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Liberalisation and Trade Reforms in Indian Agriculture

Impacts on women, food security and livelihoods

Amita Shah
Anil Kumar Roy

Gujarat Institute of Development Research

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India has adopted a fairly cautious approach to liberalizing agricultural trade despite continuous pressure from the global trade forums. Food security and livelihood of the millions of toiling mass have been at the centre of India's stance on the trade negotiations for the sector. Of course, there are possibilities new opportunities through increased trade. Women are traditionally seen as the most critical stakeholders in this context. Gauging the implications for trade liberalization for women emerged as an important theme for detailed enquiry. Whereas several scholars had already undertaken in depth analysis, much of the analysis was confined to specific sub-sector/product within agriculture. Preparing a comprehensive assessment, based mainly on the existing literature, was still missing.

The Consortium (formerly Centre) for Trade and Development (CENTAD) came up with an idea to bridge this critical gap and invited me to prepare a comprehensive document on the theme. I welcomed the invitation, knowing well that an exercise such as this may prove to be fairly cumbersome, given the limitations of gender differentiated data in the Indian context. Nevertheless an attempt has to be made to set the ball rolling. Accomplishing this all alone was difficult. Hence I requested Dr. Anil Kumar Roy to collaborate with me. I am indeed thankful to him for joining me in preparing the document.

The process however, has been fairly slow all through out owing to a number of reasons. I am grateful to GIDR for taking up the document for bringing out as the maiden publication under the newly started Occasional Paper Series of the Institute. My colleague Dr. P.K. Viswanathan has taken much of the trouble to help update and edit the manuscript. I express my sincere thanks to him and also to Mr. Amit Mandal for this critical support. There may be some errors and omissions in the document, for which I take the full responsibility.

I hope the paper would be found useful to a wide range of readers interested in the issues related to trade, agriculture, and gender.

January 12, 2012 Amita Shah

Preface

This paper examines the impact of libralisation induced trade reforms in agriculture on the status of women as well as food security and livelihoods in India. The analysis tries to depict macro scenarios and capture micro level realities through specific case studies on Indian agriculture in the wake of trade reform policies at the instance of WTO. This is important in the light of the fact that agricultural trade still constitutes only a small segment of the domestic production and market in India. Nevertheless, the impact of trade liberalisation, at least till now, is fairly localized and intensive covering specific communities in a micro setting. In fact, gainers and losers from trade liberalisation constitute different segments of the farmers, especially, women farmers and workers. Nevertheless, it is often overlooked that the gain for one segment as arising from liberalisation does not compensate for the loss suffered by the other segment, majority of whom being women. Blanket acceptance or rejection of the new opportunities and threats is neither feasible nor desirable given the historically, politically and economically defined boundaries for policy making and negotiations. The need therefore is to safeguard their interests, which not only needs corrections in trade negotiations but also necessitates restructuring agricultural sector so as to enhance environmental as well as livelihood and food security benefits among a large mass of poor producers and consumers.

Given that agricultural trade till now constituted a small proportion of India's agricultural GDP, its impact on the overall growth, even in agriculture, is limited. Much of India's agricultural growth continues to be influenced by factors such as climatic, technological (including management of land and water resources), and relative prices of inputs and outputs. What is however, pertinent is that the trade has resulted in significant impact on selected crops and locations owing mainly to the steep fall in prices on the one hand, and volatility on the other.

More than the lower prices, volatility in prices creates major impediments for evolving a strategy of sustained growth in agriculture. The analysis therefore, has tried to raise some of the critical issues pertaining to the interface between AoA-framework and developmental concerns of a large agrarian economy like India. The central argument of this paper, that women's empowerment should be part of the larger agenda of restructuring of Indian agriculture; safeguarding the interest of poor producers/consumers, especially women should be attempted primarily within the framework of the domestic policies, which in turn should shape up India's commitments under the multilateral trade regime.

Key words: Liberalisation, gender, trade reforms, AoA, food security, livelihoods
JEL Codes: K20, J16, F13, D58, Q18, D130, K33, I31

Acronyms used

ALS	Advance Licensing Scheme
AMS	Aggregate Measure Of Support
AoA	Agreement on Agriculture
APEDA	Agricultural and Processed Food Products Export Development Authority
ASI	Annual Survey of Industries
ATPSM	Agriculture Trade Policy Simulation Model
CENTAD	Consortium for Trade and Development
CMIE	Centre for Monitoring Indian Economy
CSO	Central Statistical Organisation
CV	Coefficient Variation
EOU	Export Oriented Units
EOUs	Export Oriented Units
EU	European Union
FAO	Food and Agricultural Organization
GDI	Gender Development Index
GM	Genetically Modified
GOI	Government of India
IMF	International Monetary Fund
IPR	Intellectual Property Rights
MNC	Multinational Corporation
MSP	Minimum Support Price
MT	Metric Ton
NABARD	National Bank for Agriculture and Rural Development
NCAER	National Council for Applied Economic Research
NR	Natural Rubber
NSSO	National Sample survey Organisation
NTC	Non-Trade Concerns
OECD	Organisation for Economic Co-operation and Development
QRs	Quantitative Restrictions
R&D	Research and Development
RIS	Research and Information System
SNA	System of National Accounts
SP	Special Products
SSM	Special Safeguard Mechanism
WTO	World Trade Organization

1. Introduction

Liberalisation of agricultural trade represents one of the most complex phenomenon in the context of the interface between trade, economic growth, and human welfare (Ruggiero, 1999). The issue gets further complicated owing to significantly high rates of perverse subsidization of agriculture sector in developed economies, which already enjoy huge relative advantage in the non-agriculture segment within international trade. High rates of subsidization and protection in these economies therefore lead to a situation in which developing economies are pushed to a peculiar situation where these economies may fail to reap the expected benefits from trade liberalization in agriculture, notwithstanding their historically evolved relative advantage in the sector.

Another important feature characterizing agricultural trade is the conflicting impact it generates on producers and consumers-both consisting of a large proportion of population especially the poor. Balancing these impacts is difficult because of the highly diverse nature of products, producers, and the resource endowment within which agriculture production takes place. Self sufficiency in food grain production and sustainability of scarce natural resources, especially water, are yet another sets of issues that need special attention while moving onto the trajectory of trade induced economic growth.

World Trade Organisation (WTO), through the Agreement on Agriculture (AoA) has been trying to address some of the issues raised above. The AoA consists of various components that deal with reduction in trade related distortions on the one hand, and developmental issues on the other. A series of negotiations have taken place since its implementation from January 1, 1995. Much of these have yielded limited results owing primarily to the unequal bargaining strengths, procedural difficulties, and lack of preparedness on the part of developing economies, besides the political economy and power dynamics of the globalising world.

Whereas the negotiations focus mainly on the instruments that help reducing trade distortions, what is however often overlooked within the WTO-framework is that liberalization of trade by itself can not take care of the various developmental issues such as livelihood enhancement, spatial distribution, and environmental sustainability, all of which have direct and significant bearing on not only growth in agriculture sector per se, but also the pace and composition thereof. This implies inseparability between issues related to trade and development in a large number of developing economies including India, where agriculture sector is critically and

intrinsically linked with economic, social, and political fabric therein. The July 2004 agreement and the Ministerial Meeting at Hong Kong during December 2005 however, have been the two important turning points, which began to show positive results. The July agreement provided a framework for negotiation (subsequently called the July Framework), which led to the Declaration at the Hong Kong Ministerial to end agriculture export subsidies by the end of 2013 [RIS, 2007].

It may be reiterated that liberalisation of agriculture, is not simply an issue of trade, not even of economic growth, but so much about right to livelihood, participatory democracy, and above all self esteem living in the less wealthy countries. Women, given their prime role in agriculture sector with perpetual gender inequity, have significant stakes in the manner in which liberalization of agriculture trade takes place, and the impact it exerts on the nature, pace, and spatial distribution of agriculture growth in general and human welfare in particular [Shah, 2005].

The recent discourse on liberalization of agricultural trade and welfare and women's stake thereof is marked by at least two fairly opposite strands. For instance, the neo-liberal view suggests that trade liberalization may open up new avenues for work, including for women, which may lead to reduced wage gap and increased autonomy [Kabeer and Humphrey, 1991; Bisnath, 2005; Busse and Spielmann, 2002]. Contrary to this, structuralist view points draw a pessimistic picture indicating growing feminisation within the overall scenario of increasing informalisation of the economy with concentration of productive resources and trade in the hands of few [Ghosh, 1996]. Also it has been argued that gender wage inequality is positively associated with comparative advantage in labour intensive goods, particularly in non-agriculture sector [Busse and Spielmann, 2002]. Besides the two major strands, there are trade pessimists who argue that multilateral trade among the unequal partners is inherently harmful for the developing economies and that, women bear a disproportionately large burden of the negative impact of trade within the economy [Shiva and Jalees, 2005].

There are not many studies that have systematically looked into the impact of liberalization of trade in agriculture on women, especially in a dynamic context. The empirical evidence is mixed and non-conclusive [Seguino, 2002; Standing, 1999]. For instance, evidence on gender wage gap, especially in the context of manufacturing sector seems to vary across countries and over time. Also the processes leading to the outcomes such as gender division of labour and women's bargaining power within households are found to be fairly divergent and variable over time. While there are methodological difficulties in ascertaining the impact, it is essential to undertake detailed diagnostic analysis of the processes that have significant

influence in shaping the actual outcomes of trade in agriculture and its impact on women.

Given this backdrop, this paper tries to examine impact of libralisation induced trade reforms in agriculture on the status of women as well as food security and poverty in India. The analysis is divided into seven sections including this introduction. Section 2 presents an overview of agricultural trade and identifies specific issues in the light of the AoA. Section 3 presents recent scenarios with respect to Indian agriculture and women's role within that. This is followed by an analysis of recent trends in agricultural trade in India and implications for women in sections 4 and 5 respectively. Section 6 discusses policy imperatives for safeguarding the interests of producers and workers in the light of the various provisions within AoA. The last section presents summary of major findings and discusses way forward.

The analysis tries to depict macro scenarios and capture micro level realities through specific case studies. This is important in the light of the fact that agricultural trade still constitutes only a small segment of the domestic production and market in India. Nevertheless, the impact of trade liberalisation, at least till now, is fairly localized and intensive covering specific communities in a micro setting. In fact, gainers and losers from trade liberalisation constitute different segments of the farmers, including women farmers. Nevertheless, it is often overlooked that the gain for one segment does not compensate for the loss suffered by the other segment. The need therefore is to safeguard their interests, which not only needs corrections in trade negotiations but necessitates restructuring of agricultural sector so as to enhance environmental, livelihood and food security among a large mass of poor producers and consumers.

It is the contention of this paper, that women's empowerment should be part of the larger agenda of restructuring of Indian agriculture; safeguarding the interest of poor producers/consumers, especially women should be attempted primarily within the framework of the domestic policies, which in turn should shape up India's commitments under the multilateral trade regime.

2. Contextualising Agricultural Trade: Major Issues

Liberalisation of agricultural trade, notwithstanding the complexities, is expected to unfold significant growth opportunities especially in developing economies. According to a study by the World Bank (2003), removal of agricultural tariffs and subsidies by all WTO countries may result into 15 per cent increase in exports and 12 per cent increase in imports among developing countries [Jha, V. et.al 2006: 81]. Estimates by Anderson (2003) indicated that removal of trade restrictions may result into a net

annual increase of $ 2.7 billion in India's agricultural exports. Assuming that all additional export comes from additional domestic production, this would imply doubling of the growth rate in agriculture at least for the initial few years.

While this sounds fairly encouraging, there are a few caveats in moving onto the trajectory of trade induced growth in agriculture, especially at this stage of India's economic development and the sectoral distribution of workforce thereof. Before we get back to discussing some of the major issues pertaining to trade and agriculture in Indian context, it may be useful to have a brief overview of the global scenario on agricultural trade and the implications for developing economies like India.

2.1 Agricultural Trade, Economic Growth, and Human Welfare: An Overview

Trade liberalisation, given the iniquitous scenario among the WTO-member countries, has led to uneven distribution of benefits across developing and developed countries. For instance, there has been a decline in the share of developing economies (excluding China) in the world exports from 28.57 per cent during 1980 to 27.07 per cent during 2004. There is however, an increase in the share of developing economies (excluding China) since 1990 when the share had dipped to 22.5 per cent [See Table 1.2 in RIS, 2007].

Recent estimates indicate that the actual welfare gains for the WTO members would be only one third of the projected estimate of $ 832 billion. What is more disappointing is that share of developing economies in the total gains would reduce from 60 to 31 percent. This amounts to less than a penny-a-day per capita for those living in these economies [RIS, Policy Briefs November, 2005].

The scenario pertaining to India's agriculture trade is also not so encouraging. According to Chand (2005), agriculture trade surplus has declined from the peak level of 4943 million US $ during 1996-97 to 2134 during 1999-00, which then increased to 3264 in 2003-04 million.

Much of this is attributed to the continued high level of subsidies in developed countries. The evidence with respect to agricultural growth, however, is not very clear since agricultural trade, even till now, is largely protected and restricted respectively in the north and the south. This is reflected by the fact that during the nineties growth rate in agricultural export was 3.6 per cent as compared to 4.8 per cent in the case of manufacturing sector [Ingco and Nash, 2004]. What is however, important to note is that a large proportion of agricultural exports has taken place among the developing countries; the share of developed countries in exports from the south has declined. This may

indicate `specialisation trap', where gains from trade among developing countries may be fairly limited, due to limited paying capacity of consumers in these low-income economies.

The above scenario raises certain pertinent questions on the implications of trade liberalisation, especially among developing economies such as India. It is imperative to discuss some of these macro issues, which set the larger context within which women's role in agriculture is shaped.

2.2. Major Issues

2.2.1. Comparative Advantage and Sustainable Resource Use

The historically determined pattern of economic development renders developing economies like India, a comparative advantage in exports of primary as compared to secondary products. A study estimating revealed comparative advantage index by Martin (2005) suggests that the index for India is almost twice the world average of unity, and it has improved since the nineties. While this reinforces the existing pattern of India's trade, it is noted that the revealed comparative advantage has little relevance in actual practice owing to continued large distortions especially those emanating from stringent quality standards (under sanitary and phytosanitary norms); and high delivery cost.

More than these, the critical limitation pertaining to the assessment of comparative advantage is non-inclusion of environmental cost associated with intensive use of the country's scarce natural resources especially, water [Maini, 2003; Shah, 2006]. A number of studies have indicated that several of the developing economies do not have any real comparative advantage.

The studies examining environmental implications, demonstrate that the countries without complete property rights regime (i.e. in the south) extracts from the environment hence have a revealed comparative advantage in the goods that use environmental resources more intensively Chichilnisky (1994). However, it is argued that this comparative advantage in the south is not real, given the negative externality of more intensive extraction of environmental resources. This implies that the south loses with trade whereas the north gains through the standard benefits from trade.

Similarly, Brander and Taylor (1997), assuming an inverted U-shaped growth curve of renewable resources, argued that in a dynamic context, north is more efficient in the production of those goods that use more of (renewable) environmental resources, hence export that to the south. As a result both gain from the trade. The issue therefore is whether resource scarce country like India should enhance agriculture production mainly to increase export or not.

2.2.2. Supply Response

The issue raised above has significant implications for the feasibility of doubling agriculture growth without seriously damaging sustainability of natural resources. While the studies estimating gains from trade focus mainly on production and employment at aggregate level, it is essential to know the nature of products and spatial distribution thereof.

If the recent evidence on changing pattern of India's exports is any indication for the future scenario, it suggests that exports are likely to be concentrated in high valued products like flower, fruits, vegetables, besides the traditional plantation crops and fish. It is likely that these products are concentrated in selected pockets in the country, with greater involvement of relatively more resourceful farmers.

The other concern is whether diversification for high valued products will be at the cost of food grain self-sufficiency or not? Also, one needs to ascertain whether export orientation will reduce accessibility of products like fruits, vegetables, milk and fish among domestic consumers or not.

Assuming that almost entire additional production may go for exports (as noted earlier), what would be the scenario for access to food grains and other food products among the growing population within the country-a substantially large proportion of which is severely undernourished. In absence of clear understanding on the content of additional growth in agriculture, gains from trade in monetary terms per se, may not imply substantial benefits to the country's poor producers as well as consumers.

2.2.3. Gainers and Losers (producers vs. consumers)

Balancing the interests of producers and consumers is a tricky issue especially in a large agrarian economy where poor are located in both sets of population. Evidence from a recent study suggests that unlike China, India does not gain from increased international prices resulting from reduced protection/subsidies in developed countries, because of the large proportion of subsistence farmers with limited marketable surplus (Deepika and Deshpande, 2003).

What is therefore important for the large mass of population dependent on agriculture is to enhance productive capacity of the natural resources in a manner that it simultaneously increases their access to food grains and other products. In other words India may need a policy that enhances domestic production, which primarily caters to the domestic consumers.

2.2.4. Employment and Livelihood

One of the adverse implications of the trade distorting subsidies in developed economies is that- the labour intensive products from

developing countries attract high peak tariffs, non-trade barriers, and other forms of protection [RIS, 2007:13]. These include major staple food products such as meat, sugar, milk, other dairy products; tobacco and some alcoholic beverages; and fruits and vegetables.

Obviously, Removing these barriers may help increasing production and thereby employment in farm sector. The issue is whether export market is a critical pre-condition for enhancing agriculture production in a country with large proportion of untapped domestic demand owing to lack of wage income.

It has been argued that countries with accelerated growth in agriculture sector tend to increase food imports massively and without a decline in food prices [Mellor, 1988]. This reinstates critical importance of agriculture-led, employment oriented growth strategy, resulting into increasing effective demand for food and other farm products within domestic as well as international market. It is essential that developing economies like India tend to increase employment and incomes of the poor more rapidly than their best agricultural production record can sustain [Mellor, 1988]. This implies that agriculture growth and employment generation should precede, rather than follow, growth in agricultural trade.

What is critical therefore is enhancing the productive capacity, on a sustainable basis, and obtain benefits of comparative advantage in a global market where developing countries increase their exports of labour intensive products like horticulture, certain types of livestock, and other tropical agriculture products, which do not directly compete with temperate latitude commodities. It is therefore essential that WTO helps enhancing developing economies' capacity to produce more in a sustainable manner rather than merely attempting to create `freer trade' where exports become an engine of growth within developing economies.

2.2.5. *Exports for Financing Imports?*

The last issue in this context pertains to the compulsion for developing economies to earn foreign exchange in order to finance the necessary imports. The evidence of late, suggests that on the one hand balance of payment situation has improved, and on the other, share of agriculture trade in the total earnings of foreign exchange has declined. This suggests greater freedom or space for deciding on the volume and direction of agriculture trade, especially exports, which hitherto were of critical importance for meeting the foreign exchange needs of the country [Sathe and Deshpande, 2006].

This obviously does not mean staying away from multilateral trade. Rather, it should imply negotiating for better rather than larger volume of trade. Better trade should focus primarily on developmental needs of the poorer

countries and communities thereof, rather than needs of the developing countries for enhancing trade.

The Doha Development Round seems to focus more on the latter as against the former. The need therefore is to bring sustainable development at the center stage of agricultural trade. This would imply that:

- Domestic policies take a pro-active role for creating appropriate conditions for trade in agriculture.
- Enhancing productive capacity rather than increased exports (market access) is at the core of agriculture policy, which integrates domestic and trade concerns.
- Whereas growth in exports should take care of sustainability of natural resource use, growth in imports should take care of the interest of the poor producers.
- Given the large and growing domestic market, with fairly large potential market waiting for access to wage income in hands of the poor, exports may not be seen as the uncontested goal and the only road map towards promoting agricultural growth.
- The need is to finance technology development, natural resource management, and creation of infrastructure along with credit and market development rather than trying to push exports for earning foreign exchange so as to be able to finance imports, especially of those commodities that are ecologically conducive, labour intensive, and spatially broad based.

It is in the backdrop of this larger vision that the subsequent analysis tries to: (a) locate women in agriculture' (b) identify the gender impacts of trade liberalization; and (c) discuss policy approaches for future growth in agriculture, and pace as well as composition of trade within that.

3. Agriculture Development Scenarios and Role of Women in India

This section presents a brief depiction of the contemporary scenarios in Indian agriculture and locate women's role within that. In doing so, it will help understand the impact of AoA on different sub-sectors within agriculture in general and women in particular.

3.1. Crisis and Renewed Policy Thrust

The recent policy discourse is marked by increasing recognition of the critical role that Indian agricultural sector plays in reducing poverty besides

boosting up overall economic growth in the economy [Majumdar, 2006]. The recognition has come at a time when agricultural sector has started facing yet another crisis, which poses important challenges such as low and fluctuating growth rates over time and space; continued depletion of natural resources and persistent technological stagnation in order to address the problems in drought prone as well as flood prone areas, inhabiting a large proportion of agrarian communities in the country.

While a large part of the poverty-reduction impact had emanated in the areas covered by the early phase of Green Revolution, a similar phenomenon has been experienced during the eighties in some of the agriculturally lagging states such as West Bengal, Madhya Pradesh, and Rajasthan [Bhalla, 2000]. The period, starting from the early eighties marks a turning point in India's agriculture with an unprecedented growth of 3.5 per cent per annum, and a relatively better regional spread of such growth.

Nevertheless, the growth momentum could not sustain during the nineties. The Tenth plan had started with a target of 4 per cent annual rate of growth in agriculture and allied activities in order to sustain 7-8 per cent growth in the economy. The mid-term appraisal of the Tenth Plan however, came with a disappointing picture, with the actual achievement of only 1 per cent growth during the first three years of the plan period [Planning Commission, 2003]. Clearly, this signaled an alarming situation, depressing the planners, experts, and more importantly the farming population. A resemblance, if not actual onset of a crisis, was seen as looming large over the sector [Shah, 2006a; Gupta, 2005].

The crisis scenario seems to have several manifestations, such as:

(a) Reduced area and production of food grains (the growth rate in production during the nineties was 1.08 %, far below the rate of population growth)

(b) Increased area under fallow land

(c) Decline in crop productivity during the nineties (from 2.99 % to 1.21 %)

(d) Large proportion of farmers wanting to get out of agriculture (due to non-viability of holdings and input-output prices)

(e) Over exploitation of land (forest and pastures) and (ground) water resources

To a large extent, the above scenario underlies the fact that farming system with assured irrigation has reached a plateau and that the locus of future growth is gradually shifting towards high potential rainfed areas as well as

large tracts of dry land regions in the country. While there has been a clear recognition of the fact that frequent droughts had jeopardized the growth momentum during the Xth plan, the policies are yet to get fine tuned towards reviving and developing various farming systems that are suitable to different agro-ecological systems in the country. The policy emphasis, at least until the close of Xth Plan, still remained mainly geared towards irrigation-induced increase in crop-productivity and cropping intensity, notwithstanding the laudable objectives to promote sustainable and regionally diversified agriculture.

The resemblance of a crisis, once again, has brought Indian Agriculture to another major cross road-drawing the new path will have an overarching impact on the future of Indian Economy and fortunes of millions of Indians in the next two to three decades.

Given that agriculture and allied activities constitute mainstay of a significantly large proportion of women workers (paid and unpaid) in India, it is imperative that women's participation and empowerment become part of the processes that get evolved for addressing these challenges. This, prime facie, would call for clear recognition of the fact that the face of Indian farmer is that of women. This, obviously, is to go beyond the rhetoric; the ground reality is that women are increasingly replacing men on the farm, as more and more men are leaving farming -by compulsion or by revealed preference. The recognition therefore, should essentially bring women's concerns into the central stage of agricultural growth especially in the lagging regions (Shah, 2008).

3.1.1. Crop-Diversification and Food Security: Recent Evidence

There has been an increasing trend of diversification in Indian agriculture since the late eighties. A part of this emanates from agro-ecological characteristics with predominance of large tracts of dry land and also highland regions in the country. Both these regions have comparative advantage in growing high valued products like cotton, oil seeds, horticulture, dairy and other livestock, medicinal plants, spices, tea-coffee-rubber, and other specialized crops such as cashew nut etc. The other factors driving the crop-diversification is changing pattern of market demand, which in the wake of growing income inequality, may suppress the prices of subsistent vs. commercial crops. It may however, be noted that trade liberalization may halt the process of diversification given the fall in international prices and slowing down of the exports of various products like tea, coffee, sugar etc. More perishable products like dairy, fish, fruits and vegetables, and flowers may suffer due to inadequate infrastructure for transportation and also due to the safety clauses imposed by exporting countries. This suggests countervailing effects of the two sets of forces,

which in turn, seems to have resulted into a status quo in terms of composition of crops within agriculture.

The recent evidence suggests that the index of area under food crops has remained more or less same during 1980-01, 1989-90, 1999-00, and 2003-04. Compared to this the index of production has increased substantially from 104.9 to 139.1, further to 169.7 and 171.0 during the four years (Table 1). In the post nineties production of food grains has registered an increase though, with significant fluctuations. The production increased from 196.80 million tones in 2000-01 to 204.6 million tones in 2004-05 [Krishnaraj, 2006].

Table 1: Trends in area, production and productivity of food and non-food crops in India

Year	Food Crops (Indices)			Non-Food Crops (Indices)		
	Area	Production	Yield	Area	Production	Yield
1980-81	99.80	104.9	105.1	99.4	97.4	99.2
1989-90	99.90	139.1	135.5	115.8	149.7	126.7
1999-00	97.00	169.7	159.8	130.7	189.0	136.4
2003-04	97.90	171.0	163.8	119.1	193.6	148.4

Source: Based on Table 5 & 6 from Krishnaraj, 2006.

During the same time, production of oilseeds (except soybeans) and sugarcane has declined, whereas that of cotton has increased. Production of Coffee has registered a more or less continued decline whereas that of tea and jute & mesta have undergone fluctuations since the turn of the century.

The scenario depicted above thus, suggests a mixed-pattern in terms of crop-diversification. The pattern is influenced mainly by internal and weather related factors rather than by international trade except for a few commodities like coffee, oil seeds and pulses.

Given the fact that oil seeds and pulses (also coarse cereals) are conducive for dry land ecology, the need is to promote their production not only for ensuring food security and livelihood but also for sustaining environment. Same case could be made for the plantation crops in high lands, which have been ecologically as well as culturally suitable to the region. That these crops already had significant export orientation even prior to the implementation of AoA, underlies the need for safeguarding of interests of the traditional producers/workers in the high land regions. Besides adopting safe guard measures against the international competition, enhancement of domestic demand at reasonable prices may also be an important part of the coping mechanism. Increased agricultural growth and corresponding increase in real earnings/wages are crucial in this context.

3.1.2. Expanding Opportunities in the Lagging Regions

The strategy for attaining higher growth in dry land as well as rainfed agriculture in sub-humid areas may call for adopting a three pronged approach consisting of (a) increased diversification within the context of a farming systems approach; (b) sustainable management of natural resources especially water, through appropriate institutions; and (c) setting up of adequate information as well as market linkages. It is imperative that the road map towards the strategy would be to lay foundations for women's empowerment.

This would imply that operationalisation of the new strategy would enhance women's role in making informed decisions; increase returns to their labour; and eventually ensure improved well being among women farmers, rather than merely increasing their work burden. Bridging or at least narrowing the gender gap in terms of access to factors of production such as land, credit, and knowledge, should be considered as a necessary pre-condition for turning women farmers as champions of agricultural growth with higher productivity, environmental sustainability, and gender equity.

Fortunately women already have greater space in some of the activities that have special significance for the next phase of agricultural growth in dry land and high potential rainfed areas with sub-humid conditions in northern-eastern parts of the country [Krishnaraj and Shah, 2004]. While it is difficult to estimate women's contribution to agriculture production in India, it is quite clear that they have a larger share in the production since they constitute a majority i.e. about 55-66 per cent of the workforce in agriculture excluding those not counted as workers [Sujaya, 2006]. For instance women are in the forefront of various allied activities such as livestock, fishery and cultivation of vegetables/horticulture in some of the dry land regions like Gujarat and Maharashtra. This kind of diversification is likely to be an important feature of the future growth in these regions. Similarly women have already occupied major roles in managing farming and other related activities in large parts of the sub-humid regions and also hilly areas having high incidence of male migration. These regions, unlike dry land areas, are characterized by fairly substantial untapped potential in terms of crop-yields.

(a) Women already have larger presence in the diversified sectors

(b) Men increasingly look out for employment opportunities outside agriculture and rural economies

(c) Sustainable agriculture is likely to be more `knowledge' intensive rather than `input' intensive, where traditional knowledge of farmers- both men and women- may assume special significance

(d) Revival of farming systems may also bring into its fold some of the food crops (like pulses and oilseeds and coarse grains) and other products (such milk, fish and fruits/NTFPs) that may have special nutritional value

(e) Many of the new activities may involve collective action not only for management of Common Property Resources (CPRs), but also for processing, marketing, and accessing credit. A number of schemes have already put in place participatory institutions and group based activities jointly with men, and also exclusively for women.

It may be noted that revitalising and sustaining the momentum of growth would require a paradigmatic shift in the nature of technology, institutional support systems, and price structure. According to Vaidyanathan (2006), the grim situation is not so much due to factors like inadequate price support, low public investment, and declining size of land holdings, besides sub-normal rainfall in large parts of the country. Rather the critical issue is about the composition of investment that would help `improve product potential of land and water resources already under use' [p. 4013]. It is imperative that the emerging pattern of agricultural trade is in congruence with the larger objectives of growth in India's agriculture. Essentially, the trade should reinforce the multiple role played by agriculture in the economy rather than get shaped up by the conditions of multilateral trade and the distortions thereof.

3.2. Women's Role in Agriculture

Despite being involved mainly in farming and related activities, women farmers are recognised mainly as workers rather than as producers, processors, and marketers for a large number of agricultural produce. In fact farmers –women and men- often carry out these multiple activities through out the year. The Indian data system, like elsewhere, is ill-equipped to capture these multiple activities especially by women who undertake them within home and in conjunction with domestic work collecting, processing and preparing food/feed for human consumption as well as for livestock of the households. Given these limitations we present a detailed account of women's work participation in agriculture and allied activities and also highlight the underlying gender wage differentials.

3.2.1. Female Workforce in Rural India

By 2001 there were 310.66 million workers in rural areas- 199.20 million males (64 %) and 111.46 million females (36 %). Of the total female workers 54 per cent were main workers in 2001 whereas 45 per cent were marginal workers (Table 2). Compared to this the proportion of marginal male

workers was only 14.99 per cent, which has increased significantly from nearly 1.37 per cent during 1991 [Vepa, 2005]. This suggests predominance of marginal workers among female workforce.

Table 2: Gender Composition of Workers in Rural India- 1991 and 2001

	1991		2001	
Number of Workers (In Million)	Female	Male	Female	Male
Total Workers	80.43	168.60	111.46	199.20
Main Workers	56.00	166.20	60.34	169.33
Marginal Workers	24.12	2.31	51.12	29.87
		Percentage		
Total Workers	32.00	68.00	36.00	64.00
Main Workers	25.19	74.81	26.27	23.73
Marginal Workers	91.38	8.62	63.12	36.88
% of Marginal to total workers	30.38	1.37	45.86	14.99

Source: Census of India, as cited in Vepa (2005).

As per the estimates by the NSSO, nearly 83.3 per cent of female workers in rural areas were engaged in Agriculture and allied activities. This has declined only marginally from 86.2 per cent in 1993-94. Compared to this, the proportion of male workers in these activities was 66.5 per cent, which declined substantially from 74.1 per cent during 1993-94 (Table 3).

Table 3: Sectoral composition of workforce by gender (1983 to 2004-05)

Sectors	1983		1993-94		2004-05	
	Male	Female	Male	Female	Male	Female
Agriculture	77.5	87.5	74.1	86.2	66.5	83.3
Mining & quarrying	0.6	0.3	0.7	0.4	0.6	0.3
Manufacturing	7.0	6.4	7.0	7.0	7.9	8.4
Electricity, water, etc.	0.2		0.3		0.2	
Construction	2.2	0.7	3.2	0.9	6.8	1.5
Trade, hotel & restaurant	4.4	1.9	5.5	2.1	8.3	2.5
Transport, storage & communications	1.7	0.1	2.2	0.1	3.8	0.2
Others Service	6.1	2.8	7.0	3.4	5.9	4.9
All	100	100	100	100	100	100

Source: Various Rounds of NSSO Surveys and 61st rounds of Survey, 2004-05.

We examined the composition of workforce across different activities within agriculture sector. Table 4 presents distribution of workers across sub-sectors in agriculture. It is observed that as large as 74.7 per cent of the

female and 78.4 per cent of male workers in agriculture were engaged in cultivation. This proportion has declined marginally among both female and male workers over 1983.

Table 4: Percentage Distribution of Workers by Sub-Sectors in Agriculture

	Male			Female		
Sub-Sector	1983	1993-94	1999-00	1983	1993-94	1999-00
Total Cultivators	81.4	75.3	78.4	79.7	70.5	74.7
Forestry	1.2	0.5	0.6	1.2	0.6	0.8
Plantation	0.9	1.7	1.7	1.1	1.5	1.6
Animal Husbandry	7.4	5.7	5.9	10.2	13.2	12.3
Fisheries	0.6	0.8	0.5	0.4	0.2	0.1
Other Agriculture Activities	8.5	16.0	12.9	7.4	14.0	10.4
Total non-cultivators	18.6	24.7	21.6	20.3	29.5	25.3
Total Agriculture	100.0	100.0	100.0	100.0	100.0	100.0

Source: Adopted from Srivastava, R. (2006).

Among the activities other than cultivation, animal husbandry assumes special importance especially among women. Whereas 12.3 per cent of the female workers in the sector were engaged in animal husbandry, the proportion for males was 5.9 per cent. It may be noted that the proportion of workers in this sub-sector has increased among female whereas it has declined among males as compared to 1983. Similarly, forestry has a higher share of female workers than male workers though the proportion is very small. Strangely, fishery has experienced a decline in the proportion of workers both-male and female. There seems to be a slight increase in the proportion of workers engaged in fisheries during 2004-05, perhaps due to the increase in total production as well as export in the recent period.

A majority of workers are self-employed; the proportion is more or less same among males (57.6%) and females (56.4 %) during 2004-05. Of the remaining workers only 4.8 and 9.1 per cent were under regular employment among females and males respectively. This leaves as large as 38.9 per cent of female workers in casual employment; the proportion for male is 33.3 per cent. It is noteworthy that the proportion of casual workers has declined both for males and females though the decline is sharper in the case of female workers. It may be noted that proportion of casual workers both among male and female had increased 1993-94 to 1999-00, which then have declined during the next five years (Table 5).

Table 5: Status of Employment in Rural India- 1993-94 to 2004-05 (Usual Status)

	61st Round (2004-05)	55th Round (1999-00)	50th Round (1993-94)
1. Self Employed	57.6	54.4	56.7
Male	56.4	50.0	51.3
Female			
2. Regular Employees			
Male	9.1	9.0	8.7
Female	4.8	3.9	3.4
3. Casual Employees			
Male	33.3	36.6	34.6
Female	38.9	46.1	45.3

Source: NSS report No. 515, Employment and Unemployment in India, 2004-05

We also tried to examine the relative proportion of female workers in agriculture engaged as cultivators vs. casual labor. The estimates for 2004-05 suggest that of the total female workers in agriculture 62 per cent were cultivators, i.e. self-employed whereas 28 per cent were casual workers in agriculture. The proportion is more or less same among male workers in the sector.

The estimates in Tables 3 and 5 suggest some positive changes in rural workforce including women. Not only that there is a shift of female workers from agriculture and allied activities to other sectors, there has been a significant increase among female workers engaged in regular employment, which increased from 3.4 to 4.8 per cent during 1993-94 to 2003-4. The increase among male workers in regular employment was from 8.7 to 9.1 per cent during the same period. This shift however, has tapered off during 1999-00 to 2003-04. On the lower side of the scenario, one finds that a part of the decline in casual workers has been due to a shift towards self-employment, especially among female workers. This may imply significant incidence of under employment, particularly of unpaid type.

3.3. Women's Relative Share in the Workforce in Agriculture Sector

As per the 2001 Census, female constitute 32.59 per cent among cultivators and 46.9 per cent among agriculture laborers [Vepa, 2005]. The proportion however, varies significantly across states as shown in Table 6.

Among 11 out of the 18 major stares, the share of female workers was higher than the All India average i.e. 39 per cent. These include majority of the states belonging to dry land and forest-based regions. The proportion of female workers was higher than 45 per cent among six states viz, Andhra Pradesh, Himachal Pradesh, Maharashtra, Rajasthan, Tamil Nadu and Uttaranchal. If one looks at the wage differentials, female workers receive as low as 65 per cent of the wages received by the male workers. The wage gap is likely to have increased in the post-nineties as reflected by the fact that the growth rate in agricultural wages for female was lower (1.1 %) as compared to male workers (1.43 %) during 1999/00 to 1004/05. This is a departure from the earlier scenarios during 1983-1993/94 and 1993/94-1999/00 [Sundaram, 2007].

Table 6: Share of female workers in total agricultural workforce and wage-differentials, 2001

State	Female Workers to Total (M+F) Farm Workers (%)	Index of Wage Equality (Female/ Male)
Andhra Pradesh	46.24	0.65
Assam	30.27	0.75
Bihar	29.62	0.86
Jharkhand	42.20	-
Gujarat	41.71	0.78
Haryana	40.46	0.81
Himachal Pradesh	56.67	0.75
Jammu & Kashmir	34.52	0.86
Karnataka	43.20	0.84
Kerala	27.80	0.56
Madhya Pradesh	43.77	0.83
Maharashtra	50.16	0.61
Orissa	35.70	0.75
Punjab	18.52	0.75
Rajasthan	48.39	0.67
Tamil Nadu	45.52	0.51
Uttar Pradesh	27.33	0.69
Uttaranchal	52.21	-
West Bengal	24.87	0.80
All India	39.07	0.65

Source: Vepa (2005).

Besides this, there are large numbers of unpaid workers in the sector-a majority of them being women. According to recent estimates based on time use survey in six states of the country, on an average 43 percent of the females are engaged in crop production and other SNA (System of National Accounts) activities in India in 2000 (CSO, 2000). These females spent 21 hours on an average per week in all the agricultural activities. They spent their time almost equally i.e. 10.20 hours in crop production and 10.37 hours in non-crop agricultural activities in a week. This indicates that female workers are equally spending their time for paid and unpaid work. The estimates also suggest that 60.22 per cent of all the work in rural area is unpaid work for both males and females.

Table 7: Share of Females in Total Employment in Agriculture: Operation and Sub-Sector wise

Operation/ Sub-sector	1983	1993-94	1999-2000
Ploughing	5.4	5.1	8.4
Sowing	25.5	27.9	35.2
Transplanting	43.2	42.6	43.2
Weeding	45.7	46.8	47.9
Harvesting	38.1	36.8	35.2
Other cultivation activities	28.0	27.7	29.2
Non-man in cultivation	17.8	16.7	15.1
Cultivation	29.8	30.5	31.5
Forestry	30.7	36.2	41.0
Plantation	32.7	29.2	30.7
Animal husbandry	37.3	52.2	50.0
Fisheries	23.3	10.3	11.1
Other agri. Activities	27.6	29.1	28.1
Agri. Other than cultivation	32.1	35.9	36.1
Total Agriculture	30.2	31.9	32.6

Source: Table 14 in Srivastava (2006).

Women occupy important position in specific operations within cultivation and also in activities other than cultivation. Table 7 indicates that women workers account for substantial part of the total workers in sowing (35.2 %); weeding (47.9 %); forestry (41 %); and animal husbandry (50%). Overall female workers constitute about 32 per cent in cultivation and 36 per cent of the total workers in other activities in agriculture.

Table 8: Estimate of Employment in Various Food Processing Industries, 2000-01 (Nos.)

Industries	Sector		
	Unorganized	Organized	Total
Slaughtering, preparation and preservation of meat	195022	4272	199294
Manufacture of dairy products	387446	75219	462665
Canning and preservation of fruits and vegetables	73164	26685	99849
Processing; canning & preserving of fish, crustacea & similar foods	101388	23681	125069
Grain milling	2804822	298617	3103439
Manufacture of bakery products	215396	44782	260178
Manufacture and refining of sugar (vacuum pan sugar factories)	84	215252	215336
Production of indigenous sugar 'boora', khandsari gur, etc. from sugarcane; palm juice etc.	729807	76373	806180
Production of common salt	9698	25949	35647
Manufacture of coca products and sugar confectionary (including sweetmeats)	563194	8935	572129
Manufacture of hydrogenated oils and vanaspati ghee etc.	8431	15112	23543
Manufacture of vegetable oils and fats (other than hydrogenated)	170333	94983	265316
Manufacture of animal oils and fats; manufacture of fish oil	1519	51	1570
Processing and blending of tea including manufacture of instant tea	365	125640	126005
Coffee curing, roasting, grinding and blending etc. including manufacture of instant coffee	14414	5076	19490
Processing of edible nuts	194152	133804	327956
Manufacturing of ice	15796	2364	18160
Manufacture of prepared animal and bird feed	7564	22415	29979
Manufacture of starch	754	7919	8673
Manufacture of food products not elsewhere classified	1450605	45691	1496296
Distilling, rectifying and blending of spirits; ethyl alcohol production from fermented materials	7955	21358	29313
Manufacture of wines	320	3186	3506
Manufacture of malt liquor and malt	105795	11117	116912
Production of country liquor (arrack and today etc.)	247782	5194	252976
Manufacture of soft drinks and syrups	102185	17053	119238
Tobacco stemming, re-drying and all other operations connected with preparing raw leaf tobacco	142895	49947	192842
Manufacture of bidi	2632008	424988	3056996
Manufacture of cigars, cigarettes, cheroots and cigarette tobacco	20579	13223	33802
Manufacture or snuff, zarda, chewing tobacco and other tobacco products n.e.c. (except pan masala containing tobacco)	18055	12668	30723
Manufacture of pan masala, catechu ('Kattha') and chewing lime	29269	4211	33480
Total	10250796	1815765	12066561

Source: Derived by Ministry of Food Processing Industries from CSO, Annual Survey of Industries (ASI) and NSSO 56th Round.).

Apart from cultivation and other allied activities, women also significantly contribute to processing and marketing of various agricultural commodities. Table 8 presents some estimates on the former, though estimates of women's work participation in marketing of agri-products are not available.

The above account of women's work participation in agriculture indicates three important features: First, there has been an increase in the share of female workers in the total workforce in rural areas along with a substantial decline in the proportion of marginal workers, especially among females. Similarly, there has been a decline in the proportion of casual workers with corresponding increase in not only self-employment but also regular employment; the pattern is more or less same for male and female. Second, with increasing proportion of male workers seeking work outside agriculture, women farmers are in the forefront, constituting nearly 33 percent of the total workforce in the sector. Third, women have further consolidated their position in some of the specific activities such as sowing, weeding, forestry, and animal husbandry.

Overall the scenario depicts a positive picture for female workers in agriculture, though the pace of change is fairly slow. The structural issues of invisibility and wage differentials however continue to impinge the dynamics of female workforce in the sector, often gets reflected as what is broadly termed as `feminisation' of agriculture. It is imperative to note that the increasing space for women workers in Indian agriculture is more an outcome of declining viability as well as profitability, pushing out male workers to find alternative employment, given the shrinking land holding size. Women in rural areas thus get pushed into this low productive sector given their inferior socio-economic status.

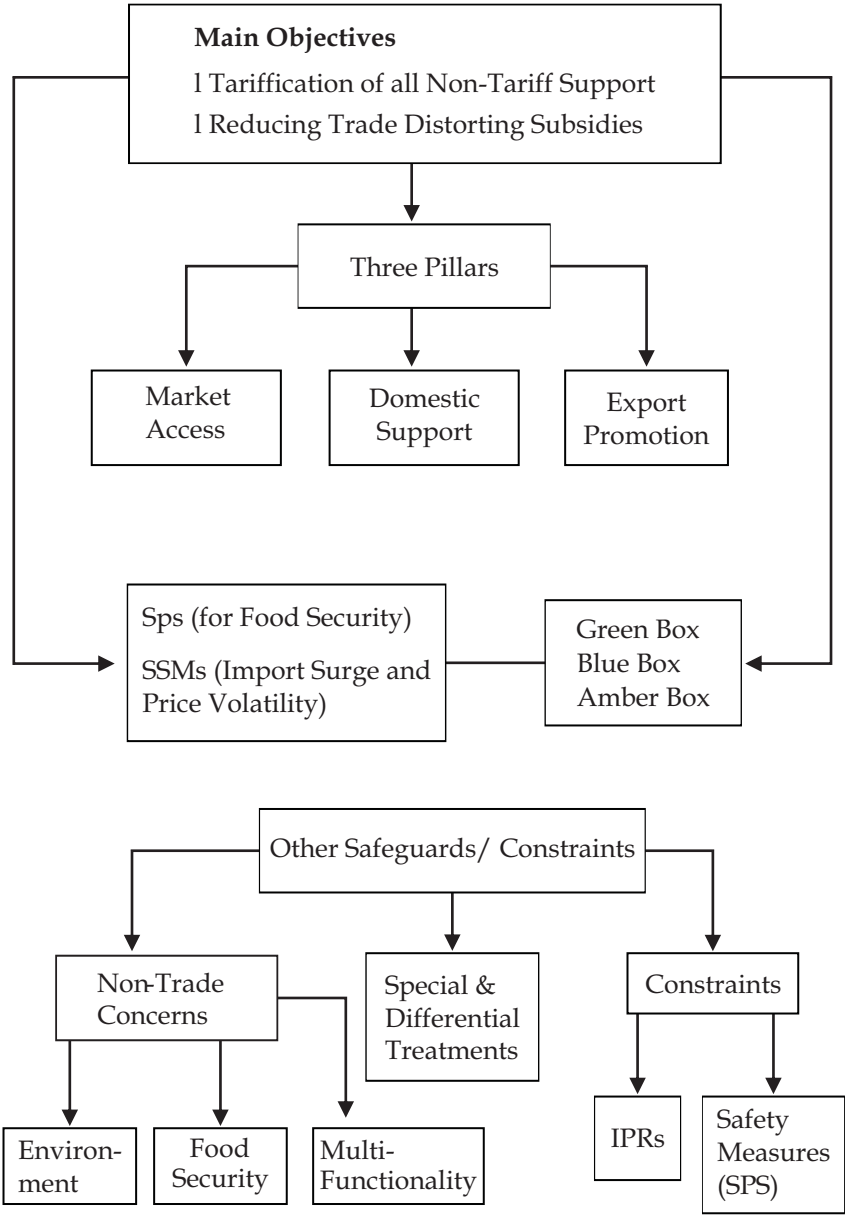
4. AoA and Agricultural Trade Scenario in India

This section presents changing scenario of India's agriculture in the light of the negotiations and commitments under the AoA. The analysis is presented in the backdrop of a brief discussion of the structure of AoA, depicting the major components thereof.

4.1. AoA: Structure and Negotiations

The AoA contains a fairly comprehensive structure revolving around three pillars, viz; Market Access, Domestic Support and Export Competition. In addition, there are provisions for safeguarding interests of the developing economies within and outside the three Pillars. Chart 1 gives a synoptic view of the structure of AoA. The highlighted components indicate space for taking care of the developmental concerns of the developing countries, much of which is outside the Three Pillars.

Chart 1: Structure of Agreement on Agriculture



4.2. India's Commitments under AoA and Impact on Selected Commodities

Given the limited success on negotiations, notwithstanding the July framework, India has till now tried to safeguard the trade interest by focusing mainly on import-restrictions as against gaining much of market access especially in developed economies. This was reflected in the fact that prices of most of the commodities, in which India is deemed to have comparative advantage, have fallen significantly owing to the continued subsidization among developed countries along with imposition of tariff reduction commitments on the developing countries under the WTO provisions.

According to the notification submitted to WTO, India does not have any obligation for reducing the total aggregate measure of support (AMS) because (a) the product specific support is negative; and (b) the non-product specific support is well below the de minimis level [Pal, 2005:30]. It may be noted that India does not provide any product specific support other than minimum support price (MSP), which was lower than the external reference price for 19 out of the 22 products for which such support is being provided. These mainly include food crops such as rice, wheat, bajra, jowar, maize, barley.

The non-product specific support consists of subsidies on various inputs such as fertilizer, irrigation, electricity, seed, and farm credit. During 1995-96, these subsidies amounted to about US$ 5,722 million, which constituted 7.52 per cent of the total value of domestic production. The permissible level is 10 per cent of the value of domestic production. It is also note worthy that the estimated subsidy under the Special and Differential Treatment amounted to only US $ 254.3 million.

It is therefore noted that the subsidy reduction formula under the July framework may not create much problem for India's domestic production; instead the constraints may arise mainly due to fiscal crunch faced by the Government. There are two important implications emerging from this otherwise comfortable situation vis-à-vis WTO. First, the external forces may not be treated as major impediment for perusing restructuring of agriculture sector on sustainable basis as mentioned earlier. Second, instead of striving form increased market access and thereby promoting export growth, India may like to plead for investment support for putting its agriculture sector on a sustainable footing.

In an important move, India has shifted a large proportion of the input subsidy under the categories of (a) investment subsidies generally available to agriculture; and (b) input subsidies to low income or resource poor producers. This, prima-facie, should be seen as a positive feature, the full potential of which could be tapped by placing domestic policies in order.

There is however, a small caveat, which pertains to the fact that the above estimates are based on the reference prices of 1998. If this gets changed to a more recent period, during which the international reference prices have undergone substantial decline, the estimated subsidies may increase. It is in this context, it is essential that India should safeguard its interest by not only re-labeling, but also genuinely restructuring and/or rationalizing the subsidy structure such that it could facilitate faster progression towards the developmental goals, covered under the non-trade concerns within the AoA.

4.3. Changing scenario of India's Agricultural Trade

4.3.1. India's Agri-Trade in the Post AOA Period

It may be noted at the outset that agriculture trade accounts for a small proportion of the agriculture GDP in India. By 1998-99, exports and imports accounted for 6.6 and 2.0 per cent of agricultural GDP, which increased from 4.8 and 1.5 per cent over the triennium preceding 1995-96 [Chand, 2005: 3]. By 2003-04 the share of exports reduced to 5.41 per cent whereas the share of imports increased to 3.57 per cent. While much of the decline in the share of exports to the total agricultural GDP could be attributed to the declining prices in international market, overall the evidence suggests that the initial gain from trade has receded in the more recent period-the point already observed.

It may also be noted that both exports and imports are subject to high fluctuations though, imports have fluctuated significantly more than the exports [see Appendix 1]. To a large extent, India's agricultural trade has been influenced by trends (fluctuations) in domestic production [Deepika and Deshpande, 2003]. This suggests inward looking scenario of agricultural trade, which apparently is influenced by the defensive approach of India's agricultural policy given the significant impact on livelihood and food security of the millions of poor producers and consumers in the country.

Notwithstanding the defensive approach, India's agricultural trade did get affected due to changing international prices, major loopholes in the July framework which affected market access in developed countries, and above all increased competition from developing economies, resulting into further depression of prices in both domestic and international markets (in the case of importables and exportables respectively).

4.3.2. Competitive Advantage

According to the estimates by Hoda and Gulati (2007), India has competitive advantage in three temperate zone crops, viz; rice, wheat and cotton. Moreover, the study suggests that the country may acquire competitive

advantage in export of sugar and dairy products provided trade distorting subsidies in developed countries are eliminated.

It may be important to note here that India has been leading (along with Brazil and others in the group) negotiations by developing economies for reduction of trade distorting subsidies that exist in the developed countries. While negotiating for a level playing field is essential in the light of the AoA, it is important to recognise that the crops (products) for which India has actual or potential competitive advantage are water as well as labour intensive. Increasing export orientation is likely to result in over use of water (export of virtual water) given the requirement of these high quality products. At the same time export orientation may also lead to corporatisation both in cultivation as well as post harvesting processes, which in turn, may lead to displacement and/ or increased informalisation of labour, aggravating the market related fluctuations and risks. What is more important is that while producers face the likely adverse impacts, consumers in domestic market may face supply crunch owing to diversion of production for export and/or higher expected prices at which there is limited effective demand within domestic market.

This is not to rule out the possibility of import of cheaper products to cater to the domestic market. In fact the present trade scenario in India does indicate common products in the list of major exports and imports. The problem with this is –it may create lose-lose scenario for the domestic producers who may suffer due to uncertainty and declining price in international, and increased competition from imports in domestic market.

4.3.3. Commodity Composition of Exports and Imports: Recent Scenario

Tables 9 thru 13 provide a detailed picture of the commodity composition of India's exports and imports over a period of about 15 years since 1990.

Table 9: Recent Trends in India's Agricultural Trade

Year	Exports (Rs. Crores)			Imports (Rs. Crores)		
	Agriculture & Allied	All Commodities	Share of Agri. (%)	Agriculture & Allied	All Commodities	Share of Agri. (%)
2000 – 01	5983	44147	13.55	2185	50056	4.37
2001 – 02	5919	43958	13.46	2906	51567	5.64
2002 – 03	6723	52823	12.73	3263	61533	5.30
2003 – 04	7538	63886	11.80	4121	78203	5.27
2004 – 05	8471	83502	10.14	4282	111471	3.84
2005 – 06	10212	103075	9.91	3991	149144	2.68
2006 – 07	12506	126246	9.91	4680	190438	2.46

Source: Government of India, Economic Survey, relevant years.

Table 10a: Commodity Composition of India's Agricultural Exports (Value in percentage)

Commodity	Phase I 1990-95	Phase II 1996-2000	Phase III 2000-04	Phase IV 1990-04	GR 1990-2004	CV 1990-2004
Milled Paddy Rice	15.06	17.66	17.42	16.73	10.19	53.1
Cake of Soybean	11.69	10.33	7.89	9.98	2.43	34.12
Tea	11.69	8.11	5.78	8.52	-1.29	22.39
Cashew nut (Shelled)	9.19	7.66	6.75	7.86	3.56	22.89
Coffee Green	5.47	5.42	2.50	4.49	1.11	44.16
Baffalo meat	2.37	3.43	4.66	3.48	14.11	54.61
Tobacco leafs	3.19	3.44	2.72	3.12	46.23	30.77
Oil of Castor beans	3.05	3.22	2.27	2.86	5.44	38.81
Cotton Lint	4.50	2.55	1.02	2.69	-14.44	114.62
Wheat	0.99	1.1	5.52	2.5	26.49	125.16
Sugar Refined	1.31	0.79	3.38	1.8	16.07	120.36
Pepper-white/long/black	1.48	2.38	0.54	1.49	26.49	64.89
Sesame seeds	1.16	1.53	2.06	1.58	12.41	54.42
Onion dry	1.69	1.06	1.81	1.51	5.23	44.76
Coffee Extracts	1.02	1.58	1.18	1.27	13.09	48.2

Notes: (1) First three columns show average percentage share of agriculture products in total agriculture exports. (2) GR= Compound growth as per cent per annum. (3)CV= coefficient of variation.
Source: Computations based on data from www.fao.org (Adapted from Sathe and Deshpande, 2006).

Table 10b: Commodity Composition of India's Agricultural Imports (Value in percentage)

Commodity	Phase I 1990-95	Phase II 1996-2000	Phase III 2000-04	Phase IV 1990-04	GR 1990-2004	CV 1990-2004
Oil of palm	12.13	29.17	30.86	26.39	34.99	79.08
Oil of Soybean	2.39	5.39	12.47	7.79	33.38	107.02
Cashew nut	10.85	3.56	5.74	5.99	7.14	65.94
Cotton lint	4.79	4.34	7.13	5.63	45.79	90.59
Pulses	4.51	1.97	4.19	3.44	7.36	72.86
Silk – raw and waste	5.62	2.48	3.01	3.35	5.55	32.55
Wheat	3.77	5.43	0	2.77	-25.62	145.22
Sugar Refined	8.76	2.34	0.07	2.69	56.83	234.88
Oil of sunflower seeds	0.73	5.7	0.96	2.66	311.24	111.51

contd...

Table 10b contd...

Commodity	Phase I 1990-95	Phase II 1996-2000	Phase III 2000-04	Phase IV 1990-04	GR 1990-2004	CV 1990-2004
Wool greasy	4.52	2.34	1.85	2.58	2.22	18.48
Fatty acids oils 431.31	1.74	2.97	2.17	2.38	19.72	58.3
Wool, Scoured	3.39	1.92	1.9	2.21	5.76	33.55
Chickpeas	2.44	1.47	2.23	1.99	4.39	87.07
Almonds	2.31	1.76	1.36	1.7	7.47	41.82
Beans, Dry	2.15	0.84	2.07	1.63	9.64	81.33

Notes: (1) First three columns show average percentage share of agriculture products in total agriculture exports. (2) GR= Compound growth as per cent per annum. (3)CV= coefficient of variation.
Source: Computations based on data from www.fao.org (Adapted from Sathe and Deshpande, 2006).

Some of the important observations are summarized as follows:

(i) Although the total volume of India's agricultural exports and imports has increased since 2001, the share in total exports has declined from 13.5 to 9.9 percent; for imports the proportion has declined from 4.4 to 2.5 per cent.

(ii) As large as 48 per cent of India's exports have been concentrated in seven products viz; rice, soybeans cake, tea, shelled cashew nut, buffalo meat, wheat, and refined sugar during 2000-04. The pattern has remained more or less same over time except that coffee and tobacco have gone out the list of the top seven commodities, replaced by wheat and sugar.

(iii) The pattern of imports is more concentrated with nearly 44 per cent of the total imports being accounted for by oils of palm and soybean during 2000-04. Overtime, wheat has gone out, where as chickpeas has entered the list of the top seven products.

(iv) There are a number of commodities, which appear in both export as well as imports. Soybeans, cashew nuts, wheat, cotton, and sugar are major commodities in the common list.

(v) While majority of the export commodities have experienced faster growth in terms of value vis-à-vis quantity, there are some important exceptions where quantity has increased faster than the value. These include most of the conventional commodities such as rice, tea, coffee, cashew nuts, and sugar. A reverse scenario is found in the case of imports, where a number of commodities have registered higher growth in value as compared to quantity. Palm oil, with as large as one third of the share in total value of imports, belong to this category.

Table 11: Growth Rates and CVs of Values and Quantities of Agri-Exports for 1990-2004

Commodity	Growth Rate of Agri-exports in Value	Growth Rate of Agri-Exports in Quantity	2/3* 100
Milled Paddy rice	10.19	15.49	65.78
Cake of Soybean	2.43	2.33	104.29
Tea	-1.29	0.1	-1290
Cashewnut Shelled	3.56	5.65	63.00
Coffee green	1.11	4.5	24.66
Baffalo meat	14.11	13.43	105.06
Tobacco leafs	46.23	4.6	10.50
Oil of Castor beans	5.44	4.08	133.33
Cotton lint	-14.44	-13.5	106.96
Wheat	26.49	25.48	103.96
Sugar refined	16.07	17.82	90.17
Pepper-white/long/black	26.49	-4.02	658.95
Sesame seeds	12.41	12.3	100.89
Onion dry	5.23	6.18	84.62
Coffee extracts	13.09	18.77	69.73

Source: Computations based on data from www.fao.org (Adapted from Sathe and Deshpande, 2006).

Table 12: Growth Rates and CV of Values and Quantities of Agri-Imports, 1990-2004

Commodity	Growth Rate of Agri-exports in Value	Growth Rate of Agri-Exports in Quantity	[Col 2/ Col3x 100]
Moil of palm	34.99	28.27	123.77
Oil of Soybean	33.38	39.79	83.89
Cashew nut	7.14	10.08	70.83
Cotton lint	45.79	51.13	89.55
Pulses	7.36	7.25	101.51
Silk – raw and waste	5.55	10.19	54.146
Wheat	-25.62	-22.04	116.24
Sugar Refined	56.83	61.28	92.73
Oil of sunflower seeds	311.24	292.36	106.45
Wool greasy	2.22	4.08	54.41
Fatty acids oils 431.31	19.72	19.01	103.73

contd...

Table 12 contd...

Commodity	Growth Rate of Agri-exports in Value	Growth Rate of Agri-Exports in Quantity	[Col 2/ Col3x 100]
Wool, Scoured	5.76	10.08	57.14
Chickpeas	4.39	5.34	82.2
Almonds	7.47	5.44	137.31
Beans, Dry	9.64	10.08	95.63

Notes: (1) First three columns show average percentage share of agriculture products in total agriculture exports. (2) GR= Compound growth as per cent per annum. (3)CV= coefficient of variation.
Source: Computattions based on data from www.fao.org (Adapted from Sathe and Deshpande, 2006).

(iv) A number of export-commodities have experienced low growth during 1990-2004 along with high co-efficient of variation. Conversely a number of important import-commodities have registered high growth with high variations. The price between domestic and international prices is found to be higher in a number of export-commodities such as tea, coffee, cashew nut, and also oilseeds (like rapeseed, groundnut), banana, and tobacco. The price ratio however, is fairly variable year by year.

Table 13: Coefficients of Relative Prices (Domestic Price/ World Price)

Commodities	1998	1999
Rice	0.63	0.71
Wheat	1.30	1.41
Coffee	1.67	1.91
Tea	1.18	1.33
Sugar	1.06	0.77
Cashew	1.03	0.99
Groundnuts	0.84	0.79
Cake of groundnuts	1.34	0.60
Cake of rapeseed	1.35	1.60
Sesame seed	0.46	0.56
Cake of sesame seed	1.13	0.97
Castor oil	1.12	1.02
Rapeseed oil	1.47	1.80

contd...

Table 13 contd...

Commodities	1998	1999
Linseed	0.97	1.16
Linseed oil	1.25	0.71
Tobacco	0.39	0.35
Cotton lint	0.79	0.79
Jute	0.94	1.06
Onion	1.39	0.67
Potato	0.94	0.77
Apple	1.40	1.42
Banana	0.29	0.28
Rubber	1.47	1.60
Pepper	1.08	1.01
Ginger	1.07	1.92
Tobacco	0.38	0.29

Notes: Domestic price is the representative average annual wholesale Price in the major producing state of the respective commodity in India. World price is the leading market price for which ever available and the relevant unit prices respectively for other commodities.
Source: Agricultural Prices in India, Ministry of Agriculture, Govt. of India, International Financial Year Book, IMF, FAO Trade Statistics

4.3.4. Emerging Scenario

The experience in the post-AoA period thus, suggests a fairly complex scenario for India's agricultural trade. A detailed study by Chand (2005) indicated that during 1998-99 and 2000-01, exports had increased only by seven per cent, whereas imports registered a sharp increase to the tune of 64 per cent. Decline in international prices was found to be the single most important factor causing a steep decline in the value of exports though quantum of exports had increased. This implied that increased exports brought less revenue. The net trade surplus thus, is found to have declined or fluctuated over time.

This raises the critical issue of the net (welfare) gain from exports, given the resource intensity and potential fear of displacement of labour, which even in the initial period was found to be mixed [Chand, 1999]. It may be reiterated that much of the welfare gains from exports depends on increased agricultural production and higher prices to be obtained in the international market. If the price advantage is not available, one needs to revisit the proposition of increasing agricultural production in export oriented crops

as against the ones that have larger developmental implications in terms of ecological balance; spatial distribution; and affordability by the poor. There is also an added risk in terms of market fluctuations.

Evidence suggests that export of Basmati rice and wheat could not stand the international competition; the exports had to be sustained by providing large amount of subsidies. Oil meal, another important export-commodity, had suffered due to fall in prices and quantity. The traditional export commodities, viz; tea, coffee, spices and tobacco suffered mainly due to falling prices, but not quantity of exports. Export of cotton almost came to a halt due to several reasons, including increased demand from domestic industry. The case of sugar is marked by fluctuations in the domestic production. Export of high valued products from marine, dairy, and horticulture sectors had shown a consistent performance. Apparently women have substantial presence in various activities in these sectors as noted earlier.

Fall in international prices has given rise to significant increase in imports. Edible oil was on top of the list of the commodities that registered significant increase in imports. The other commodities were cotton, spices, pulses, fruits and nuts, and wood and wood products. While import of edible oil resulted in significant decline in domestic prices along with increased per capita availability, imports of pulses did not bring similar results. In either case, the issue is that of strengthening domestic production in crops like edible oil and pulses because of the significant importance of these crops in dry land regions and people's livelihoods thereof. Similarly, production of crops like fruits, nuts, and spices also deserve special attention in the light of the fact that export of these crops have been hit hard in the post WTO period. Falling domestic prices thus, would go against the interest of local producers.

Enhancing domestic production for the importables is also important in view of the fact that high volatility in international prices had proved even high bound tariffs inadequate to regulate imports.

The challenge therefore, is how to safeguard interests of the domestic producers whereby they get adequate incentives to increase supply of the commodities at affordable prices. Technologies, promoting sustainable farm practices assume special significance in this context. The need is to increase basic investment in these low potential dry land regions and provide special support for a shift towards sustainable farm practices-all these need to be treated as part of the multifunctional of agriculture in dry land regions.

The summary as given in Table 14 presents a cryptic picture of the emerging scenario of India's agricultural trade and policy imperatives.

Table 14: Post WTO Trade Scenario for Major Commodities and Implications for Future Negotiations and Strategy

Products	Trade Scene	Main Factor	Future Policy and Strategy
Rice	Export adversely affected. Import threat	Increased competition from developing countries like Vietnam, Thailand	Improve competitiveness of domestic production
Wheat	Export adversely affected. Import threat	Low prices and subsidies and support in EU and US	Seek elimination of export subsidies and domestic support in OECD
Oilcake	Export adversely affected	East Asia crisis and GM varieties in USA, Argentina and Brazil. Subsidies in USA	Improved varieties of oilseeds particularly soyabean. Seek reduction in subsidies in USA
Sugar	Export adversely affected	Subsidies in EU and USA	Seek elimination of export subsidies and domestic support in EU and USA
Cotton	Export adversely affected. Imports increased	Continued domestic support in the USA and other countries	Seek elimination of domestic support in USA. Technologies to compete with Bt. Cotton
Tea, coffee, spices	Export adversely affected	Competition from Vietnam, Indonesia, Sri Lanka and other developing countries	Improve competitiveness of domestic production. Do not seek too much protection for developing countries
Horticulture products	Exports increased. More scope	Rising demand for high value and processed food	Seek improved market access. Improve processing, packaging and transport of produce
Meat and meat products	Exports increased. More scope	Preference for low cost and safe products	Seek reduction in subsidies in US and North America
Dairy products	Imports possible. Checked through tariffs	Subsidies in EU, USA and Canada	Elimination of export subsidies and domestic support in EU, USA and Canada
Soyabean oil and other vegetable oil	Serious import threat	Superior technology in other major producing countries	Improvement in domestic production technologies and processing
Palm oil	Very sharp rise in import which meets 40% domestic demand	Very cheap price and close substitution between different vegetable oils	Consumer awareness about quality. Prohibit blending. Upgradation of technology of oilseeds in the country
Wood and wood products	Sharp rise in import. Depressed domestic prices	Low duty	Raise duty

Table 14 highlight that some of the crops/commodities where women have significant presence, need certain specific policy initiatives for sustaining and/or increasing the market share. These include plantation (tea, coffee, spices); dairy and meat products; and horticulture. Unless the policy support is commensurate, the sub-sectors within agriculture may face severe jolt. The most likely result could be- many of those working in these sub-sectors may suffer; women are possibly the first to bear the brunt of unemployment, reduced wages, and lower profits. Some of these aspects are discussed in the light of the case studies in the next section.

5. Impact of Agricultural Trade and Labour Laws: Evidence from Case Studies

This section presents a few case studies, covering some of the important commodities in India's agricultural trade. While most of these cases depict adverse impact on Indian producers/consumers, they nevertheless pose two important questions. First, is to what extent the problem has triggered by external forces? And second, what have been the coping mechanisms and what kind of measures are required to overcome the problems; how far these problems could be tackled though a well coordinated domestic and trade policies?

While there are no ready answers to these questions, it is essential to take a fairly comprehensive view of the problems and likely solutions.

5.1. Indian Floriculture Sector and Trade in India

5.1.1. Overview

Indian Floriculture sector has been promoted in view to its high value export oriented returns which is largely influenced by the global trade. The WTO regime has opened up new market for developing countries particularly South Asian Countries to export cut flowers to European, USA and Australian markets. The government of India offers tax benefits to new export oriented floriculture companies in the form of income-tax holidays and exemption from certain import duties. Agricultural and Processed Food Products Export Development Authority (APEDA), responsible for export promotion and development of floriculture in India, grants subsidies for establishing cold storage, pre-cooling units, refrigerated vans and green houses, and air freight subsidy to exports. It has been found that commercial floriculture has higher potential per unit area than most of the field crops and is therefore a lucrative business. However, the policy of high value crop diversification faces higher risk in terms of lack of infrastructure and access to global market. Agriculture diversification geared toward high vale export driven crops needs to be viewed as an alternative policy option to improving the returns particularly of small and medium farmers who may

not be able to invest in capital inputs at the initial stage. Nonetheless, they may not be able to avert the risk involved with this industry at the point of time. It is therefore, seems difficult to ascertain that promotion of floriculture industries in India provides viable trade of crop diversification from traditional crop to high value crops such as cut flowers. However, capitalising geographical advantage as a factor to increase export of cut flowers from India and the extent of its contribution to national income needs to be examined.

5.1.2. Production and spatial distribution

Indian floriculture industry has been shifting from traditional flowers to cut flowers for export purposes. The liberalized economy has given an impetus to the Indian entrepreneurs for establishing export oriented floriculture units under controlled climatic conditions. In India, Maharashtra, Karnataka, Andhra Pradesh and Haryana have emerged as major floriculture centers in recent times. About 183,000 ha area has been grown under floriculture during 2009-10. More than 250 export-oriented units (EOUs) have been approved in the sector out of which 155 units are operational. But many of them operate at less than 50% of their capacity. With redressal of the problem, the floriculture industry may turn to be viable enterprise for earning foreign exchange. Returns from floricultural products were estimated at Rs. 205 Crores, which included Rs.105 Crores from traditional and Rs. 100 Crores from modern flowers (The data collected by National Horticultural Board, Government of India). There were more than 300 export-oriented units in India. More than 50% of the floriculture units are based in South zone mainly in Karnataka, Andhra Pradesh, and Tamil Nadu. Also West Bengal, Maharashtra, Rajasthan have large areas under floriculture. The domestic flower production goes on increasing annually. Technical collaborations with foreign companies have been approved for India, in order to increase total share in the floriculture world trade.

5.1.3. Export

After liberalisation the Government of India identified floriculture as a sunrise industry and accorded it 100 percent export oriented unit (EOU) status. However, India's share in the world floriculture trade is negligible. There has been a significant rise in the floriculture exports in recent time. The total export of floriculture products from India in 2005 was Rs.8174 Lakhs while it increased to Rs.10117 Lakhs by April, in 2006. Japan, the Netherlands, Germany, UK, UAE and Hong Kong have been the major destinations for Indian cut-flowers. The major importers of live plants and bulbs are Germany, France, Italy, UK, USA and Japan etc. The major importers of cut flowers are Germany, USA, UK, France, Netherlands, Italy, Japan etc. Cut –flowers are the most widely traded floriculture product and

the consumption has been increasing worldwide, cutting into the share of other floriculture products. Germany is the major importer of cut-flowers. The Netherlands has dominated the world floriculture export trade. In cut-flowers Netherlands accounted for an estimated market share of 64 per cent of world cut-flower exports in 1995, followed by Colombia (14 percent) and Israel (4.2 percent). The developing countries share in the world cut-flower trade in 1995 is estimated at 28.4 percent. India's share in the global cut flower trade in 1995 was a mere 0.3%. The negligible share of Indian cut flower trade to total world trade of cut flower has to be viewed in terms of geographical advantages as well as constrain factors in exporting the products.

5.1.4. Critical Policy issues: Who gets what?

Despite the fact that India is endowed with diverse agro-climatic conditions like good quality soils, suitable climate, abundant water supply, low labour cost, proximity to market in Japan, Russia, South-East Asia, Middle-East Countries, it has not been able to optimize the potential of floriculture sector. This is largely due to certain trade barriers, which still exits in exporting the products to global market. The low performance is attributed to many constraints like non-availability of air space in major airlines, since most of the airline operators prefer heavy consignments. The existing number of flights during the peak seasons is not sufficient for export purpose.

Exporters face infrastructural problems like bad interior road, inadequate refrigerated transport and storage facilities, and lack of professional backup of delivery and supporting companies, which result into high cost of technology for Indian entrepreneurs. Tedious Phyto-sanitary measures and an unorganized domestic market also come in the way of development of floriculture industry in India. Government's initiatives have been encouraging so far, however, there need to be viable policy framework to promote floriculture in the country. Subsidy on airfreight for export of cut-flowers and tissue-cultured plants is allowed by the Government. Freight rates are Rs.10 per kg of export to Europe and Rs. 6 per kg of exports to West Asia, South East Asia whichever is less. Import duties have been reduced on cut flowers, flower seeds, tissue-cultured plants, etc. Setting up of walk in type cold storage has been allowed at the International airports for storage of export produce. Direct subsidy up to 50 percent of the pre-cooling and cold storage units is available, as well as subsidy for using improved packaging material is given by APEDA. Eleven-model floriculture centre units and two large centers, 20 tissue culture units have been established by Ministry of Agriculture. Refinance assistance is available from NABARD to a number of hi-tech units at reasonable interest rate.

A careful examination of exiting strategies to promote floriculture in India demands huge capital investment at the initial stage with high risk of

exports constraints faced by the global market. Lack of basic infrastructure and risk of land allocation to non traditional crops particularly for cut-flowers as crop diversification strategies poses tremendous pressure on farmers particularly medium, small and marginal farmers both in South and North Zone floriculture area in India. A Study by Sen and Raju (2006) brings out serious policy issues for cut-flower industries in India in view of crop diversification as viable policy option of rural poverty alleviation strategy. Abstract of the study is presented in the Box 1.

Box 1: Globalization and Expanding Market for Cut-Flower: Who benefits?

Crop diversification may be perceived as a strategy for profit maximisation or risk minimisation but it is the former that is more relevant in the context of the post-economic reform era. In recent years, floriculture has emerged as a high growth segment within the agricultural sector. There has been a considerable shift in the composition of floriculture exports in favour of cut-flowers [Chengappa and Mysore 2005]. The concerted efforts at export oriented production of cut-flowers since 1991 could be attributed to this shift. Flower trade, especially in Delhi and other metropolitan cities, has grown manifold during the last decade. Much of this growth can be attributed to the post-reform policy changes that led to an appreciable expansion of the domestic and export markets for cut-flowers.

The study assesses the impact of high value crop diversification particularly cut-flower on small and marginal farmers in terms of profitability, nature of participation and tries to examine the relationship between farm size and access to market and risk involved in price volatility. The results of the study reveals that farmers can earn more from flower cultivation as compared to other traditional crops such as wheat and sugar can, however in terms of net returns there seems little doubt about the relatively higher profitability of flower compared with other crops.

However, the relationship between farm size and floriculture suggest that small farmers do not cultivate flower as actively as the large farmers, and even if they do so, they do not pursue it for long. Regarding the profitability and return factors, due to the combination of flowers cultivated, it has been found that there is no difference in net returns of flower cultivating and non-flower cultivating households for the smaller farm size groups, while larger farmers are significantly better off. Moreover, small and marginal farmers may not be able to take high risk as the goods in question are perishable and prices are subject to high degree of fluctuations in the global market. Even if the crop diversification is attempted by these farmers, they are not able to benefit substantially due to their inability to absorb risk factors associated with more profitable high value products when lower volume of produce is traded. High value crop diversification as a strategy to increase income levels of small farmers growing flowers is not going to be successful. The policy strategy has to incorporate elements such as institutional credit for the profitable crops and farmers' direct participation in the market (Sen and Raju, 2006).

5.2. Marine Fisheries and Trade in India

5.2.1. Overview

The Fisheries is an important primary activity and fishing and related processing industries provide employment to many people around the world. The ocean is the main breeding ground and therefore the provider of the fish. The marine fisheries continue to be an important part of fishery sector holding 50% of the total fisheries sector production in the world. India's share in global fisheries is around 4% and it comes into the list of medium level fish producing countries. As it is evident from the following figures, India's share in fisheries and fish food production is between 3.5 to 4 per cent of the total, and the share has been increasing since 1990. Now it is showing some signs of stabilization.

5.2.2. India's Marine Fish Production and Export in the last Decade

India's Marine fish production has been increasing sharply after 1990. The total marine fish production was 322 thousand tones in 1990, which has increased to 2920 thousand tones by 2007-08. The share of fishery sector in total export has also increases from 12 per cent in 1990 to 42 per cent in the year 2004. The trends both in production and its share have shown increase during the last decades. This implies that marine fisheries in India have been doing well due to its demand overseas especially the European Union (EU) and China and other South East Asian countries. India has been exporting unprocessed fish with very little value addition to these countries. Several studies have indicated that marine fisheries in India have been over exploited. There has been very little deep sea fishing; hence overexploitation of marine fisheries may turn into resource crisis in near future. Marine fish catch in India is concentrated in few areas with its geographical advantages. Gujarat with its 1600 km long coastal stretch has been the leading producer of marine fish in India followed by Kerala.

Other major states that produce marine fish are Maharashtra, Tamilnadu, Andhra Pradesh, Karnataka, West Bengal, and Orissa. Other areas have localized fish catch which contributes to its overall productions. Although marine fisheries does not provide large employment to its coastal population, people engaged in fishing activities suffer a lot from poor infrastructure facilities, lack of access to market and intervention of middle man in this sectors.

5.2.3. Critical Policy Issues: Benefits and loss (Loosers and Gainers)

Increasing trends in India's marine fisheries production and export contribute to the national income in one hand and promotes fish processing industries on the other. It also generates employment opportunities for the poverty ridden rural areas particularly in coastal regions in India. National

and state governments' initiatives to promote fisheries (both inland and marine) lead to export promotion; however, it has been observed that marine fisheries in India have been overexploited as observed already. The case of world fisheries is no different in this respect. National governments across the world have over-harvested earth's living marine resources by virtue of excessive subsidies (Stone, 2002). This holds true in case of countries like India, which has increased its total catch in recent years to promote export. The curtailment of subsidies will not heal the natural loss of marine food resources. A policy framework is needed for more valuable catch in long run through protection of marine environment. The major issues facing the Indian aquaculture sector are discussed in Box 2.

Box 2: Aquaculture in India: Trends, issues and Development

Aquaculture in the past ten years has witnessed both horizontal and vertical expansion in India, with total production increasing from 1.395 million tonnes in 1992 to 2.202 million tonnes in 2001, an increase of over 57 percent. Conventional farming practices using carp as well as an increased emphasis on diversified culture of freshwater prawns and to some extent catfish, are important areas of growth in the freshwater aquaculture sector. Greater adoption of modern farming techniques and assured higher profit margins in carp culture over most other agricultural enterprises has attracted farmers to fish farming. Freshwater aquaculture has further witnessed diversification through the incorporation of high valued species like freshwater prawn and has increased its production from 455 tonnes in 1992 to over 30 000 tonnes in 2003.

The early 1990s witnessed a spectacular rise in farmed shrimp production with an increase from 40 000 tonnes in 1991–1992 to 82 900 tonnes in 1994. Furthermore, the sector took almost 4–5 years to revive following the damage inflicted by white spot syndrome. A cautious approach and the adoption of good management practices subsequently helped the sector to reach a record production of 115 000 tonnes in 2002–2003 from approximately 152 000 ha under production. A high export potential backed by an assured supply of quality seed through the establishment of large numbers of shrimp hatcheries, the availability of other critical inputs like formulated feed, easily accessed institutional finance, increased entrepreneurial involvement, the entry of several privately owned large companies and above all higher profit margins were the guiding force behind last decade.

Aquaculture over recent years has not only led to substantial socio-economic benefits such as increased nutritional levels, income, employment and foreign exchange but has also brought vast un-utilised and under-utilised land and water resources under culture. With freshwater aquaculture being compatible with other farming systems it is largely

contd...

Box 2 contd...

environmentally friendly and provides for recycling and utilisation of several types of organic wastes. Over the years, however, culture practices have undergone considerable intensification and with the possibility of obtaining high productivity levels there has been a state of flux between the different farming practices. In the brackish water sector there were issues of waste generation, conversion of agricultural land, salinization, degradation of soil and the environment due to the extensive use of drugs and chemicals, destruction of mangroves and so on. Though some of these issues posed concerns, most however, were isolated instances with the bulk of farming conforming to eco-requirements.

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Source: http://www.fao.org/fi/website/FIRetrieveAction.do?dom=countrysector&xml=naso_india.xml

Recent Study on aquaculture in Sunderbans (one of India's ecologically fragile regions) confirms the environmental damage (Chopra et. al 2006). The study further elaborates that aquaculture in developing countries has been promoted in response to export driven demand from USA, Japan and Europe. As a consequence to this, thousands of hectares of coastal lands have been brought under this venture resulting in negative externalities in both water and land regimes of coastal region in India particularly in the Sunderbans. This has lead to degradation of marine environment. The decade long aquaculture practice in Sunderbans in the absence of hatcheries resulted in seed collection for tiger prawn from the wild using labour intensive dragnets of various kinds. In this process juveniles of many finfish and shellfish are trapped and wasted, as they are not remunerative. This destructive practice has lead to major damage to finfish and shellfish communities in the region. They are also important plankton called 'icthyoplankton' in marine ecosystem, which provides nutrition to members

of higher trophic level largely to bony fishes, sharks, turtle, and dolphin etc. The study further quotes a project report of Ministry of Environment and Forests (1996) which estimated that 48 species of finfish juveniles are wasted per net per day per haul, which amounts to about 9.834 kg. This constitutes a huge loss of species diversity in this region. Further the sustainability of shrimp farming has also been threatened due to over collection of shrimp fry. Destruction of aquatic resources is considerable due to harmful practices in the discard of by-catch in the Sunderbans. The conversion of land to aquaculture is the consequence of profit driven export oriented behaviour and is a social cost to this farming. The study concludes with a sustainable policy prescription that land intensive aquaculture can be adopted so as to avert the biodiversity loss. Economies of scale in aquaculture production ensure the economic viability of such an approach to these malpractices.

5.3. Plantation Agriculture

Plantation sector assumes special significance in India's agricultural trade. Though the sector consisting mainly of crops such as tea, coffee, natural rubber (NR), cashew and spices constitute hardly 2 per cent of India's agricultural exports, the sector occupies a pivotal position in the regional economies of Southern India, viz., Kerala, Tamil Nadu and Karnataka as well as North/North-Eastern states of West Bengal, Assam, Meghalaya, Tripura, Himachal Pradesh, etc. Historically, plantation agriculture has been promoted in India under the colonial patronage and European financial capital and most of these crops, except rubber had been promoted as export oriented crops, mainly to cater the requirements of the colonial rulers (Viswanathan, 2005). The export- orientation of the sector thus, has left a strong imprint on the size and forms of production organization; focus on high-end markets; though with relatively weaker infrastructure and institutional linkages for promoting value addition with quality control. A more or less similar scenario had continued in the post-independence era as well, where exports from agriculture was a major earner of foreign exchange, critically needed for laying a strong foundation for industrial progress in the country.

While the plantation sector in India has flourished under the policy environment of domestic support and protective trade measures (George et al., 1988) in the post-independence era, the experiences have varied across crops. One of the most explicit impacts of the trade liberalisation policies had been the emergence of market uncertainties leading to a fall in the international and domestic prices of commodities caused by the dilution in tariff and non-tariff protective barriers. The magnitude of decline in prices from the peak levels reported during the decade 1990-2001 has been the

highest for rubber (42%) and tea (28%). The instability in prices (expressed as coefficient of variation (CV) from the peak level prices) has also been the highest for rubber (26%) and tea (17%) [Viswanathan, 2005; Viswanathan and Shah, 2009].

5.3.1. Crisis in plantation agriculture and coping mechanisms

The decline in commodity prices triggered its adverse effects on the tea and rubber production and trade sectors leading to an unprecedented crisis in plantation agriculture in India. For instance, there was almost 37 per cent decline in India's tea exports from US$ 594 million during 1990 to US$ 378 million during 2004 (Sathe and Deshpande, 2006). In the case of rubber, the liberal trade policy reforms have resulted in removal of quantitative restrictions (QRs), which in turn enabled the rubber products manufacturers to directly import rubber through the duty free channels as an incentive for export of rubber products. The policy changes in the post-QRs regime thus paved the way for increased imports of rubber and rubber products into India. Resultantly, almost 96 per cent of the total quantity of rubber imported in the 1990s was routed through the duty-free channels; especially through the advance licensing scheme (ALS) (George et al., 2002).

The decline in prices had its pernicious impact on the tea and rubber production sectors as the tea planters as well as the rubber producers had responded vehemently to the crisis in terms of adopting various measures to overcome the impasse. The coping mechanisms adopted by the tea planters and the rubber producers broadly confined to cost saving and labour displacing measures such as dilution and even discarding of scientifically recommended agro-management practices, labour retrenchment, lockouts and resistance to routine tripartite wage negotiations, etc (Viswanathan and Rajasekharan, 2001). Evidences suggest that a large number of tea estates have been closed due to the troubled labour relations. It may be noted that while the issues of labour standards and flexibility may need rethinking in the overall scenario of economic reforms and social security etc., it may be erroneous to assume that labour militancy as the major cause of the crisis. For, the challenge emerging in the wake of the increased competition is not only in terms of reducing the cost, especially of labour. Rather the challenge is much larger and more fundamental, which may entail a range of issues pertaining to the forms of production organization, structure of the market, and land –use or ecological sustainability.

5.3.2. Employment and Wages in Plantation Industries

According to occupational wage survey Report on plantation industries, out of the total employment of 9.78 lakh workers in the three Plantations,

45.25 per cent were male, 53.54 per cent female and the remaining 1.21 per cent workers were adolescents. No child worker was reportedly employed in any of these plantations (Table 15).

Table 15: Distribution of Workforce in Plantation Industries by Sex and Age, 2006

Industry/ Stratum	Estimated Total No. of workers	Percentage of workers			
		Men	Women	Adolescents	Children
1. Coffee plantations	105288	44.83	54.71	0.46	---
a) Karnataka	92007	44.76	54.72	0.52	---
b) Tamilnadu & Kerala	13281	45.31	54.69	---	---
2. Rubber Plantations	61270	57.70	42.30	---	---
a) Kerala	54707	58.98	41.02	---	---
b) Tamilnadu & Karnataka	6563	47.04	52.96	---	---
3. Tea Plantations	811854	44.36	54.24	1.40	---
a) Assam	480121	44.85	52.91	2.24	---
b) West Bengal	159072	44.85	52.91	2.24	---
c) Tamilnadu	48574	47.07	52.55	0.38	---
d) Kerala	101748	36.93	63.07	---	---
e) Residual	22339	40.90	59.10	---	---
All Plantation Industries	978412	46.56	53.44	---	---

Source: Occupational wage survey (Sixth round 2006), Report on plantation industries. http://labourbureau.nic.in/OWS%20Table%202.2.htm

The employment of piece-rated workers was commonly observed in all the three Plantations, as majority, i.e., 80.79 per cent of the workers have been employed on piece-rate system of wage payment, whereas the remaining 19.21 per cent of the workers were employed on time-rate basis. The highest percentage of the total work force was employed as 'Plantation Labour' (89.48 percent), followed by 'Rubber Tapper' (3.80 per cent). The average daily wage rates were recorded as Rs. 89.77 in Rubber Plantations, Rs. 71.66 in Coffee Plantations and Rs. 54.27 in Tea Plantations. The overall average daily wage rates of men, women and adolescent workers combined for all the plantations, were recorded at Rs. 60.47, Rs. 57.15 and Rs. 33.49, respectively. The overall average daily wage rate for all the workers in three plantations stood at Rs. 58.37.

It emerges from the above that women dominate the workforce mainly in tea and coffee plantations. But, the average daily wage rates of women workers at the industry level were less than that of their male counterparts in all the three plantations. However, the average daily wage rate of female worker was higher than that of their male counterparts in one occupation in Coffee Plantations, in 3 occupations in Rubber Plantations, and in one occupation in Tea Plantations.

5.4 Processing of Cashewnut: A Case of Informalisation

India is the second largest producer of cashewnut next only to Brazil. By 2000, cultivation of cashewnut was spread over 0.72 million hectares of land with total production of 0.45 million MT, at an average productivity of 710 kg/ha, much higher than the global average.

Besides being a major producer, India is the largest player in terms of imports of raw nuts mainly from Mozambique. The import of raw cashewnut came under free trade in 1991. Since then there have been significant changes in export of processed cashew from India; terms of trade; and production organisation- all these having significant impact on the livelihood of small producers on the one hand and processors on the other. Women have significant presence in both.

While India's export of cashew kernel has experienced a significant increase since 1990, the terms of trade has deteriorated owing to declining price in the international market. Whereas the price for raw cashew declined from 700 US$ (per MT) in 1999 to 411 US$ in 2000-01, the price of kernel declined from 3.15 (per Ib) US$ in 1999 to 1.6 USD in 2002. India being a major importer of raw cashew nut and exporter of processed products suffered on both counts. The fall in import prices led to lowering of prices for domestic producers, whereas lower price in export market increased the domestic resource cost for earning a unit of foreign exchange.

Kerala state is the largest processor of cashew nuts, accounting for about 50 per cent of the installed capacity in India. By 2000, the state had 400 factories for processing cashewnuts, providing employment to 0.2 million workers. Economic liberalisation along with trade liberalisation has led to significant shift from factories to `cottage' industry in informal sector.

A case study by Eapen et al., (2003) demonstrates the adverse implication of informalisation of the cashew nut processing sector in Kerala, and its impact on women workers involved thereof. The study observed that: "Liberalisation has been accompanied by the evolution of cashew processing activities from factory to cottage and commission based processing. Labour standards and working conditions seem to be deteriorating particularly for women, who represent the overwhelming majority of workers. In Kerala, the hub of the cashew industry in India, most public sector factories have closed and in private factories, employers have `seasonalised' and `informalised' workers. Gender based inequality means that women work for even lower wages than men in poor and health-threatening environment" (Eapen, et al., 2003: 8)

The above evidence indicates that whereas the deteriorating labour standards is part of a larger reality resulting from a number of factors-

structural, demographic, and policy environment of economic reforms, trade liberalisation has accentuated the process. The recourse from these kinds of regressive trends therefore has to be sought within the context of internal forces, to which external factors need to converge.

5.5. Deepening Agrarian Crisis under Liberalisation: The Case of Farmer Suicides in Maharashtra, Punjab and Kerala

5.5.1. Context

Agriculture development in India has been found neglected in the political economic regimes one after another in recent decades. The lack of sound agriculture policy has resulted in overall slowing down of agriculture growth in India and thereby it's reduced contribution to the Gross Domestic Product (GDP). However, people's dependency on agriculture has not been reduced in the similar way. The percentage share of agriculture contribution to GDP has been reported to be 17.62 per cent at the current price of 1999-2000 (CMIE, 2005-06) while agriculture sector provided 56.7 per cent (1999-00) employment in the country (Economic Survey, 2002-03).This is a typical phenomenon of higher dependency syndrome on agriculture sector which reduces the labour productivity in the long run. This also leads to high incidence of poverty in rural India. The vicious circle of poverty in Rural India hit harder the lower strata of farmers and agricultural labourers than any other groups. Although there has been little progress in reducing the rural poverty in India during the last decades, the deepening agrarian crisis has manifested in increasing farmers' suicides in major states in recent times especially in Maharashtra, Karnataka, Kerala, Andhra Pradesh and Punjab (Mishra, 2006; Mohanakumar and Sharma, 2006; Satish, 2006). There is direct implication of this to the current neoliberal economic regimes in the country. A brief discussion about the incidence of farmer suicides in the states of Maharashtra, Kerala and Punjab is attempted here so as to understand the various determinants of farmers' suicides and how far it is related to the current agriculture trade regimes under multilateral trade negotiations at the international level. An attempt has also been made to arrive at the broad policy framework as suggested in these studies and elsewhere. The gist of the three cases is present below.

5.5.2. Farmer Suicides in Maharashtra

The study on farmer suicides in Maharashtra has been an attempt to reflect the overall agrarian crisis of recent times in the state. It further tries to highlight the linkages between macro-micro agriculture policy implications that lead to such sporadic manifestation of farmers committing suicides. The suicide mortality rate has increased from 15 in 1995 to 57 in 2004, which is one of the highest among all the major states in India. There are various

reasons of suicide; however, farmers' suicides can not be explained in isolation as only a neurobiological cause. It has an external catalyst factor of socio-economic domain prevailing in the society in question. The prevailing agriculture situation in the state particularly in cotton growing regions of Vidarbha has direct link to the dumping of global market by US. The rain dependent cotton growers have been facing an acute problem of declining profitability due to the same along with various other factors such as low import tariff, failure of Monopoly Cotton Procurement Scheme and withdrawal of the state. Withdrawal of role of state resulted in decline in investment in agriculture sector, poor agriculture extension services and urban biased role of credit institution. This has resulted in high dependence of farmer on informal credit institutions in the villages which increased their debt burden in long run due to high rate of interest. There is no risk coverage mechanism in the state which saves the farmers from crops failures.

The study reasons out various causes of farmers suicides in this region of Maharashtra which are systematic risk factors that reflects larger socio-economic and agrarian crisis. They are high incidence of indebtedness, deterioration in their economic status, conflicts with other members in the family, crop failure, decline in social potion, burden of daughter's/sister's marriage, suicides in a nearby village, addictions, change in behaviour of deceased, disputes with neighbours/others, health problems, recent death in family, history of suicides in family and other family members being ill. These are the broad categories of reasons of suicides in the state; however, a control group analysis has been compared with suicides and non-suicides cases and the results provides specific reason of farmers suicides as higher outstanding debt, low ownership of assets (bullocks), access to basic amenities, large family size (more female member) and lower value of produce. These are inactive of those factors that do not occur in isolation. They are bound to happen in the society of socio-economic and agrarian crisis. There is an urgent need of policy intervention both short term and long terms that will not only prevent farmer's committing suicides but will also try to address the deep rooted socio-economic and agrarian crisis that exits in the country as whole. We will elaborate on broad policy implication after all the cases studies at the end (Mishra 2006).

5.5.3. Farmer Suicides in Kerala

As stated earlier, there is a close association of farmers' distress leading to suicides in many cases with the current free market political economic regime in India. The association gets stronger in the region where the export oriented products are cultivated. The direct linkage of local production system to the international market under current WTO regime makes such agri-business risky in terms of price fluctuations, crop failure and lack of

institutional support both from the local government as well as the civil societies. Kerala is an example of such regions where production of coffee and pepper, other spices, such as cardamom and rubber to some extent are the major export oriented crops. The study examines two hypotheses of cropping pattern, market integration and farmers' distress in Kerala under current multilateral world trade regimes of which India is a founder member. These are: a) higher the dependency of a population on agriculture, greater is likely to be the incidence of casualties and b) the more is a crop integrated to international market, the higher would be its adverse consequences on the dependent population. These hypotheses came true with a micro study in Wynad district in Kerala growing coffee and pepper.

The history of agriculture development in the state reveals that the cropping pattern has been tailored to be export –oriented for high returns from the international market. The peasantry class was transformed into a free labour class. The price crash resulted in spate of farmer's suicides in recent decades has been manifestation of dependence of crops on the international free trade market. The worst affected are the small farmers as they are more vulnerable to failure of crops and price decline in international market. The various reasons of farmers' suicides that are prevalent in Kerala are cropping pattern, indebtedness and assets loss of suicides victims' households. Amongst these socio-economic determinants of suicides, indebtedness figures as the prominent reason for farmer's suicides in Kerala. This explains that there is severe lack of institutional credit system and involvement of other civil societies in current agrarian crisis. Farmer suicides in Kerala also confirm the deep rooted socio-economic and agrarian crisis that exists in India under the emerging scenario. The piecemeal approach in dealing with farmers suicides by providing compensation to the deceased family is not a healthy solution. Unless the entire issue of agrarian crisis is addressed in a holistic manner that protects the farmer's from committing suicides, the condition of farmers can not be improved on a sustainable basis (Mohanakumar and Sharma, 2006).

5.5.4. Institutional Credit, Indebtedness and Suicides in Punjab

The study analyses farmer suicides in Punjab slightly different way than those of the previous ones. The study though agrees to some extent that indebtedness is one of the reason for suicides, its not the only or the main cause. Hence, it cannot be concluded that there is a causal relationship between credit burden of the farmer's and suicides in the state. It further reveals that farmers' suicides may also not be viewed as an expression of agrarian crisis. It is the overall crisis of stagnation of economy, decline in peasantry movements, retrogressive social practices and conspicuous consumptions, rising unemployment and growing inequalities in all spheres of life in the state. The cases of suicides in Punjab are not

higher compared to other agrarian states in India. However, it does reflect the declining status of farmers who could not withstand the loss of the value of products due to decline in prices, lack of institutional supports etc. Overall agriculture growth rate has been declining in the state which was even lower than the national average during the 1990s. Despite being one of the highest per capita income states, Punjab faired very low in major indicators of human development. It ranks 16th in gender development index (GDI) amongst the major states in the country. Status of women is very poor in the state as the sex ratio in Punjab has been 874 which is well below the national ratio of 933. Juvenile sex ratio is even worst in the state. The gender discrimination has its economic cost in the long run which needs to be addressed in the context of trade liberalisation. There is a huge gap between work force participation rates amongst men and women. Punjab faces twin problems of rising unemployment and deteriorating work culture amongst the youth. Risk coverage is poor and there is a severe lack of civil society organisation to provide support to farmers in coping with the crisis. Thus the problem of indebtedness and cases of suicides in Punjab may not be narrowly interpreted as the manifestation of agrarian crisis as these are only the symptoms of a larger malaise in the society. Therefore, there is a need to address the larger deep rooted issues of lagging agriculture production system in India.

The cases of farmer suicides in the three major agrarian states as discussed above reveals greater economic crisis unfolding in rural India in the wake of liberalisation of trade policies. It also establishes linkages of international trade with the local products in India which is bound to happen under the WTO regime. Farmers' distress as caused by the multilateral trade negations call for immediate corrections of agriculture policy which may provide greater benefits to farmers (Satish, 2006).

5.5.5. Policy Implications

1. Policy formulations call for solution to agrarian crisis through large scale public investment and extension service by the state.
2. Availability of credit (enhance rural credit marketing system)
3. Risk factors should focus on yield, price, credit, income and weather related uncertainties.
4. Assured irrigation for specific crops that are linked to international trade
5. Diversification of cropping pattern, along with non-farm employment generation
6. Address deskilling due to change in the application of new technologies
7. Provide suitable conditions for alternative faming
8. Policy should implement with policing that reduces the access to organo-phosphorous poisons

9. Support from public institutions and greater involvement of civil societies

5.6. Trade Liberalisation and Indian Seed Industries: IPR Perspective

Agriculture research particularly the transfer of technology in seed development as an industry has been primarily dominated by the public enterprises in India. But, the new economic policy of 1991 under liberalisation has also opened up door to private players including multinational companies for large investment in seed industry in India. Indian seed industry is now considered to be one of the most dynamic and diversified seed industries in developing world (Pal, et al., 2007). However, the recent development under WTO regime may bring certain restrictions by virtue of IPRs on plant variety and biotechnology. But the public sector needs to learn to manage its IPRs to strike a balance between the efficiency and equity aspects of seed industries in India. The sustainability of agriculture will depend on the proper use of technology and its transfer on an appropriate time and space. The recent studies (Pal, et al., 2007; Ramaswami, 2002; Chand, 2004) on Indian seed industries have focused on various aspects which provide a complete case of trade liberalisation and its impact on seed industries under the WTO regime. This paper draws heavily on these studies to present the case of seed industries in India in response to impact of WTO on Indian Agriculture.

Agriculture development in India under the 'green revolution' has shown the impact of seed technology which was responsible for achieving self sufficiency in food grains. Yet, there has been general neglect of this subject in research as far as its importance of adoption of technology and resultant impact on farmers are concerned. However, of late, there has been growing interest amongst the researchers and policy makers to address the pertinent issues of the dynamic seed industry which is a welcome trend as it might help evolving well informed policies and action programmes on this subject.

5.6.1. Structure and policy regulations of seed Industry in India

Indian seed industries are functioning in a distinctive combination of public and private entrepreneurship. However, there is a dominance of public sector enterprises followed by rapidly growing private sector investment in seed industries in recent years in India. The Indian seed industries display a complete heterogeneity in various dimensions of the industry. The seed industry targets almost all the major field crops and fruits and vegetables in the country. The product dimensions of seed industries in India vary distinctively in terms of hybrid seed and open pollinated varieties. Hybrid seed dominates in coarse cereals such as sorghum, pearl millet and maize. Hybrids are also important in cotton and oilseeds. After the initial purchase, farmers have to multiply their own seeds in case of open pollinated verities.

However, this is not the case of hybrid seed. Due to its deteriorating yield characteristics in successive generations, farmers have to buy hybrid seed every year. This gives further burden on inputs expenditure of farmers making farming vulnerable when other complementary inputs are not met timely. However, some of the cereal crops of rice and wheat are not dependent on seed industries in India but are supplied by the farmers themselves. Nearly 90% of the requirements of these seeds are met by the farmers. Seed industries in India generally outsource the production of seeds to contact growers and it carries all those exploitative characteristics thereon. It is the seed industries in India that started contract faming thereby increasing the importance of private sector investment in the industries. However, governmental regulations are applicable to seed industries and various trade related matters. There are major seed policies in India that govern the industry. They are Seed Act 1966, the Seed Control Order of 1983, Seed Policy 1988 and amended New Seed Policy of 2002. The Indian Government also enacted Plant Variety Protection and Farmer's Rights Act, 2001. These are some of the instruments of policy regulation for seed industries in India. The public enterprises are required to submit their certification of seed whereas it is not mandatory on the private players. Besides controlling the quality of the seeds Government of India also controlled the export and import of seeds. The economic reforms of 1991 allowed limited imports of seed especially high value seed of vegetables, flowers and ornamental plants. However, imports of others crops were restricted in some ways or the others.

5.6.2. Appropriateness and gains under liberalised era

One of the major policy developments which directly influence the seed industry in India is the introduction of IPRs under WTO agreement in which India is a primary member. Given the strong public sector support in research and development (R&D), Indian seed industries have been diversifying in recent years. The new legislation of IPRs should be viewed in terms of enabling policy instruments under the new economic policy along with other regulations. They are important for the growth and further diversification of Indian seed industries. However, immense care needs to be taken for the IPRs as the big players may harness much of the benefits from this regulation. Benefits of IPRs in India is likely to be biased toward larger and strong stakeholders, however, farmer' should be protected of their rights preserving plant varieties. There are various issues such as protection of farmer's interest, seed quality and prices, IPRs and private seed industries that need to be addressed for equitable distributions amongst all the stakeholders including farmers. Much of benefits are accrued to seed suppliers which has got monopolistic power in current free trade regime. The Non-IPRs such as gene protection, trade secrets and contracting will still remain the vital instruments in the hands of private

sector seed companies. Also, farmers will have very little understanding of complex nature of IPRs and commercial seed marketing which will make them more vulnerable to market forces under the current liberalised regime.

5.6.3. Policy imperatives

Government should take initiatives to provide all related information of seed marketing, information about their contract rights, characteristics of crops varieties. It will take a long way to correct market forces governing seed industries. However, regulatory mechanisms need to strengthen for private players in order to discipline this volatile market. Above all there is an urgent need to strengthen the weakening linkages between the agriculture R&D (seed development in particular) and farmer's adaptability. Much of the works need to be done under the diffusion of innovation of technology. There is also some silver lining possible in this regard, such as Honey Bee Network and National Innovation Foundation which are linking the technological innovations directly to the farmers in Rural India (Gupta, 1999).

5.7. Impact of Contract Farming in India-some case studies

Agriculture trade in India as discussed in earlier sections has not been able to utilise the current trade policy under the WTO regime in its earnestness, for, agriculture development has few advantages under this liberalised regime of multi-lateral trade policies in the world. The third world countries are agreeing to contract farming system both with the Multinational companies and local agri-business firms. The international players, i.e. multinational companies are allowed to do business and arrive at contract with the local farmers for growing a specific agriculture commodity and market it. In such cases, both the local farmers and agri-business companies may take advantage of the contract farming and there are many cases of product specific contract farming in India. But the other side of grass is not always green. There are various lacunae in the current trade policy which takes undue advantages of the loose agrarian arrangement of India that leaves farmers, particularly small and medium farmers on a disadvantageous position.

One would like to understand that what it means and what kind of contract system exists in India. The simple definition by Roy (1963) defines contract farming as 'those contractual agreements between farmers and companies, whether oral or written, specifying one or more conditions of production and marketing of agricultural product.' More recently Little and Watts (1994) provided an holistic definition of contract farming as a "form of vertical coordination between growers and buyers-processors that directly shape production decisions through contractually specifying market

obligations by volume, value, quality and at times advance price determinations); provides specific inputs; and exercise some control at the point of production." It could be simple arrangement between farmer and the firm wherein firm could buy certain quantity of specific product on a pre-negotiated price and/or the firm could have total control over production from supplying inputs to harvesting. The contract farming involves three things i.e. pre- agreed price, quality, quantity or acreage and time (Singh, 2002). The type of contract and the intensity of arrangement depend on the nature of commodity, objectives of the firms and area of operations (Asokan and Singh, 2005).

The contract farming could be of three types, a) procurement contract under which only sale and purchase conditions are specified; b) partial contract where in certain inputs are supplied by the contracting firms and produce is bought on a pre-agreed price; and c) total contract under which the firm supplies and manages all the inputs on the farm and the farmer becomes just the supplier of land and labour (Singh, 2002). Involvement of the firms increases with the complexity of the contract and they display complete control over production system. In turn, farmers are left with no bargaining power over the price of their products and get over exploited in the process. Labour exploitation is particularly visible in certain contract farming systems in India. There is also a tendency of self exploitation wherein family female worker and female child workers are employed for increasing the efficiency. In this context, two cases of contract farming, one from Punjab and another one from Andhra Pradesh have been reported in a study by Singh (2001) which is worth discussing here as this study presents an elaborate analysis of gender perspective and practice of child labour in contract farming in the two states. Hence we describe these two cases of contract in the following with a view to highlight its impact on gender exploitation in the rural labour market.

5.7.1. Contract Cotton Seed production in Andhra Pradesh

There are 2.5 Lakhs girls in the age of 10-15 years who are involved in contract cotton seed production industries in the state. They accounts for about 95% workdays that are performed under the contract cotton seed farming on 28000 acres of area under cotton seed production, particularly Bt Cotton. They are initially hired for a season of 100-150 days but it continues for many years together. Women are replacing men due to contractual nature of agriculture and wage difference is quite visible under contract cotton seed farming. Women generally work for longer duration and on casual basis with low earning. This has led to increase in work opportunity for women workers under the current contract farming regime in practice, though the benefits to workers particularly women workers are not commensurate with their efforts.

5.7.1.1. Process of labour Exploitation

Female Child workers are preferred in contract cotton seed farming as they are supposed to be good at cross pollination. There is a belief that female child worker before they reaches puberty should be allowed to work and do cross pollination. The cross pollination done by the adult female workers are supposed to destroy the crops. This superstitious belief reinforces the practice of female child workers in cotton seed contract farming in the state. This makes cotton seed farming a highly profitable agribusiness in the state. It has also been observed that the efficiency of female child workers is much higher than the adult male or female workers in cross pollination. This activity is done by the female child workers as they move much faster in the field and pluck the flowers quickly and do cross-pollination in a much faster way. However, these child workers face higher risk of health hazard due to maximum exposure in the fields. Cotton seed production uses high amount of pesticides and chemical fertilisers which poses health problems to these female child workers.

5.7.1.2. Contracting for Child labour Exploitation

The preference of female child workers in contract cotton seed farming are done in strategic way by the firms in operation. Female children's parents are contracted well in advance of cropping season. The credit is extended either in cash or in kind for engaging female child labour for 8-9 months on the farm. The credit (cash/grain) advance leads to interdependency of credit and child labour market in Andhra Pradesh. This has become an important strategy of contract production system and labour exploitation in the state by the MNCs. Therefore, intensification of farming through contact farming (production system has increased the labour exploitation (particularly female child worker)) of labour of women and children.

Contract farming as a strategy for increasing farm outputs and improving the labour productivity to some extent has been successful. Though the new labour arrangement under contract farming has increased the employment opportunities and real income especially for women workers, it has changed the relationship between workers and employers which lead to differentiations within labour. The above case shows the darker side of contract farming regime in the state which is highly labour exploitative and accrues benefits to firms and loss to workers in the long run.

5.7.2. Tomato and potato contract farming in Punjab

Fruits and vegetable crops require more intensive labour inputs than any other crops and their labour system resembles that of the industrial sector. This requires timing as they are perishable goods, quality of products that

matches with firm's standards and other marketing mechanism that follows the production cycle. These could not be ensured only by mechanical methods. Contract farming of fruits and vegetable requires quality (efficient, timely and well planned), flexible (easily available and low cost) and docile (politically trouble free) labour to maximise the profit. Thus the contract farming under company's control may be termed as "factories in the fields" from the perspective of labour utilisation (Collins, 1993). In the absence of labour laws, labour exploitation takes place in contract farming both by the MNC and Local farmers. As in the case of cotton, female workers are preferred as they are good at grading, sorting, packaging etc. It has been observed that the worker productivity per female worker is higher. Similar to the cotton seed production under contract farming in Andhra Pradesh, the wage differences are also being observed in Punjab in tomato and potato contract farming. There is a prevalent practice of family child labour and female workers in contract farming of potato in the state.

5.7.2.1. Labour Scenario in Tomato Farming

As observed, female workers are generally used extensively in contract tomato farming from transplantation to harvesting and also in packaging. The female workers engaged in contract tomato farming are easily available, low cost, sincere and docile. This is despite the fact that Punjab accounts for only 6 per cent of female workers in agriculture labour market which is lowest in the country as compared to 39 % for India as a whole in 1991. However, their daily wages are 50-60 % of that of their male counterparts in state. It has also been observed that there is a prevalence of child labour in this crop farming under contract. The manifestation of self exploitation is reflected in engaging family child labour in this farming by the small farmers to maintain the contract agreement terms and conditions.

Wage Rates and Labour exploitation: The wages are paid under piece rate of Rs. 2-2.50 per crate (carrying 20 kg) of tomato picked by the workers (female) which is highly exploitative in nature. In order to increase the efficiency and productivity of labour, the motto of 'more you work more you get paid' works in contract tomato farming. One acre of tomato harvesting requires 15-20 women workers for two days as one woman picks 20-30 crates per day. The wages increases at the time of harvesting as tomato harvesting competes with other products such as potato and wheat. However, the wages are depressed when inflow of migrant labour take place from other states during the harvesting season.

5.7.2.2. Labour Scenario in Potato Farming

There is no difference of what has been observed in case of tomato farming in the state as far as the impact of contract farming on agricultural workers in general

and women workers in particular is concerned. This phenomenon is also prevalent in other developing countries of the third world. Job opportunities for women labour has increased as they replace their male counterparts in specific products, such as fruits and vegetable framing. Women workers are preferred in contract potato farming as they are good in sorting, grading and packaging. Cases of mother with infants working on the contract potato farming have been observed as it is performed at one place generally under shed.

Wage rates and labour exploitation: The wage rate for crop harvesting is based on work output. It is generally Rs. 5 per bag or Rs. 40 per day per female workers which is very low as per the minimum agricultural labour wage rates in Punjab. Similar to tomato farming, family female workers are also engaged in contract potato farming just to maintain the contract terms and conditions. Generally, the family female labourers are used for supervising the sorting, grading and packaging work at their houses which goes unaccounted as far as the wages are concerned.

5.8. Hidden risk of environmental degradation

The direct impacts of contract farming in terms of availability of work, increasing efficiency and labour productivity in agricultural sectors in India can be examined carefully as the indirect and or hidden negative impacts are not favourable in long run. It has been observed from above discussion that contract farming promotes labour exploitation, encourages child labour practices and over exploits female workers in rural labour market. It also favours only the large farmers who can easily adhere and meet the terms and conditions of contracting firms, be it MNCs or local firms. However, a greater danger which is unnoticed so far is the degradation of environment due to intensive farming under the contract system. Contract farming practices in India covers very low or no risk of natural calamities which may destroy the standing crops in question. Besides, it also overexploits ground water, increases soil salinity leading to overall decline of soil fertility in long run and pollution due to over use of pesticides and chemical fertilisers. Thus, there is a need to protect rural resource base under contract farming.

These phenomena are quite natural in a political economy where there is a lack of agricultural policy and labour laws. These kinds of labour exploitation are bound to happen in labour surplus countries like India. There is a need to changing agrarian structure under contract farming as far as issues of female labour exploitations are concerned. The issues that need to be addressed are transfer of skill, choice of technology, organisation of labour, working conditions terms and conditions under contract farming. The issues of increasing prevalence of child labour needs a special attention in serious research on contract farming for policy makers and planners as well.

6. Safeguarding the Interests of Producers and Workers

The foregoing analysis suggest that although agriculture trade constitutes a small proportion of India's agriculture sector; and that, India does not need to make any major commitments for reducing product specific and non-specific subsidies unless the developed countries make a major move towards reducing the trade distorting subsidies, recent experiences from international trade reveal substantial impact on selected commodities-exportables as well as importables. The specific case studies presented above further highlight that the adverse impact of trade has been spatially concentrated; its intensity is likely to be fairly high.

Together the evidences suggest the need for safe guarding interest of the poor producers as well as consumers through various mechanisms. There are three major channels through which the interests of these communities, of which women constitute a significant component, can be safeguarded. They are:

(a) Checking sharp decline in international prices by plugging the loop holes in the July Framework and effective negotiations

(b) Bringing non-trade concerns at the centre stage rather than at periphery of AoA

(c) Restructuring and expediting agriculture growth to cater to the larger developmental goals by focusing on domestic production and producers so as to generate employment and effective demand in the domestic economy

In what follows we try to highlight some of the important components of the three mechanisms and the labour laws, essential for safe guarding the interests of poor producers in the sector.

6.1 India's Submission for Tightening the Compliance by Developed Countries

India has adopted a two-pronged approach, asking for substantial reduction in subsidies in developed countries and flexibility for undertaking support-measures. Some of the important features are [Pal, 2005]:

(i) Appropriately structured `tiered' subsidy reduction formula, which can more or less harmonize the subsidy levels across developed and developing countries.

(ii) Change in Blue Box subsidies should be linked with additional criteria to ensure that it leads to substantial reduction in trade distorting subsidies. On the other hand, Green box subsidies should ensure they are not trade distorting and at the same time takes care of some of the legitimate concerns of developing countries.

(iii) Reduction of de minimis ceiling for developed countries to four percent (from the present level of 5%), whereas for developing countries there should not be any reduction in the ceiling, given the difference in proportion of people depending on agriculture and the level of Government expenditure for supporting this large segment of people across the two sets of countries.

It is proposed that linking the issue of market access in developing countries with domestic subsidies in developed countries may help creating pressure for better compliance by the developed countries. There are also issues pertaining to SPS, peace clause, environmental disputes on which co-operation within developing countries are crucial. While these may be good negotiating strategies, what is essential is to establish the fact that agriculture, in developing countries cannot be subjugated to the rules of WTO. A more holistic approach to developmental goals and trade need to be adopted; inter-sectoral bargaining may constitute important element within a holistic perspective of trade.

6.2 Recognition of Special Products and livelihood protection

While the July Framework has made a positive progression for creating a level playing field, the actual compliance is quite tardy. While the paper does not intend to get into the details of the anomalies in the compliance especially among the developed countries, it is important to recognize that developing economies like India cannot allow these anomalies to further damage livelihood of the poor farmers owing mainly to the sharp decline in prices. Recognition of Special Products (SPs) assumes crucial importance in this context.

The July Framework has made provision for the developing countries whereby they can designate Special Products in order to address the developmental goals, covered under non-trade concerns, viz; food security, livelihood and rural development. Under the provisions for SPs, developing countries may adopt lower tariff reduction, with a longer time frame and also get exemption from the minimum access quota provisions. This would give developing countries the much-needed leverage for safeguarding interests of the crops and the livelihoods.

Among the various indicators outlined for identification of SPs also include ratio of women-men workers involved in production of specific crops/commodities. Besides, India can also consider setting up a number of criteria for identification of Special Products [Jha, et. al, (2006): 112-113]. These are:

(i) Based on the results of ATPSM simulations for tariff cuts, SPs may be provided to products if: (a) import surge is above 10 per cent; (b) import surge is accompanied by decline in domestic production; and (c) decline in welfare

(ii) Limited scope of diversification on account of geographical conditions

(iii) Small and marginal farmers account for more than 25 per cent of the production of the concerned product

(iv) Staple food items

Based on the above criteria, the product categories in India that can be classified as SPs are shown in Table 16.

Table 16: Product Categories in India worth considering for SP status

Product Group	Import surge above 10 per cent	Import surge accompanied by decline in domestic production	Decline in welfare	Limited scope for diversification on account of geographical conditions	Low-income and resource-poor farmers account for more than 25 per cent of production	Staple food Items
Livestock	Yes	Yes			Yes	
Milk concentrate		Yes				
Cheese			Yes			
Wheat			Yes		Yes	Yes
Rice					Yes	Yes
Barley	Yes	Yes	Yes		Yes	
Sorghum	Yes	Yes			Yes	Yes
Pulses			Yes		Yes	
Apples	Yes	Yes	Yes	Yes		
Other tropical fruits			Yes			
Sugar raw	Yes				Yes*	
Oilseeds	Yes			Yes	Yes	
Cotton		Yes	Yes		Yes	
Vegetable oils			Yes			

Source: Jha et.al; 2006, Table 2.28. (* For Sugarcane)

6.3. Non-Trade Concerns and Food Security

Non-Trade Concerns find special reference while setting the goal of the AoA, though, not part of the rules governing the two major objectives, viz; elimination of all non-tariff barriers, replacing them with tariffs; and reducing market distorting subsidies for domestic support and export promotion within specified limits.

The preamble to the AoA provides some indications as to what can be treated as the NTCs. It states that 'commitments under the reform programme should be made in an equitable way among all members, having regard to non-trade concerns, including food security and the need to protect the environment, having regard to the agreement that special and differential treatment for developing countries in an integral element of the negotiations, and taking into account the possible negative effects of the implementation of the reform programme on least-developed and net food importing developing countries'. Food security and protection of the environment have thus been identified as the major NTCs that the AoA was

mandated to address. The NTCs also find a mention in Article 20 of the AoA, wherein the need to continue the reform process, that it has initiated, has been emphasized.

While the AoA makes some provisions for taking care of food security in member countries, it remains as an appendage to the two main objectives noted above. The only provision for addressing the issue of food security through AoA is- exemption of the expenditure made on public stockholding of food grains, from the calculation of aggregate measure of support (AMS). The exemption however, is subject to the fact that such expenditure is part of the programme, identified by the national legislation. Another provision pertaining to food security-is giving food aid to the poor. The condition here is that `the poor should be identified by using clearly defined criteria of nutritional objective, hence remains subject to the approval of WTO' [Dhar, 2001: 4].

The above provisions focus mainly on ensuring aggregate supply on the one hand, and the access of poor to food grains on the other. It nevertheless, does not address the issue of promoting domestic production by farmers, a large proportion of which are poor-men and women. The above provisions therefore does not create additional safeguards for protecting these farmers from the declining prices, thereby impairing domestic capacity of food production in developing countries [Dhar, 2001:17].

There is of course, a case for improving food security through the route of trade, as demonstrated through a study conducted by FAO, covering the period of 1970-1990 [FAO, 1996 in Dhar p.17]. The evidence from a number of countries however, suggests contrary owing to the risks associated with dependence on food imports. The risks refer to (a) adequate supply at global level; and (b) availability of foreign exchange to finance the imports. Experience from a number of countries suggest that both these are problematic; with China entering as a major importer of cereals, there is likely to be squeeze in the global supply. It is thus argued that `if trade is made the singular basis for policy making in agriculture in particular, domestic production of food grain could be seriously undermined, which in turn, threatens the realization of food security' [Dhar, 2001:15].

India's stance is to plead for more autonomy in agricultural policy where multi-functionality and food security, rather than trade per se, are treated as the basic objectives. This of course, would mean going beyond the AoA. Recent rounds of negotiations, with setting up of the WTO-committee on agriculture seem to open up space for a new perspective on agriculture trade. Meanwhile, India needs to consolidate efforts to accomplish these goals; meeting the targeted levels of food grain production, in the wake of growing diversification within agriculture and diversion of crop- land to non-agriculture uses need careful attention in this context.

7. Summary and Way Forward

The foregoing analysis tries to capture impact of trade liberalisation on women in agriculture, the food security and livelihood aspects of farmers in India. This has been done in the light of the overall trends in Indian agriculture and women's role thereof in particular. The central argument of the analyses is that whereas India's agriculture sector is already in deep crisis, trade liberalisation tends to accentuate the crisis in several ways. Women having larger stakes in the sector happen to be major victims of the crisis both-individually as well as collectively.

By 2004-05 nearly 83 per cent of the female workforce in rural areas was engaged in agriculture as against 66 per cent among the male workers. The gap between the proportions of rural workers engaged in agriculture sector has widened significantly over the decade thereby indicating feminisation of agriculture in India as elsewhere in the developing world. The phenomenon of feminisation however, is likely to be under-stated as a substantial part of the estimates of female workforce, especially in agriculture and allied activities, is un-enumerated. The phenomenon however, holds negative connotation, despite constituting an increasing proportion of workforce in the sector, owing to the shrinking space, reduced earnings, and increased hardships or drudgery. Being a formidable contributor to agricultural growth, tend to get affected relatively more because of their greater stake in the sector as compared to men who tend to move out of agriculture in search of alternative occupations, which of course, is driven by a mix of better opportunities and/or distress.

There could be at least two different approaches for facilitating women in agriculture to strengthen and consolidate their position as the most important stakeholders, going beyond the sheer strength in terms of workers. First, and a more popular one, is to bring women to the center stage of the mainstream activities in agriculture right from being innovator of technology to negotiating the terms of marketing farm produce. The other approach is to focus mainly on strengthening agriculture sector by harping on increased sustainability and equitability such that the most important stake holders, i.e. women get the benefits from enhanced productivity, food security, and reduced drudgery. Needless to say that the two approaches are closely inter-related; the first may ideally constitute an integral part of the mechanism for operationalisation of the latter.

The case studies presented in the paper give a comprehensive picture of the complexity of the problems faced by Indian farmers in general and women in particular. The evidence in most cases, suggest that trade liberalization has resulted into closure and loss of jobs especially in plantation agriculture. It has also led to influx of large capital through contract farming, opening new avenues of exploitation. Still worse is the case where policies of economic liberalization has created further imbalance between input-output prices where increased cost of inputs (due to reduced subsidies) had rendered many farmers vulnerable to the extent of committing suicides. Of all, what is worst is the continued neglect of regions, crops, and farmers that have been deprived

of basic support in the forms of technology, initial investment, and information besides credit and market access.

This however, is not the only or the complete story. There are sub-sectors (like fishery and processed food) and segments of the communities (resourceful and having access to irrigation) that may have gained from increased exports. Also, there are sub-sectors like animal husbandry and dairying, medicinal plants, and afforestation that have potential to benefit from the trade. It is also likely that contract farming, if properly implemented and supported, could help collectives of farmers owning small and often unviable farms where returns to labour is extremely low or negative. The need therefore is to tap the opportunities and turn them to the benefits of the economy, the regions, and the farmers, especially women.

What has thus emerged is a cobweb of real life scenarios that are mixed and complex. There are gainers and losers-actual as well as potential. Blanket acceptance or rejection of the new opportunities and threats is neither feasible nor desirable given the historically, politically and economically defined boundaries for policy making and negotiations.

Given the fact that agricultural trade till now constituted a small proportion of India's agricultural GDP, its impact on the overall growth, even in agriculture, is limited. Much of India's agricultural growth continues to be influenced by factors such as climatic, technological (including management of land and water resources), and relative prices of inputs and outputs. What is however, pertinent is that the trade has resulted in significant impact on selected crops and locations owing mainly to the steep fall in prices on the one hand, and volatility on the other.

More than the lower prices, volatility in prices creates major impediments for evolving a strategy of sustained growth in agriculture. The analysis therefore, has tried to raise some of the critical issues pertaining to the interface between AoA-framework and developmental concerns of a large agrarian economy like India. Also it is important to note that the real impact is yet to be realized as the trade agreements move towards the completion of the initial grace period, beyond which it would be difficult to sustain the present levels of protection.

What is therefore important is to work simultaneously on two aspects. First, is to correct the anomalies in the sectoral policies so as to put India's agricultural sector on higher planes of productivity, sustainability, and equity-including gender equity. This in fact, should feed into the second aspect of trade negotiations where India could rightfully plead for supporting agriculture sector thereby protecting the larger interests such as stability of overall economic growth, sustenance of natural resources, and livelihood of the people involved, especially women.

The analysis therefore highlighted critical importance of strengthening and restructuring the pattern of agricultural growth within the realm of the domestic policies. This in turn, should lead to increased trade due to improved efficiency on the one hand, and increased demand on the other. It is thus imperative that India should consolidate its position whereby it pleads for better compliance from the developed countries and at the same time ensure greater autonomy for restructuring of agricultural growth in a manner that promotes food security, employment and livelihood support, and environmental sustainability.

Finally, an important message that emerges form the discussions in different sections of the paper is that in so far as agriculture sector is concerned, the dichotomy between domestic and trade policies is almost non-tenable. In fact, it is essential that the former must take precedence over the later. This perhaps, should be treated as the bottom line for policy making on India's agriculture in general and India's trade in agriculture in particular. It is within this larger context, various initiatives for gender mainstreaming may attain the desired objectives.

Appendix 1: India's Share in World Trade (Value in US billion $)

	Agricultural Exports		India's	Agricultural Imports		India's	Total World Trade	
Year	World	India	% share	World	India	% share	Exports	Imports
1990	325.56	3.07	0.94	351.46	1.08	0.31	3334.4	3455.4
1991	328.65	2.80	0.85	353.02	0.74	0.21	3436.3	3578.3
1992	357.33	2.95	0.82	386.16	1.35	0.35	3775.9	3884.9
1993	338.73	3.36	0.99	355.21	1.04	0.29	3767.7	3840.2
1994	388.44	3.24	0.83	403.52	2.20	0.55	4289.9	4365.0
1995	442.86	5.49	1.24	460.97	2.22	0.48	5130.3	5213.9
1996	465.52	5.85	1.26	480.18	2.21	0.46	5350.2	5471.3
1997	457.53	5.66	1.24	468.43	2.58	0.55	5539.3	5647.4
1998	437.71	5.23	1.19	457.13	3.83	0.84	5451.4	5579.1
1999	417.14	4.64	1.11	443.50	3.97	0.90	5645.1	5802.5
2000	410.98	4.95	1.20	433.14	2.88	0.66	6376.7	6571.1
2001	414.33	5.23	1.26	441.62	3.92	0.89	6130.1	6335.7
2002	442.63	5.52	1.25	465.06	4.03	0.87	6428.6	6575.3
2003	525.07	6.50	1.24	551.34	4.91	0.89	7469.0	7657.9
2004	607.33	7.06	1.16	637.93	5.12	0.80	9052.5	9568.2
2005	653.84	9.02	1.38	678.61	5.36	0.79	10488.7	10854.8
2006	721.83	11.26	1.56	751.26	7.07	0.94	12112.7	12437.2
2007	873.80	16.71	1.91	910.25	8.09	0.89	14002.6	14303.6
2008	1059.00	17.31	1.63	1110.56	9.14	0.82	16120.5	16524.3
2009	946.81	15.66	1.65	981.22	12.82	1.31	12516.4	12720.2
GR	6.19	10.53		5.99	18.43		7.74	7.65
CV %	40.37	64.72		39.80	72.99		51.66	51.54

Note: (1) Agriculture Trade excluding fisheries and forestry products

(2) Column 3 and 5 indicates share of India's Agri. Export and Imports respectively, Column 9 and 11 indicate share in worlds total exports and imports respectively

(3) CV = Coefficient of variation, Rate of Growth = Compound growth as per cent per annum

Sources: FAOSTAT and International Trade Statistics, 2011 (WTO).

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1. **Natural Resources Management, Agriculture and Climate Change**

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   The main themes pursued under this area include policy dimensions concerning of the micro, small and medium enterprises, industrial clusters, regional industrialization and intellectual property rights, especially in pharmaceuticals, biotechnology and Bt cotton. Studies enquiring into provisioning of and access to basic infrastructure and the linkages between infrastructure and regional growth have also been carried out. Current research includes studies on aspects of trade and development with special reference to India. Public finance, especially, state finances, is a new area of interest.

3. **Employment, Migration and Urbanisation**

   Studies under this theme relate to employment, labour, diversification of economic activities and migration. The Institute has made significant contribution in these areas, especially during the 1980s and 1990s. International migration has emerged as an additional theme. Urban services and aspects of urban economy and governance are the other emerging areas.

4. **Poverty and Human Development**

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