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Resource-Poor Farmers in South India

On the Margins or Frontiers of Globalization?

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Abstract

It is often argued that an important reason why globalization may lead to GDP growth but fail to reduce poverty is because the poor are unable to participate in the new market opportunities and are marginalized. In this paper we examine the experience of resource-poor farmers in south India, who participated aggressively in the new market opportunities that opened up with trade reforms. However, these expanded market opportunities failed to improve their welfare. The paper examines why and how this happened.

As cotton prices increased sharply following the reforms, a number of poor farmers shifted to cotton cultivation. However, cotton cultivation requires much greater technical expertise, working capital, and marketing network than the traditional crops. Interestingly, as state support declined, the network of private traders rapidly expanded to meet not only the marketing needs of the new crops but also to provide working capital and technical expertise. We show how this expanded, and largely unregulated, operation of private traders in multiple markets also provided them with the opportunity to extract greater surplus from the farmers. Thus, while increased participation in external markets exposed farmers to greater price risks and fraudulent

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Keywords: globalization, poverty, agriculture, contracts, India

JEL classification: I31, O13, O24

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dealings by the private traders, the shrinking role of the state reduced the farmers' ability to cope with these risks. The result was a decline in average incomes of the resource-poor farmers and rising levels of indebtedness, as costs of production grew sharply.

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Acronyms

AP	(state of) Andhra Pradesh
CACP	Commission on Agricultural Costs and Prices
CCI	Cotton Corporation of India
GDP	gross domestic product
MSPs	minimum support prices
NSSO	National Sample Survey Organisation (of India)
RFAS-2003	Rural Financial Access Survey conducted in 2003
URAA	Uruguay Round on Agreement on Agriculture

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1 Introduction

In this paper we examine how globalization, although providing the potential for higher overall economic growth, may often fail to improve the wellbeing of the poor. Several recent econometric studies have examined the impact of globalization on poverty using data from a wide range of countries.[1] However, these studies have largely used reduced-form specifications that do not shed any light on the different pathways through which globalization affects the wellbeing of the poor. Thus it is not surprising that most of the current debate is focused on technical issues regarding whether and to what extent globalization has increased world poverty rather than on understanding how globalization affects the poor. The latter requires an analysis of the multiple pathways that different regions/countries have undertaken. The process of globalization integrates different regions, but there is a large diversity in the manner and the extent to which this integration takes place. Understanding this diversity is critical in the formulation of antipoverty policies around the world.

Thus, for instance, it is often argued that globalization leads to an increase in poverty through the process of marginalization of the poor (Murshed 2002). 'Marginalization of the poor' in this context implies that (i) the participation of the poor in growing markets is limited and is falling (in relative terms), and/or (ii) the opportunities for their growth are shrinking as the country opens up.[2] Marginalization may occur because the poor lack access to the resources (such as human capital, land, credit or other physical assets) that are needed in order to participate in the growing markets. The recent experience of many low-income countries—particularly in Africa and some in Latin America—is cited as strong evidence of globalization leading to marginalization of the poor and consequently to higher poverty.

Against this presumption of marginalization of the poor in the process of globalization, there are also numerous instances where the poor have significantly increased their participation in new export markets. However, the evidence regarding the effect of this increased participation on poverty levels is mixed.[3] In this paper we are interested in understanding the processes by which increased market participation by the poor may lead, under certain conditions, to further deterioration of their wellbeing. In order to do so, we examine the case of resource-poor farmers in the Telangana region in the northwestern part of the state of Andhra Pradesh (AP) in India. We focus on AP because it is a very stark representation of some of the paradoxes of globalization. When the World Bank started working directly with state governments in India, AP was its focus state. It was at the forefront of reforms initiated in the areas of fiscal discipline,

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1 See, for instance, Bhagwati and Srinivasan (2002), Dollar and Kraay (2001), Winters, McCulloch and McKay (2004), and Chen and Ravallion (2000).

2 Shorrocks (2002: xv) points out that marginalization means that the participation of the poor low-incomes countries 'in the increased trade that globalization brings is limited, and in many instances is declining in real terms. Their access to private international financial market is practically non-existent, and their share of real inward investment is in many cases declining'. It should be noted that marginalization connotes a generalized tendency towards systematic and progressive fall in relative shares over the long run and not just short-term variability.

3 See, for instance, Harrison (2006) for a comprehensive survey of the evidence.

decentralized governance, and encouragement of foreign direct investment.[4] The state was also a major recipient of funding from multilateral organizations as well as private investors. Over the past decade, AP has witnessed higher growth rates than the average for the rest of the country. Its particularly impressive performance in the area of information technology brought it into international limelight.

However, the greater market opportunities afforded by globalization did not automatically translate into greater welfare for the resource-poor farmers in this state. In particular, in the Telangana region, which accounts for roughly 40 per cent of the population in the state of Andhra Pradesh, rural poverty rates increased somewhat in the post-reform period from 1993-94 to 1999-2000.[5] There have been several reports on widespread agrarian distress in other parts of the state as well (GoAP 2005). One disturbing symptom of this distress is the unprecedented and continued rise in the rate of farmer suicides over the past few years (Vidyasagar and Chandra 2004). In this paper we argue that the reason why resource-poor farmers in AP have not benefited from globalization is *not* because they became marginalized, as generally believed. In fact, we find that these farmers increased their participation in export markets (in both absolute and relative terms) and have been highly receptive to international technology transfers. This is particularly true of poor farmers in the semi-arid Telangana region of the state who did not benefit as much from the earlier green revolution technologies as opposed to the better-endowed coastal regions of the state. Trade liberalization provided them the opportunity to expand their production of remunerative export crops, like cotton, using modern technology in the form of hybrid seeds, fertilizers and pesticides. Thus it could be argued that these farmers, far from being left behind, were at the frontier of the globalization wave.

How did greater participation of the resource-poor farmers in the growing markets afforded by globalization lead to lower welfare? This is the central puzzle addressed in this paper. A few explanations have been offered in the globalization literature to explain why this might happen. A common explanation is that the high volatility of international commodity markets leads to significant income shocks for poor farmers who lack adequate safety nets. This is true for the cotton farmers in our study also, but it is only part of the explanation. It explains temporary income shortfall, but not chronic poverty. An alternative explanation is that in many developing countries (including India) trade liberalization occurred as part of the IMF/World Bank initiated structural adjustment programmes that also included cutbacks in several pro-poor public investments and social programmes. These cutbacks in public spending may have contributed to the rise in poverty. However, it is also true—as proponents of these reforms are quick to argue—that such reforms give a powerful boost to private enterprise which is arguably more efficient. In the Indian context, particularly, the growth of the private sector in the post-reform period has been spectacular. Ironically, our analysis reveals that it was the fast but largely unregulated growth of the private sector, even into areas traditionally reserved for the public sector (such as agricultural credit, research, and extension) that explains a large part of the problem. Markets grew

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4 Under the leadership of reform minded Chief Minister Naidu, Andhra Pradesh was widely hailed as 'the state that would reform India' (*The Economist* 2000: 38).

5 Poverty estimates reported in this study are based on NSSO expenditure surveys and are explained in greater detail in section 5.

but their governance lagged far behind, and it was the poor who suffered disproportionately, as we show in the paper.

2 Background

In this section we start with a brief overview of the macroeconomic scenario in the pre-reform and post-reform period in India. We then discuss the long-term trends in the agricultural sector of Andhra Pradesh. The discussion in this section helps set the later analysis on rural poverty and its underlying causes in a broader perspective.

2.1 Macro economic scenario: pre-reform and post-reform period

From the time India became an independent nation in 1947, its policy regime has been characterized by extensive controls on domestic production, pricing, trade and a managed overvalued exchange rate. In the specific case of agriculture, the main thrust of policy since the mid-1960s had been on achieving food self-sufficiency. Domestic policy instruments used to attain this goal included input subsides on fertilizers, power and irrigation, minimum support prices for major crops (such as rice and wheat), and quantitative restrictions on agricultural exports and imports. While the industrial sector was heavily protected under the import substitution regime, agricultural production was in the aggregate actually dis-protected (taxed) by as much as 20 per cent from 1970 to the mid-1990s (Gulati and Kelley 1999). This is because although expenditures on price supports and input subsidies were large, these were more than offset by the relatively low domestic farm-gate prices that were sustained behind the border measures.

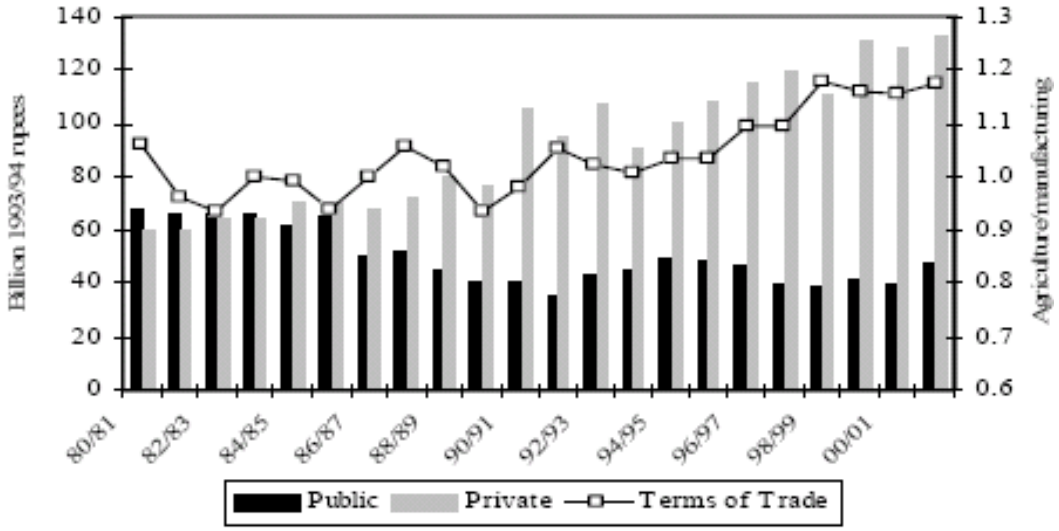
In 1991, faced with a balance of payments crisis, India embarked on an economic reform programme in line with the structural adjustment and stabilization policies initiated by the IMF and World Bank. The reforms focussed largely on trade liberalization, encouraging foreign direct investment, reforming capital markets, and deregulating domestic business. At the same time, the rupee was made convertible on the trade account, leading to a sharp depreciation of the exchange rate over the next several years. The reforms initiated the process of making Indian industry more competitive internationally, strengthening the balance of payments, and boosting economic growth. Since 1990 average annual growth has averaged 5.6 per cent and inflation has been relatively low (Gulati and Kelley 1999).

It is important to bear in mind that domestic and border policies directly affecting agriculture were not included in these early reform efforts. However, the reduced levels of industrial protection increased incentives in the agricultural sector through an improvement in the domestic terms of trade, as shown in Figure 1. The terms of trade between Indian agriculture and industry worked against agriculture through the mid-1980s but have turned to favour agriculture since the early 1990s (Landes and Gulati 2003). In 1994, import restrictions on oilseeds, sugar and cotton were liberalized but most agricultural products remained subject to import controls. As the reforms progressed and the foreign exchange situation became more comfortable, quantitative import restrictions on a whole range of agricultural commodities were phased out starting in 2001. The impetus for these changes came from the market access disciplines of the Uruguay Round on Agreement on Agriculture (URAA). Another significant development in recent years has been the commercial introduction of genetically

modified cotton seed varieties in 2002 by the multinational corporation, Monsanto. In this paper, however, we focus only on the effects of the limited agricultural trade liberalization that took place from the mid to late 1990s. This is because poverty estimates (based on the latest round of NSSO expenditure survey) are only available for this period.

It is interesting to note that while the government pushed heavily for border policies, input subsidies on fertilizer, power, and irrigation remained largely unaffected by the reforms.[6] Minimum support policy for major crops (such as wheat and rice) also remained virtually untouched because of the fear of political retaliation. The inability of the government to control the large outlays on subsidies for agricultural inputs and outputs, together with fiscal tightening, curtailed its ability to invest in rural infrastructure. Even in the pre-reform period from 1980-81 to 1990-91, gross capital formation by the pubic sector in agriculture had fallen by 32 per cent (at constant 1993-94 prices). Following the reforms in 1991, the downward trend continued and by the year 2000-01 this statistic had fallen by a further 11 per cent from its 1990-91 level (Figure 1). To some extent, this fall in the public sector's investment was compensated by the private sector, whose share in total gross capital formation in agriculture increased from 49 per cent in 1980-81 to 78 per cent in 2000-01. However, the share of agriculture in total gross capital formation in the economy fell from 15 per cent to 5 per cent during this period. In the case of AP, particularly, this falling trend in the share of agriculture has been even more pronounced. The share of agriculture and allied activity in state government expenditures under various plans declined from 11.8 per cent in 1980-81 to 1.8 per cent in 2001-02 (Rao and Suri 2006).

Figure 1
Terms of trade and gross agricultural capital formation in India



Source: GOI (2004).

6 Landes and Gulati (2003) point out that 'the budgetary outlays on the major input subsidies for inputs, have not been subject to discipline under the URAA. The subsidy outlays are below the de minimis levels permitted in the URAA and, at any rate, each of the major subsidies has been notified as a subsidy for low income and resource poor farmers and, hence, not subjected to discipline'.

With the movement towards financial liberalization, greater pressure was put on nationalized banks to improve their performance.[7] Formal credit to agriculture was squeezed, as banks became even more averse to lending to agricultural borrowers, particularly smaller borrowers. The proportion of bank credit to small borrowers (below Rs 25,000) dropped from 18 per cent of total commercial scheduled bank credit in 1994 to 5 per cent by 2002 (Mahajan 2004). Priority sector lending to agricultural sector also suffered a significant blow, coming down from 16 per cent in 1990 to 11.6 per cent in 1999 (Singh and Sagar 2004). Relaxing of some of the earlier restrictions on the location of commercial banks further intensified the shift away from rural areas, as the cost of delivery of credit in rural India is much higher than in urban India. The share of rural sector in total credit fell from an already low level of 19 per cent in 1992-93 to 14 per cent in 1998-99. It is alarming to note that the share of rural areas, and in particular the agricultural sector, fell not only in relative terms but also absolute terms. The number of bank accounts in rural areas fell by 8.41 million and the number of borrowers from the agricultural sector decreased by 4.51 million during this period (Singh and Sagar 2004). In the next subsection we discuss the impact of this credit squeeze and other policy changes on agricultural development during the post reform period in AP.

2.2 Long-term trends in agricultural sector in Andhra Pradesh

To set the discussion on the impact of reforms in perspective, it is useful to begin with a brief overview of the long-term trends in the agricultural sector in Andhra Pradesh. Located in the southeastern part of the country, AP is the fifth largest state in India. It is one of the major surplus producers of rice and accounted for about 13 per cent of the country's total production in 1998-99. The agricultural sector contributed 28 per cent of the state's gross domestic product and employed about 70 per cent of the workforce in 1998-99. There has been a gradual deceleration in the growth rate of agricultural output in AP from 3.4 per cent per annum in the 1980s to 2.3 per cent per annum in the 1990s (GoAP 2005). The growth rate of yield of rice, the state's principal irrigated crop declined steeply from an annual rate of 3.1 per cent in the 1980s to 1.3 per cent in the 1990s. During the same period, the average annual growth rate of yield of cotton also declined from 3.4 per cent to 1.4 per cent.

An important structural change in the agricultural economy of AP has been the growing proportion of small and marginal holdings.[8] Around 66 per cent of operational holdings in AP were small or marginal in 1970-71. This proportion grew sharply over the years, and by 1995-96 it stood at around 80 per cent (Table 1). The proportion of small and marginal holdings in the total cultivated area also grew sharply from 19 per cent in 1970-71 to 43 per cent in 1995-96. The large proportion of marginal and small holdings in the agricultural economy of AP has important implications for the economic viability and sustainability of agriculture in the state, as we discuss later. In addition, after Punjab, AP also has the highest incidence of landlessness among rural households in

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7 For instance, the Narasimhan Committee report in 1993 recommended that banks should focus on profitability and adopt prudential norms. This implied more stringent provisioning for non-performing loans than earlier (Mahajan 2004).

8 These size categories are defined as follows: (i) marginal if land owned is less than 1 hectare, (ii) small if land owned is greater than 1 but less than 2 hectares, (iii) medium if land owned is greater than 2 but less than 5 hectares; and (iv) large if land owned is greater than 5 hectares.

India. Around 46 per cent of rural households in AP were landless in 1970-71, in contrast to 35 per cent at the all-India level. By 1999-2000, the proportion of landless grew to 52 per cent in AP compared to 41 per cent at the all-India level.[9]

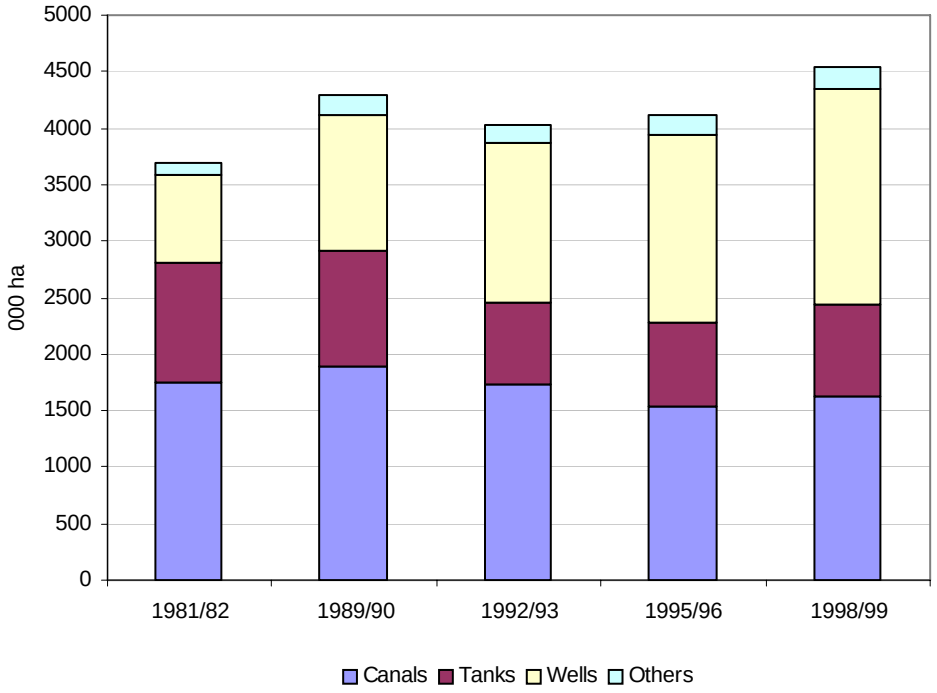
Irrigation has been very critical to the agricultural development of Andhra Pradesh in terms of increasing yields, facilitating multiple cropping, and providing insurance against the highly uncertain rainfall in the semi-arid regions of the state. Gross irrigated area in 1998-99 accounted for about 45 per cent of the total cultivated area in AP. While irrigation through publicly funded sources (such as canals and tanks) has been historically very important in AP, the 1970s and 1980s witnessed rapid growth in the number of privately owned wells. As shown in Figure 2, net irrigated area under wells increased by 140 per cent between 1981-82 and 1998-99. In contrast to this, the area under canals

Table 1
Distribution of operational holdings in Andhra Pradesh: 1970-71 to 1995-96

Year	Marginal (<1 ha.)	Small (1-2 ha.)	Semi-medium (2-4 ha.)	Medium (4-10 ha.)	Large (>10 ha.)
	Percentage of holdings				
1970-71	46.0	19.6	17.4	12.7	4.3
1995-96	59.4	21.3	13.2	5.3	0.8
	Percentage of area				
1970-71	8.0	11.3	19.2	35.2	26.3
1995-96	20.2	22.5	26.0	22.5	8.9

Source: GoAP (2003).

Figure 2
Net irrigated area by source in Andhra Pradesh ('000 ha.)



Source: World Bank (2001).

9 These statistics are based on NSSO surveys.

and tanks declined in both absolute and relative terms in the 1990s due to a deceleration in public investment and public neglect of traditional water sources. Farmers from all land ownership categories have invested heavily in private wells. However, since digging wells is a large, lumpy, and highly risky investment, the probability of well-ownership varies inversely with land ownership (Aggarwal 2000). A World Bank funded survey of irrigation technologies in AP in 1999-200 finds that even though small and marginal farmers accounted for around 80 per cent of total holdings in the state, they owned only 48 per cent of the total electric powered wells in the state (World Bank 2001).

The increase in groundwater irrigation during this period has been particularly sharp in the Telangana region where it is now the major source of irrigation as opposed to coastal AP where canal irrigation is predominant. The Telangana region lies in the northwestern part of the state[10] and is generally considered the least developed part of the state. It has a semi-arid climate and some of its subregions are highly drought prone. The average rainfall is about 800 mm and varies considerably across the years. In the rest of this paper, we focus largely on the Telangana region.

3 Trade liberalization and market participation of resource-poor farmers

We begin by discussing the basic characteristics of resource-poor farmers in the context of agriculture in the Telangana region. Then we examine why and how these farmers increased their participation in export markets in the post-reform period.

3.1 Characterizing resource-poor farmers

In most rural poverty profiles, agricultural land ownership is used as an important (and often the sole) criterion to distinguish between poor and non-poor households. However, as argued before, irrigation is a critical input in agricultural production that effectively enhances the productive value of land, particularly in semi-arid regions. Thus, instead of distinguishing between farmers on the basis of their land ownership alone, we also take into account their access to different sources of irrigation, to reflect the fact that a farmer who owns a piece of land in a canal-irrigated area is much better endowed than a farmer with an otherwise similar holding in a region but with no access to public sources of irrigation. Moreover, since around 80 per cent of holdings in this region are classified as small or marginal, classification by landownership alone is not very useful without information on whether these lie in rainfed or irrigated areas. Several studies report that poverty decreases as the availability of irrigation increases. For instance, a recent study by Singh, Kumar and Woodhead (2002) finds that poverty rates in 1993 among marginal farmers with no irrigation were 32 per cent as opposed to a poverty rate of 22 per cent among their counterparts with more than 80 per cent of land irrigated. In semi-arid regions, this differential between irrigated and non-irrigated areas is likely to be larger. So for the purposes of this study, we define resource-poor farmers as those small and marginal farmers who have no access to any assured source of irrigation.

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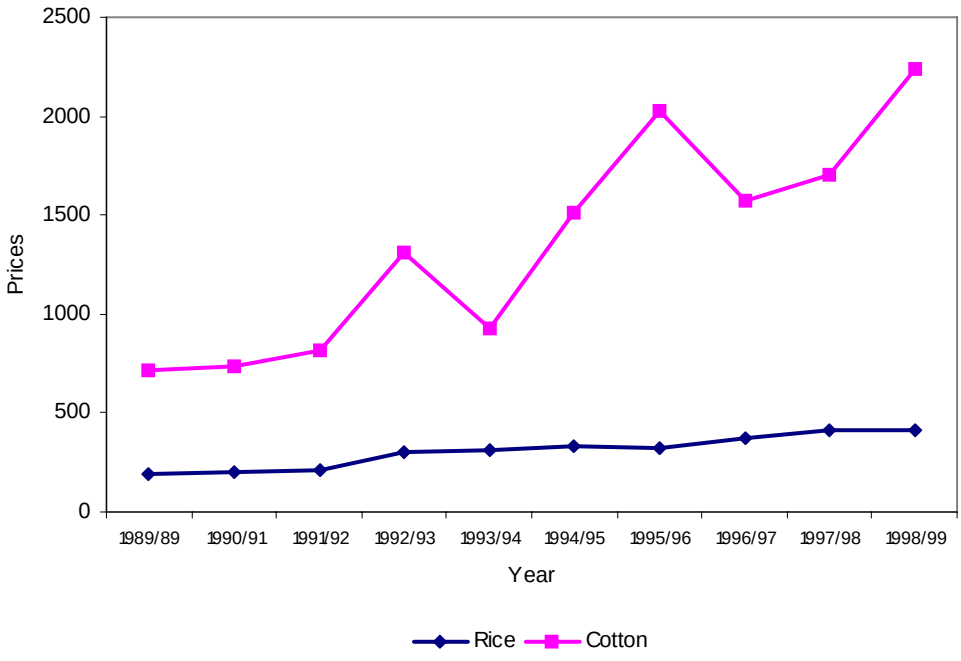
10 Telangana consists of the districts of Adilabad, Karimnagar, Nizamabad, Medak, Ranga Reddy, Hyderabad, Mahbubnagar, Nalgonda, Warangal and Khammam districts.

Table 2
Cropping patterns during different seasons in AP across irrigation categories

Crop	Electric well-owners	Non-owners		
		Canal users	Water purchasers	Rainfed
	Kharif (rainy) season			
Rice	49.48	60.30	54.15	17.10
Other cereals	4.99	3.19	0.99	13.89
Pulses	3.08	3.73	2.78	10.51
Cotton	8.17	14.19	6.71	17.04
Coconut	2.70	0.34	0.25	
Oil seed	5.14	2.76	3.83	21.90
Spices	6.24	6.46	4.50	6.57
Sugarcane	11.08	5.03	14.14	0.95
Tobacco	2.44	0.40	4.94	2.67
Fruits	4.08	0.23	2.34	
Vegetables	1.43	1.60	3.09	1.54
Total	100.00	100.00	100.00	100.00
	Rabi (post rainy season) season			
Paddy	41.99	25.61	24.13	11.58
Pulses	14.66	9.81	13.81	24.65
Cotton	0.48	19.77	20.19	21.91
Coconut	2.90	0.42	0.41	
Fruits	4.88	0.29	3.86	
Oil seeds	7.08	18.58	12.61	28.84
Spices	0.64	7.97	6.91	7.28
Sugarcane	5.99	6.10		2.14
Vegetables	21.19	11.45	18.08	3.37
Total	100.00	100.00	100.00	100.00

Source: World Bank (2001).

Figure 3
Rice and cotton prices in Telangana



Source: CES (1998).

Cropping patterns differ widely across farmers, depending on whether they have access to assured sources of irrigation. As shown in Table 2, for those who own wells with electric pumps or have access to canal irrigation, rice is the main crop grown in *kharif* (rainy) and *rabi* (post rainy) seasons. On the other hand, for those farmers who do not have an assured supply of irrigation, coarse cereals, pulses groundnut, oilseeds, and cotton are important. It is not difficult to see why rice is the preferred choice among farmers who have an assured source of irrigation. Rice is an important food crop that helps meet the consumption needs of the farmer while also providing him with an assured market income since rice is heavily protected through state intervention in the open market. Rice has also witnessed substantial yield increases over the past decades. Compared to yields in 1960-61, yields obtained in early 1980s were 90 per cent higher (GOI 2004). The extension and research network for rice has also been much more extensive than for any other crop.

On the other hand, millets, maize, cotton, pulses, chillies, and oilseeds have been the only viable alternatives for farmers with no assured sources of irrigation. These crops are less water intensive and are grown under both rainfed and irrigated conditions. Expected net returns from the cultivation of these crops have been much lower than for the irrigated crops, while the risks are higher because of rainfall variability and price fluctuations (in the absence of effective price support polices). In particular, as shown in Figure 3, price of cotton is associated with much higher volatility than that of rice. In addition, cotton cultivation has also been subject to the risk of pest attacks. This factor, in particular, deterred many poor farmers from growing cotton in the pre-reform period.

3.2 Supply response of resource-poor farmers to cotton trade liberalization

Restrictions on cotton trade were lifted in 1994 and as a consequence, cotton prices in the Telangana region rose from Rs 1,339 per quintal in 1993-94 to Rs 2,057 per quintal in 1994-95 (CES 1998). This sharp price increase suddenly made cotton a very attractive crop, particularly for farmers without access to irrigation. The total supply of cotton more than doubled from 101,697 quintals in 1993-94 to 262,208 quintals in 1997-98, as farmers shifted to cotton cultivation even in regions where it had not been traditionally grown. This sharp supply response to rising prices is consistent with evidence from previous studies that also report a relatively high own price elasticity of supply for cotton (Gulati and Kelly 1999).[11] In a recent study based on panel data from 13 states, Kanwar and Sadoulet (2001) find that the area planted under cotton is highly responsive to its gross profitability (relative to two major competing crops) with the associated long-run elasticity of 0.1, which was higher than that for all other cash crops. Most of the expansion in cotton cultivation was in the rainfed areas, as farmers shifted away from millets and maize to cotton. As shown in Table 1, cotton accounted for more than 20 per cent of total acreage for rainfed farmers in the 1999-2000 *rabi* season, while it accounted for less than 1 per cent of total acreage for well-owners. In 1998-99, about 95 per cent of rice and sugarcane area was irrigated, 75 per cent of wheat, 34 per cent of maize, 20 per cent of groundnuts and only 17 per cent of cotton.

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[11] In contrast to this, the supply elasticity of rice has been found to be much less responsive to own prices (Gulati and Kelley 1999). As expected, supply elasticity for rice is highly significant with respect to availability of irrigation.

India now has the largest area in the world under cotton cultivation (21 per cent of the total) but accounts for only 14 per cent of global production. Compared to global levels, the cotton yield in India is one of the lowest, mainly due to lack of irrigation, limited supplies of quality seeds, and poor management practices. Marketing of both cottonseed and lint is done by three major groups, the private traders, state level cooperatives and Cotton Corporation of India (CCI). Of the three groups, private traders handle more than 70 per cent of cottonseed and lint followed by cooperatives and CCI. The government annually establishes minimum support prices (MSPs) for various cotton varieties on the basis of recommendations from the Commission for Agricultural Costs and Prices. The government-run CCI is entrusted with market intervention operations when market price falls below minimum support price.[12] However, as Rao and Suri (2006) argue, CCI's role in cotton markets in AP has been minimal because the MSP for cotton has been set at a very low level and has consistently fallen far below the market price. For the past few years, the government of AP has recommended higher MSPs for cotton because of the state's much higher costs of production relative to the all-India average (GoAP 2005). The union government, however, has not followed these recommendations and, according to several studies, the minimum support price is lower than the average cost of production (GoAP 2005; NCF 2006).

4 The path from increased market participation to debt trap

In the previous section we discussed the shift in the cropping pattern of resource-poor farmers from food crops (such as maize and millets) to cotton, as a consequence of trade liberalization. In this section we delineate how this shift in cropping pattern led to greater indebtedness. We begin by examining how the working capital requirements of the farmers grew because of the shift to cotton cultivation and the sharp escalation in input costs. Then we examine the sources of credit (formal versus informal) for resource-poor farmers and the emergence of private traders as an important source of credit. Finally, we take an in-depth look at the nature of contracts between private traders and farmers and how these contributed to the rising levels of farmer indebtedness.

4. 1 Working capital requirement for cotton

With the cropping pattern shifting away from millets and maize to cotton, agriculture in rainfed areas of AP became highly intensive in use of purchased inputs, thus leading to a sharp increase in the working capital requirements of farmers. Cotton is the most pesticide intensive crop grown in AP. At the all-India level, although cotton is grown on about 5 per cent of the cultivated area only, it accounts for nearly 50 per cent of pesticide consumption (Venugopal 2004). The per hectare variable costs for unirrigated cotton cultivation in Warangal district in the Telangana region in 1997-98 were almost 4 times that for maize and 2.5 times that for groundnut (Table 3). Compared to irrigated crops such as rice also, the variable costs for irrigated cotton on a per hectare basis are much higher (Table 2). Among all the states in India, AP now has the highest consumption of pesticides per unit of output and second highest consumption of fertilizers (GoAP 2005).

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[12] An important exception is the state of Maharashtra, where there is state monopoly procurement. Cotton cultivators in this state are prohibited from selling seed cotton to any buyer other than Maharashtra State. Cooperative Marketing Federation.

This sharp escalation in working capital requirements is reflected, in part, in the data from the latest all-India survey of indebtedness among farm households carried out by the National Sample Survey Organization (NSSO 2005b). The survey reports that 82 per cent of farm households in AP were indebted in 2001, as opposed to 49 per cent at the all-India level. The survey also finds that a growing proportion of outstanding loans among farm households in AP were used for meeting current agricultural expenditures, as opposed to capital expenditures. In 2001, current agricultural expenditures accounted for close to half of total outstanding loans in AP while capital expenditures accounted for only about a quarter. In contrast to this, at the all-India level, only 35 per cent of outstanding loans were used for current expenditures and 37 per cent for capital expenditures. Even in agriculturally advanced states, such as Haryana and Punjab, a much lower proportion of outstanding loans was used for current expenditures (33 per cent and 43 per cent, respectively). Thus the case of AP is somewhat unusual and to explore this further, we turn our attention next to the sources of lending for farmers in the province.

Table 3
Costs and returns for major crops in Warangal District in Telangana

	Cotton				Groundnut	Maize	Rice
	1996-97		1997-87		1997-98	1997-98	1997-98
	Irrigated	Unirrigated	Irrigated	Unirrigated	Unirrigated	Unirrigated	Irrigated
Human labour	14844	8719	15788	9053	4076	1778	4248
Bullock labour	1482	1112	1482	1482	1482	1482	1791
Seed	1482	1482	1482	1482	1482	642	926
Manure	1482	1482	1482	1482	0	988	988
Fertilizer	4619	4199	5088	4594	371	2100	2099
Pesticides	5558	4199	7287	5706	494	1544	642
Irrigation	2470	494	2470	494	741	0	3705
Interest on working capital	3816	2601	2470	494	618	363	835
Total variable costs	35753	24288	39315	26893	10917	6407	14741
Total fixed costs	15610	7524	15610	7524	4730	3285	5785
Total costs	51364	3181	54925	34397	15647	9692	20526
Yield	22.2	14.8	14.6	10.1	5	22	39.026
Price	1685	1685	1960	1960	2717	988	440
Gross returns	34726	23208	27071	19007	5977	8892	18673
Returns over paid costs	11802	5103	-1707	-4619	1030	4500	9811
Returns over variable costs	-1028	-1079	-1225	-7867	-4940	2485	3932
Returns over total costs	-16638	-8603	-27879	-15391	-9670	-800	-1880

Source: CES (1998).

4.2 Formal versus non-formal sources of lending for resource-poor farmers

Several studies note that in spite of the expansion of banking in the rural sector, a large section of the rural poor remains outside the fold of formal credit institutions. A recent

survey of rural households' access to financial services, conducted in 2003, reports that only 24 per cent of rural households in AP accessed credit from formal sources (Basu. and Srivastava 2005).[13] Of all the rural households, landless labourers, tenants, and those with small holdings face the worst situation. Thus, for instance, the RFAS-2003 survey observes that 87 per cent of marginal farmers had no access to formal credit sources and thus relied more heavily on non-formal sources credit than other cultivating households. The situation is further aggravated by the fact that in many parts of AP (particularly so in the Telangana region), the land registers are poorly maintained. As the Report of the Commission on Farmers' Welfare points out,

> in many areas (especially Telangana region) the names of the current holders and actual cultivators are not recorded in the land registers, such cultivators are not eligible for institutional finance and a range of other public benefits such as compensation in the event of natural calamities, and so on. In addition, some regions (especially in more irrigated areas) have a high proportion of tenancy, which is typically unrecorded, and tenant farmers face similar difficulties in accessing bank loans and other benefits. They are therefore all driven to the informal credit market, which supplies loans at very high rates of interest, which in turn adds greatly to their cost of cultivation. In tribal areas there are even more difficult issues of land entitlement... (GoAP 2005: 26)

The interest rates on loans from non-formal sources, such as village moneylenders and traders, are significantly higher than that from formal sources. As shown in Table 4, the median interest rate on loans from the formal sector is around 12 per cent per annum. In sharp contrast to this, the dispersion of interest rates on non-formal sector loans is much larger, with the median interest rate on loans observed to be around 36 per cent per annum. Agricultural moneylenders have historically been important among the non-formal sources of credit. However, in recent years, private traders have emerged as important suppliers of credit, as we discuss next.

Table 4
Source-wise interest charges on agricultural loans in selected villages of Andhra Pradesh

	Institutional loans		Non-Institutional loans		Total loans	
Rate of interest, %	No.	Percentage	No.	Percentage	No.	Percentage
<12	4	1.75	0	0	4	0.04
12	112	49.2	14	1.51	126	10.94
13-23	73	32.02	3	0.32	71	6.16
24	31	13.59	370	40.04	401	34.81
36	8	3.5	479	51.84	487	42.27
48	0	0	5	0.54	5	0.04
60	0	0	37	4	37	3.21
>60	0	0	16	1.73	16	1.39
Total	228	100	924	100	1152	100
	(19.79)		(80.21)		(100)	

Source: GoAP (2005).

[13] Rural Financial Access Survey (RFAS-2003) conducted by the World Bank and National Council of Applied Economic Research, New Delhi.

4.3 Extraction of surplus through interlinked contracts with private traders

To meet farmers' growing credit needs, private traders in seeds, pesticides, and output also began to supply credit. Such contracts between a trader-lender and farmer-borrower are quite pervasive in India and also other parts of the world. In these contracts, the trader lends to the farmer in exchange for a promise to deliver the crop at a pre-agreed price discount or at harvest time when market prices are the lowest. Several formal and informal accounts suggest that the countryside in the Telangana region is flooded with pesticide dealers and their agents, with one recent report suggesting that there are as many as 13,000 dealers in the district of Warangal alone (Menon 2004). This would suggest that the pesticide market is quite competitive. However, as Venugopal (2004) agues, the market is differentiated by product (several different pesticide formulations are now available) and location (local village shop versus the market in the nearest town). Further, for the resource-poor farmers buying pesticides on credit, the market is limited to local traders who know them well. The personalized nature of such interlinking can act as a barrier to the entry of other parties, thus creating a fragmented market structure, with each trader commanding considerable monopolistic power. It is well known that by operating in multiple markets (inputs and/or output and credit), a trader can extract greater surplus than is possible through single markets (Basu 1997; Gangopadhyay and Sengupta 1987).[14]

In the literature on trader-lender interlinked contracts, an optimal interlinked contract is generally characterized by an interest rate discount, which is compensated by underpayment in the output market.[15] In our case, the interest rate discount is difficult to verify empirically because we have no direct information on what the interest rate would be in the absence of the interlinked contract. However, the interest rate discount, if present, is likely to encourage the farmer to borrow more than he would otherwise. Furthermore given that the loan is fully collateralized against the value of the standing crop, the trader also has the incentive to overextend the loan. If this is so, then it is possible that this kind of interlinkage also leads to increased indebtedness for the farmer. Most models on interlinked contracts are based on one-period settings, and thus this possibility of growing indebtedness over time has not been formally analysed.

The latest all-India survey on farmers' indebtedness (NSSO 2005b) lends some indirect support to the above argument on rising indebtedness and overextension of loans. The survey finds the incidence of indebtedness among Andhra Pradesh farmers to be the highest among all other states in India while the asset value of farm households in AP (Rs 0.135 million) was found to be less than the all-India average (Rs 0.373 million). As discussed earlier, around 82 per cent of the farm households in the state were found to be indebted. Interestingly, the survey reports that the proportion of indebted households is more or less the same among all socioeconomic groups. This suggests that the problem of indebtedness is pervasive in the agrarian economy. More importantly, the survey records a debt liability-to-asset value ratio of 7.14 in AP, which is the highest

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14 In the context of a Nash bargaining framework, Bell (1988) shows that the farmer may be worse-off with an interlinked set of transactions than with a separate set of bilateral bargains.

15 See for instance, Gangopadhyay and Sengupta (1987).

among all the states of India (NSSO 2005c: 38).[16] This ratio is considered to be an important measure of the risk exposure of farmers, with high values (generally above 0.70) as being indicative of future repayment problems. The very high level of debt liability-to-asset value ratio observed in AP is somewhat of a puzzle. In part, this may be explained by the high rates of default on loans from institutional sources and the overextension of loans under the special personalized nature of interlinked credit-product contracts, as discussed above.

Another significant change in AP in the post-reform period was the decline in public investment in agricultural extension services and associated attempts to privatize extension services. Public expenditure on extension, which is borne by the state government, was only 0.02 per cent of the state's GDP during 1992-94 as against the all-India average of 0.15 per cent (GoAP 2005). The Report of Commission of Farmers' Welfare (GoAP 2005: 18) observes that 'with the virtual breakdown of the extension machinery and lack of access to institutional credit, small and marginal farmers became increasingly dependent upon the private traders for credit and extension services'. This is further corroborated by evidence from a recent NSSO survey on 'access to modern technology for farming' according to which only 9.4 per cent of the Andhra Pradesh farmers had access to information from extension workers in 2002 (NSSO 2005c). Private traders played a much larger role in AP, with around 30 per cent of farmers accessing information through them compared with just 13 per cent at the all-India level.

This additional role of the trader as the provider of scientific information further enhances the potential for strategic manipulation of contract terms and extraction of gain. As mentioned earlier, cotton is vulnerable to a very high risk of pest attack. This problem intensified as more and more farmers moved from other crops to cotton, thus creating cotton monocultures that are more susceptible to pest attacks (Aggarwal 2005). Press reports and anecdotal evidence record several cases where pesticide dealers advised farmers to apply more pesticides than stipulated by the manufacturer.[17] For instance, to quell the farmers' fears of pest attacks, the pesticide dealers advised them to apply pesticides early, shortly after the sowing phase. The prescription in the scientific literature is to wait a few days before applying any pesticides. Early pesticide application, when not actually needed, often induces pests to acquire resistance early on and so much stronger pesticides are required later in the growing period (Altieri 2002). As pests gradually acquired resistance and farmers started on the pesticide treadmill, costs of cultivation rose sharply. In the absence of any regulation or quality control, reports of other malpractices—such as the sale of spurious seeds with very low germination rates—also began to surface.

5 Debt trap and chronic poverty

In this section we examine how the shift to cotton cultivation and the growing role of private traders led resource-poor farmers into a debt trap and chronic poverty. After the

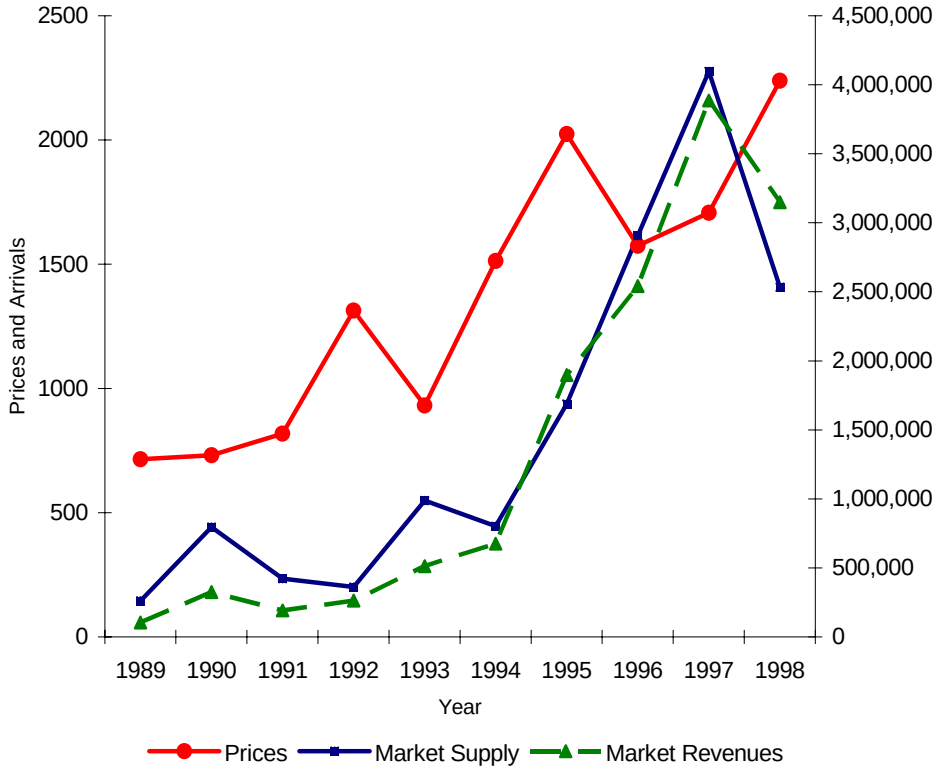
16 The debt liability-asset value ratios for other major agricultural states in India were found to be 1.62 for Haryana, 1.72 for Punjab, 2.71 for Gujarat, 3.55 for Kerala, 3.71 for Karnataka and 4.48 for Tamil Nadu.

17 See, for instance, Ghosh (2004) and the series of articles by Sainath on the AP suicides in *The Hindu*. Available at www.hindu.com.

lifting of trade restrictions, the price of cotton increased by approximately 62 per cent in 1994-95, followed by a further 33 per cent increase in 1995-96 (Figure 3). The resource-poor farmers saw this as the opportune moment to shift from traditional food crops to cotton cultivation. However, prices in the subsequent year fell 22 per cent from their peak level in 1995-96. Although prices in 1997-98 recovered somewhat (by around 8 per cent), that year's deficient rainfall produced very low yields. The reports of the Commission on Agricultural Costs and Prices (CACP) show that the net returns per hectare in current prices (after taking into account total costs) from cotton cultivation in AP were negative (a loss of Rs 1,641) in 1996-97 and only Rs 72 per hectare in 1997-98.[18] It is widely believed that the CACP underestimates many of production cost elements in AP, thus it is possible that the actual situation was even worse (GoAP 2005).

This is particularly true in the more intensive cotton growing areas of the state, such as the Warangal district in the Telangana region. As shown in Table 3, in 1996-97 when cotton prices fell from their 1994-95 peak level of Rs 2,057 per quintal to Rs 1,685, farmers in Warangal were unable even to recover their variable costs. Prices over the next year recovered somewhat to Rs 1,960 (an increase of around 16 per cent) but this was not enough to compensate for the sharp (around 34 per cent) fall in yields caused by adverse weather conditions and pest attacks. It is estimated that in the early 1960s about 20 per cent of the cotton output was lost every year due to pest attacks (CICR 1998). By the late 1990s, as cotton cultivation intensified and the pest problem became more acute,

Figure 4
Prices, market supply and market revenue of cotton in Telangana



Source: Author's calculations based on CES (1998).

[18] Cited in GoAP (2005).

an estimated half of the cotton output was lost due to insect pests (CICR 1998). Before liberalization of the cotton trade, a shortfall in production from adverse weather conditions in a specific region would push up prices, thus the fall in incomes would not be as drastic (see Figure 4). However, with the exposure to world markets, this link was broken and farmers were subjected to greater income volatility without any effective system of crop insurance.[19]

The discussion in this section raises the question: if cotton cultivation was becoming riskier and net returns low in the late 1990s (including some years when even variable costs could not be recovered), what prevented the farmers from reverting to relatively safer food crops like maize, pulses, and millets? The dilemma faced by farmers in these circumstances are well illustrated in a recent study by Rao and Suri (2006) based on a primary level survey of two villages in Guntur district in AP. Rao and Suri observe that in the village with meagre irrigation facilities, around 98 per cent of the cropped area was devoted to cash crops, such as cotton and chillies. Given the very high indebtedness levels in the village, farmers were asked why they cultivated these cash crops instead of low-cost cereals, which could at least provide them with their food requirements. The farmers replied that 'they would either float or sink with the cash crops because they are already neck-deep in debt and it is not possible to think of repaying the debts with the meagre returns on the low-value crops' (Rao and Suri 2006: 1550). This explains how the rising debt levels from high working capital requirements but low repaying capacity can lead to a situation where the farmer becomes trapped into growing high-risk crops just to be able to make his loan repayments. Resource-poor farmers who do not have access to institutional sources of credit are more likely to affected by similar situations because they are more likely to borrow from private traders who insist on the cultivation of cash crops.

Rao and Suri (2006) highlight another salient feature of the current high levels of rural indebtedness. In their survey, they note that a large proportion of the debt was incurred for agricultural expenses (about 62 per cent) and very little was borrowed for education, health, social ceremonies, or consumption. Citing studies on rural indebtedness during the colonial period, they argue that historically a large proportion of a farmer's debt was incurred for non-agricultural expenses. However, they argue that evidence from their own surveys and the recent NSSO data

> disproves the belief that the farmers are getting indebted because they take more loans to meet unproductive expenditure such as social ceremonies or to meet the growing needs of education and health. The high cost of inputs seems to be the main factor in the growing indebtedness of the farmers (Rao and Suri 2006: 1548).

This is an alarming trend because it is indicative of the growing unsustainability of agriculture as an economic activity.[20]

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19 The RFAS (2003) survey, cited earlier, reports that over 82 per cent of households surveyed did not have any insurance, and almost none of the poorest households had insurance (Basu and Srivastava 2005).

20 The Situational Assessment Survey of Farmers conducted by the Ministry of Agriculture lends further support to this emerging trend. The survey notes that 40 per cent of farmers, if given the choice, would want to 'quit agriculture and take up some other career'.

Since agriculture is the major source of livelihood in the rural areas, the growing problems in the agricultural sector are also reflected in the trends in rural poverty rates. As shown in Table 5, rural poverty rates (as measured by the headcount ratio) in the Telangana region had declined in the pre-reform period from around 24.12 per cent in 1983-84 to 13.92 per cent in 1993-94.[21] However, in the post-reform period, poverty rate increased somewhat to 14.27 per cent in 1999-2000. Table 5 also shows real per capita expenditures for different farm size categories. As can be seen from this table, with the exception of medium farmers, real per capita expenditures for all farm size categories increased during the pre-reform period from 1983-84 to 1993-94 but then decreased during the post-reform period from 1993-94 to 1990-2000. It is important to note that the decline in real per capita expenditures in the post-reform period was the sharpest for small and marginal farmers as well as agricultural labourers, thus leading to an increase in rural inequality.

From December 1997 to the end of April 1998, around 360 suicide deaths by farmers were reported in the cotton growing Warangal district alone in the region of Telangana. It is estimated that in all of AP, around 3,000 farmers have committed suicide during the period 1998-2003 (Vidyasagar and Chandra 2004).[22] Although it is a combination of stress factors that compels a farmer to end his life, several recent studies conclude that the accumulation of huge debts and the feeling of hopelessness regarding future repayments triggered the suicides in most cases.[23] The high incidence of suicides has continued unabated since the late 1990s in spite of the government's recent efforts to provide subsidized credit and price support for cotton growers.

Table 5
Poverty rate and real per capita expenditure (Rs/month) in rural Telangana

	1983-84	1987-88	1993-94	1999-00
Headcount ratio: rural Telangana	24.12	21.52	13.92	14.27
Real per capita expenditure (Rs/month) by farm size categories				
Large farmer	149.47	180.10	169.58	168.30
Medium farmer	135.19	135.58	130.98	128.35
Small farmer	113.52	127.27	133.80	127.02
Marginal farmer	112.36	121.43	131.92	116.13
Agricultural labourer	96.45	100.34	110.17	102.83
Non-agricultural self employed	117.35	135.81	132.69	125.23
Non agricultural labourer	114.35	127.29	136.69	142.38
Weighted average	115.60	125.72	132.14	119.57

Source: Vamsi (2004).

21 The poverty rates reported here are based on Vamsi (2004) who calculates these rates using NSSO data for the Telangana region. In order to make the data for 1999-2000 comparable to data from previous rounds when a different recall period was used in the questionnaire, she uses an adjustment method suggested by Angus Deaton and discusses this in detail in the appendix of her paper.

22 The reported figures on farmer suicides, particularly from government sources, are likely to be an underestimate because they record suicides only among those defined as 'farmers'. Very often, female cultivators and tenants are left out.

23 This was the main finding of the Commission on Farmers Welfare (2005) set up by the government of Andhra Pradesh to investigate the causes behind the rise in farmer suicides.

6 Summary and conclusions

It is generally believed that an important reason why globalization may lead to GDP growth but fail to reduce poverty is because the poor are unable to participate in the new market opportunities and are marginalized. The implicit presumption of unresponsiveness of the poor to new market opportunities is not always justified. In this paper we examined the experience of resource-poor farmers who participated aggressively in the new market opportunities opening up with trade reforms, but ironically failed to improve their wellbeing through this new opportunity. In fact, it led to higher inputs costs, rising indebtedness, environmental degradation, and chronic poverty.

In attempting to explore why this happened, we examined how policies in the pre-reform period—such as provision of subsidized credit and other agricultural inputs, output price support, and expansion of agricultural research and extension—had selectively favoured the better endowed regions and farmers. The majority of small and marginal farmers without adequate access to irrigation or institutional finance became marginalized by the agricultural development that focused on a narrow range of irrigated crops rather than the dryland crops grown by these farmers. This pattern of agricultural development also led to falling groundwater tables, declining soil fertility, and greater probability of pest attacks, all of which in turn gradually increased the long-term costs of agricultural production in the region.

Given this scenario, it is not surprising that when trade reform led to a sharp increase in the price of a crop like cotton which could be grown under rainfed conditions, resource-poor farmers seized the opportunity. However, cotton also requires much greater technical expertise, working capital, and marketing network than the traditional crops these farmers had grown. Interestingly, as state support declined, the network of private traders expanded at a fast pace to fulfil not only the marketing needs of the new crops but also to provide much needed working capital and technical expertise. This expanded, and largely unregulated, operation of private traders in multiple markets also provided them with the opportunity to extract greater surplus from the farmers through their interlinked contracts. Thus, while increased participation in external markets exposed farmers to greater risks in terms of fluctuating prices and fraudulent dealings by the private traders, the shrinking role of the state reduced farmer ability to cope with these risks, both *ex ante* and *ex post*. The result was a decline in average incomes of the resource-poor farmers and rising levels of indebtedness.

To conclude, this study lends support to the argument that generally trade reform *alone* is not sufficient to reduce poverty, but *not* because the poor are unresponsive to new market opportunities. On the contrary, globalization may offer new opportunities for the poor in many developing countries who have been left behind during the decades of capital intensive development strategies. However, it needs to be recognized that integration into the global economy also poses new challenges and risks. Thus there is need for complementary policies, such as those regarding provision of institutional credit, targeted safety nets, technical expertise, marketing support, and infrastructure that ensure that the poor are able to take full advantage of these opportunities. In countries such India and several other developing countries where trade reforms have been part of structural adjustment programmes, state support has been cut back when and where it is needed the most. Thus it is not surprising that the impact of these reforms on poverty has been minimal.

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