figure 3.5 of Chapter 3, where the SS schedule in the first quadrant represents (3.15), for *N* = 1. The XX schedule in the second quadrant represents (3.16), with *N* = 1. Let us now examine how these schedules will shift following a decline in *N* by *dN*< 0. Let us focus on the SS schedule first. Deterioration in the state of nature in period 0, captured by a fall in *N* by *dN* from one, will

keep the vertical intercept of SS unchanged, but reduce its slope by $\frac{\alpha\theta}{N^2}dN$. Hence, SS will

rotate downward. The new SS schedule is labeled SS$^/$. Focus now on XX. Both its horizontal intercept and slope become smaller. It, therefore, shifts to the left and become steeper. The new XX is labeled XX$^/$. If the shock lasts only for one period, in the next period, both SS and XX will move back to their old positions. We shall now describe how S and X will behave over time following a one-period adverse natural shock. Suppose initially the economy was in steady state with $S = \overline{S}$ and $X = \overline{X}$, respectively. Also suppose that the one-time adverse natural shock occurs in period 0 lowering X in period zero to X$^/$ – see Figure 3.5. As a result, S in period 1 will fall to S$^/$ - See Figure 3.5. From the next period, period 2, however, S and X will start rising back towards their initial steady state values as shown by the arrows in Figure 3.5.

The above analysis points to one reason why farmers commit suicide in India. Following a significant adverse natural shock, many farmers' food output goes much below the subsistence level leaving them hungry. Since it will take long for food output to move back to its initial level, many farmers being unable to bear the pain of hunger may commit suicide. The larger the preponderance of small and marginal farmers, the greater is likely to be the incidence of farmer suicide following a significant adverse natural shock.

It is also clear from the above analysis that the deleterious impact of an adverse natural shock may be mitigated though a policy of loan waiver. One can easily work out that through a policy of loan waiver along with suitable amount of transfers to farmers for the purpose of enabling them to increase purchases of industrial intermediate inputs, it may be possible to restore food output to its initial steady state level in the period just next to the one in which the adverse natural shock occurs.

3.3 Summary of the Results Derived in Chapter 3

The analysis of this chapter shows that the food security of the common man in India is gravely threatened under free market conditions. In a free market, farmers' bargaining strength is nil vis-a-vis the traders. Hence, the farmers will get for their produce the lowest possible price. In a free market, financial institutions are profit driven. As most of the arable land in India is cultivated by the small and marginal farmers who have very little to offer by way of collateral, they are likely to get a very small amount of loan at very high interest rates. Farmers also have to buy industrial intermediate inputs from the corporate sector. As the corporate sector has tremendous monopoly power, the prices of industrial intermediate inputs are likely to be fairly high. For all these reasons quite a large part of the land and infrastructure available to the farmers may remain unutilized gravely threatening the food security of the ordinary people. This study also shows that a onetime loan waiver for the farmers increases food output and improves farmers' well-being only temporarily. It does not produce a permanent impact. Finally, the study yields the result that a onetime adverse natural shock may depress food output and farmers' well-being below their respective normal levels for quite some time. This may force many farmers to starve and commit suicide.

4. Chapter 4: Government Intervention and Food Security: Need and Nature

In the previous chapter, we examined the issue of food security under free market conditions. We pointed to several reasons why free market conditions will gravely threaten India's food security causing immense misery to the farmers and the poor. In this chapter, we point to two more factors that adversely affect food security in a free market. The factors we identify here are first, the uncertainty associated with production and price of food and second, the behavior of the corporate sector, which, because of its monopoly power, finds it optimal to regularly hike prices of industrial intermediate inputs used in food production. The studies undertaken in this chapter and the last one show that free market forces will lead to large scale underutilization of the available land and infrastructure in the food sector. These studies point to the urgency of appropriate government's policies for maximizing food output through full utilization of the land and infrastructure of the food sector. This chapter seeks to derive these policies. It also seeks to derive the policy that the government should adopt to distribute the surplus food output of the food sector among the non-farmer people equitably. It, then, examines the implications of the recently passed three Farm Laws and concludes that the objective of these laws is to hand over Indian agriculture to the corporate sector. It, then, proceeds to examine the implications of corporatization of Indian agriculture. The importance

of the issues considered here can hardly be overemphasized. The endeavour is worthwhile because the issues considered here are examined in a rigorous theoretical framework, which we hope capture all the relevant salient features of India. Such a study, to the best of our knowledge, does not exist in the literature.

Let us briefly state the major results derived in this chapter. It first focuses on the uncertainty associated with price and production of food. Food production is highly uncertain. Adverse natural conditions can damage the crop considerably. Moreover, a long time elapses between the sowing of a crop and its harvesting. Farmers cannot know what price will prevail at the time of harvesting of the crop. Food crop is perishable. Farmers, as they are financially weak, do not have adequate storage space to store their crop for a long period of time. Hence, once the crop is harvested, the farmers have to sell it off as early as possible. They have to meet their debt service charges from the sales revenue. The longer the delay in selling the crop, the larger are the debt service charges of the farmers. Moreover, any given crop is produced by a very large number of farmers. Hence, no individual farmer has any control over the total supply of the given crop. Thus, after the crop is harvested, the farmers cease to have any bargaining strength and are completely at the mercy of the traders. Thus, if the price they receive after the harvest is very low, they become bankrupt. The factors mentioned above make food production highly risky to the farmers. In any given period, the farmers have a given amount of their own fund, which they can utilize for food production. Alternatively, they can park it in a safe financial asset yielding a given interest rate. Again, the farmers can borrow at a given interest rate. How much they can borrow depends upon the collateral they can offer. Thus, in any given period, farmers' own fund plus the maximum amount of loan they can secure for food production give the total amount of fund at the disposal of the farmers for food production. We have argued in this chapter that the greater the uncertainty of food production, the smaller is the fraction of the farmers' fund the farmers will use for food production. This study points to another reason why free market adversely affects food security. Farmers use large amounts of industrial intermediate inputs for food production. The corporate sector under the control of just a few capitalists supplies the farmers with these inputs. Our study shows that the capitalists may have a vested interest in raising the prices of their products at regular intervals. A hike in the prices of industrial products will reduce farmers' demand for their products. Hence, scarce productive resources will be released from production of ingredients for food production. Capitalists, just a few in numbers, must be knowing this and they will raise their consumption and investment demand commensurately so that the scarce productive resources released from the production of food (wage goods) get utilized to cater to their needs. Thus, by raising prices the capitalists are able to grab a larger amount of goods and services at the expenses of farmers and ordinary workers. We think that this is the only reason why prices rise all the time in capitalist countries. Data on inflation show that the rate of inflation has always been positive in every capitalist country every year.

The results derived in this chapter and the last one show that to ensure full utilization of land and infrastructure available for food production, i.e. to maximize food output, government intervention in the foods sector is absolutely essential. The study in this chapter shows that to achieve this task and to eliminate farmers' dependence on credit, the government should

supply the farmers with industrial inputs at prices fixed at such low levels that the farmers are able to buy as much industrial input as they need to fully utilize their land and infrastructure with their own fund in the given period. To remove price uncertainty of the farmers, the government should buy up all the marketable surplus of the farmers at a price, which we will refer to as the procurement price. The procurement price should be fixed at such a level that the farmers' sales proceeds equal the amount of farmers' own fund in the given period. This will enable the farmers to maximize food production in the next period also provided the government keeps the price at which it supplies the industrial inputs fixed. Thus, if the procurement price and the price at which the government supplies industrial inputs are kept fixed, farmers will be able to produce the potential level of food output period after period. To increase the potential level of food output, the government should invest heavily in infrastructure and research and development in the food sector. We have discussed the best way of doing it in detail in Chapter 2.

Let us now focus on the issue of distribution of the food procured by the government. The government should distribute it equally among the non-farmer population. Therefore, the government should fix a per capita quota of food by dividing the amount of food to be distributed by the number of non-farmer persons. We will call the price at which the food is distributed the ration price of food. The employed industrial workers spend all their income on food. They are assumed to be too poor to save or to consume non-essential items of consumption. Hence, the ration price of food should be fixed in such a manner that each of the industrial workers is able to buy with his income only the quota amount of food. Let us now focus on the issue of financing the food procurement cum distribution and input subsidization programme. Note that the farmers pay to the government their own fund in a given period for the industrial intermediate inputs they buy from the government. They again get back the same amount as revenue from the sale of the marketable surplus of food to the government. This part of the programme is, therefore, self-financed. The government, therefore, has to finance only the input subsidy. Let us now examine how the government can do it. Under the programme delineated above, the only sector that faces an expansion in demand is the industrial sector. This happens because output of food rises from a low level to its potential level. If the existing capacity in the industrial sector is large enough to accommodate the cumulative expansion in industrial output that this increase in demand gives rise to, the subsidy can be financed by borrowing from the RBI. In the other case, capitalists' income has to be taxed so that capitalists' consumption and investment demand go down to such an extent that the existing industrial capacity is able to fully accommodate the food policy induced increase in demand for industrial output.

This chapter then focuses on the three recently passed Farm Laws and examines their implications in detail. The first of these three acts is called The Farmer Produce Trade and Commerce (Promotion and Facilitation) Act, 2020.This law establishes free market in agricultural produce. Previously, State Governments set up Agricultural Produce Market Committees (APMCs). Farmers could sell their produce and traders could buy farmers' produce only in the market yards designated for such transactions by the APMCs. These market yards are referred to as mandis. To ensure that the farmers get just prices for their

produce and to preclude the possibility of cheating, traders could buy from the farmers their produce only in the mandis under the supervision of the State Governments. More importantly, to ensure that the farmers get just prices for their produce, the Food Corporation of India (FCI) or State Government Agencies on behalf of the FCI procured food grains from the mandis at pre-specified procurement prices (which are also referred to as minimum support prices or MSPs), which were fixed at remunerative levels and announced well ahead of the sowing of the crops to do away with the price uncertainties of the farmers. The farmers could sell as much as they wanted at the procurement prices. Even though FCI's procurement operations cover only major food grains, it effectively sets a floor to the prices of other agricultural crops as well, since farmers to a considerable extent have the option of not producing other crops in their land if they are not assured of remunerative prices for them. This is because they can use their land only to produce those crops, which are covered by the government's procurement operations.

This Act stipulates that purchase and sale of framers' produce need not be confined to mandis. Traders can purchase farmers' produce from the farmers wherever they want. These purchases and sales can take place even on digital platforms. This Act enables the corporate sector to lure the farmers away from the mandis by offering them higher than the procurement prices initially. If this continues for a few years, the government will get the excuse to abolish the mandis and do away with its procurement operations. Once this happens, farmers with their perishable output and no storage facilities will be completely at the mercy of the mighty corporations. The corporate sector then will secure all the marketable surplus of the farmers at the lowest possible price.

The Farmers (Empowerment and Protection) Agreement on Price Assurance and Farm Services Act, 2020 is the second of the three Acts. This Act creates a legal framework for contract farming in agriculture. Under this Act, a buyer and a farmer can enter into a written contract prior to the production or rearing of any farm produce for the delivery of an agricultural produce of a specific quality and standard at a specific time at a specific price. The buyer may also supply the farmers with all the different kinds of inputs. Before the time of the delivery, the buyer can assess whether the quality of the produce to be delivered meets the standard specified in the contract. He can hire the services of an expert agent for this purpose also. If the farm output does not come up to the contract-specified quality, the buyer can refuse to buy it.

This Act is of considerable concern to us all. The reason is the following. Most of the farmers are fund-constrained. The paucity of the fund does not enable most of the farmers to fully utilize their land. This may lure the farmers into contract farming if the buyer provides them with all the necessary inputs on an adequate scale. However, since agriculture is a nature process, farmers cannot guarantee that the quality of the output will come up to a specific standard. Moreover, there is always the possibility that the expert agency appointed by the buyer for assessing the quality of the output may declare it substandard on the basis of many fine criteria. In other words, the specification of quality in the contract opens up the

possibility of cheating by the corporate buyers who are enormously mighty financially relative to the Indian farmers. If the buyer refuses to buy the farm produce on the ground that it is not of the contract-specified quality, the farmer will have to pay to the buyer all the costs he has incurred in providing the farmer with the necessary inputs. The farmer obviously will not be able to pay without selling off his land. This way this Act also facilitates transfer of land from the famers to the mighty corporations.

The third of the three acts, The Essential Commodities (Amendment) Act, 2020, states that the government will not interfere with the supplies of essential food stuff such as cereals, pulses, onions, edible oilseeds, oils etc. except under extraordinary circumstances such as war, natural disaster, extraordinary price increase etc. The government will also not impose any ceiling on the amount of stock that traders or processors in farm produce hold as long as the stock held does not exceed the installed storage capacities of the traders and processors. This Act, therefore, enables the corporate sector to stock as much farm produce as they want by installing commensurately large storage capacities.

The objective of these acts is to pave the way for withdrawal of all kinds of government intervention in the production and distribution of agricultural produce and handover the agricultural sector to the giant corporations. This chapter has examined the implications of corporatization of Indian agriculture along with those of withdrawal of input subsidies from the farm sector and the financial sector reforms that have made banks and other financial institutions profit driven. With the withdrawal of government's procurement operations and subsidization of farm inputs, there will take place drastic fall in the prices received by farmers for their marketable surplus of food. Input prices will also rise steeply. At the same time, the financial sector reforms that have made the banks and other financial institutions profit-driven will lead to a large fall in the amount of loan the farmers are able to secure and a steep rise in the interest rates they face. All these changes, as our study in the last chapter shows, will lead to a drastic fall in farmers' output of food. This is likely to drive small and medium farmers to bankruptcy. They will not be able to pay off their debt service charges after meeting their subsistence requirement of food. Their unpaid debt service charges will accumulate and they will be forced to sell off their land to pay off their debts. Our study also shows that periodic occurences of natural calamities, without any government relief, will also force many of the farmers to sell off their land for survival. Thus, the major part of the farmers' land will pass on to the corporate sector. Thus, per capita food consumption will fall drastically and unemployment rate will rise sharply in the farmer households, a large section of which is likely to become landless on account of the three Farm Laws. This chapter also studies how the corporate sector will use the farmers' land that has come into its possession. Given the high degree of monopoly power enjoyed by the corporate sector, its profit rate in the non-food sector may be quite high. It may not consider farming profitable unless profit rate is as high as in the non-food sector. Given the technology and the prices of industrial inputs, profit rate in the food sector as faced by the corporate sector depends upon the price at which it sells food. They may not take to farming unless this price is sufficiently high. It will also use highly capital intensive method of farming. Given the highly capital intensive methods of production used in the non-food sector and the corporate food sector, food output

has to be quite small to make the market price of food as high as the corporate sector requires. Thus, it is highly likely that the corporate sector will use for food production just a small segment of the farmers' land that has gone into their possession. Therefore, this chapter concludes that corporatization of Indian agriculture will gravely threaten India's food security and raise unemployment and poverty manifold much to the misery and suffering of the common man.

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