CHAPTER 1

INTRODUCTION AND RESEARCH DESIGN
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1.1 Introduction
1.2 Statement of the research problem
1.3 Rationale for selection of the research problem
1.4 Review of literature
1.5 Objectives of the research study
1.6 Hypotheses of the research study
1.7 Definitions of important terms
1.8 Sample design and research methodology
1.9 Scope and limitations of the study
1.10 Chapter scheme
CHAPTER 1

INTRODUCTION AND RESEARCH DESIGN

1.1 Introduction

The coming into being of the WTO, on 1st January 1995, was like a double-edged sword, as on one hand it ushered an era of opportunities to countries, mostly developing countries, while on the other hand it simultaneously posed challenges to them in the form of sustaining the global competition and in being prepared to utilize the opportunities, which the liberalized world trade offered.

The opportunities would come about by WTO's advocacy of trade liberalisation, removal of quotas, dispute redressal mechanism etc leading to a freer world trade, which was hampered by higher tariff rates, the non-tariff barriers like quota regimes, excessive protection to domestic industry and agriculture through subsidies, especially by the developed countries. Thus the developing countries are likely to gain greater market access especially for their agricultural produce and commodities.

The threats accompanying the WTO agreements could stem from the sustainability factor with respect to facing global competition in an increasingly competitive world market, emphasis on quality along with price competitiveness, adherence to Sanitary and Phytosanitary (SPS) norms and adapting to the issues of Technical
Barriers to Trade (TBT). This calls for a greater need to enhance the competitiveness if the industry is to face the challenges and tap the opportunities thrown open by the WTO. In future, exporters of agricultural produce or commodities and also the people associated with agriculture will have to be aware of the impact of the Agreement on Agriculture along with the other agreements that are incorporated in to the WTO.

When India signed the Uruguay Round Agreements, the long-term implications of many of the obligations it was undertaking were far from clear. Later, when quantitative restrictions had to be lifted and patent protections tightened, there was a public outcry. At that stage, it was convenient to attribute the responsibility for these decisions to the WTO. Hence, the public at large has a very negative perception of the TRIPS Agreement and there is a feeling that developing countries, including India, were literally coerced into accepting the agreement; a feeling that is still very deeply entrenched in the Indian psyche and still persists as the general perception of the WTO even today. These feelings become even more pronounced in the context of agriculture. A general feeling that exists among the masses is that the single most important achievement after independence is attaining self-sufficiency in agriculture and there is a feeling that the WTO is out to undo this very achievement by its insistence on liberalization, without acknowledging the importance of self-sustainable domestic production.1 In this context it is of importance to note the views expressed by Devinder Sharma, a trade

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1 Priyadarshi Shishir, "Decision-Making Processes in India: The Case of the Agriculture Negotiations", Case Studies Of Participation In WTO- Managing The Challenges Of WTO Participation: Case Study 15, page 1
and food policy analyst who, in 2000, wrote that, "five years after the World Trade Organization came into existence, the anticipated gains for India from the trade liberalization process in agriculture are practically zero. And yet, undaunted by the negative fallout from the implementation of the WTO's Agreement on Agriculture, the Ministry of Agriculture is aggressively pushing for the second phase of reforms. The entire effort of the free trade initiative is to destroy the foundations of food self-sufficiency so assiduously built over the years." ²

India is uniquely endowed with all the natural resources, which probably no other country can boast of. This to some extent can be stated to be the reason for India's pre-1991 economic policy, which was mainly aimed at self-sufficiency through domestic means and had an overtone of protectionism. However, the then economic situation and the dwindling foreign exchange reserves coupled with the changed world economic order that was emerging due to the ongoing Uruguay Round negotiations of GATT necessitated a change in the economic policy and thus the liberalisation of the economy began in 1991. Thus India embarked on the journey of greater economic interdependence among the nations of the world in order to reap the benefits of the changed world order. Against this backdrop, the present study is undertaken to assess the impact of WTO, particularly on sugar industry.

² ibid 1 page 5
1.2 Statement of the research problem

The problem chosen for the research study is:

"WTO and Indian Agricultural Sector: Analysis of Impact on Sugar Industry in Belgaum district of North Karnataka"

1.3 Rationale for selection of the research problem

The need of the research study titled, "WTO and Indian Agricultural Sector: Analysis of Impact on Sugar Industry in Belgaum district of North Karnataka" can be seen with reference to the following aspects:

Indian economy is still primarily an agrarian economy, with over 66% of the population dwelling in villages and depending either directly or indirectly on agriculture as a means of livelihood. India does have and can continue to maintain the competitive advantage in agricultural produce. The focus has to shift to increasing its share in world agricultural trade by boosting agri-exports. This is possible if Indian agriculture is competitive in terms of price, quality, and hygienic norms etc that are a pre-requisite to exports in a competitive globalised era. Exports from the agricultural sector not only help in earning valuable foreign exchange but also help in providing employment opportunities to the masses in the agricultural sector and the allied agro based industries. It also helps in prevention of the migration of the rural populace to the urban centers, thereby bringing about a balanced socio-economic development of the society. Thus, its positive ramifications are manifold if a sincere and focused approach is developed and
adopted. Hence, this study related to the sugar industry, which is primarily an agro-based and rural-based industry assumes importance.

India is the largest consumer and the second largest producer of sugar in the world. However, India is not a major player in the global sugar trade as most of the production is consumed domestically. The era of liberalised trade and the provisions of WTO have impacted the way in which the global sugar trade is conducted. Indian sugar industry cannot remain oblivious to it and has to look at the opportunities presented to tap the global market as well as take necessary steps to obviate the threat posed by cheaper imports of sugar, if the situation arises.

The Indian sugar industry has a turnover of Rs. 300 billion per annum (1 billion =100 crore) and it contributes Rs. 20 billion to the exchequer every year. It is the second largest agro-processing industry in our country after cotton textiles. It is highly fragmented with organized and unorganized players. The unorganized mainly produce gur and khandasari. There are 531 sugar mills in India. Out of which 294 are in the co-operative sector, 167 are in the private sector and 70 are in the public sector. The pricing of sugar cane as well as the sugar is administered by the central government. Some state governments too administer the price for sugar cane by way of increasing the Statutory Minimum Price-SMP- announced by the central government, which is called as the State Advised Price (SAP). Also there exists a levy price of purchase by the central government, which is meant for distribution of the sugar to the populace with low income through the Public Distribution system (PDS). The other category being the free sale sugar.

3 Source: www.indiansugar.com, accessed on 02-02-2007
The sugar factories end up with increasing payments every year to the farmers while they do not have much say in the pricing of the sugar. But the farmers too are not happy as the government subsidy is gradually decreasing as a proportion of their investment. In comparison to the Indian farmers, the farmers in the western countries are heavily subsidized, thereby making their output highly price-competitive in the world market. This is tilting the world agricultural trade in favour of the rich developed countries, which could have a very serious impact on the viability of agriculture as an occupation in the developing and least developed countries of the world.

Karnataka is one among the six states, which totally contribute to 90% of India’s sugarcane and sugar production. There were totally 44 sugar mills in Karnataka, at the time of conducting the research, of which 25 were in north Karnataka. The number of sugar mills located in Belgaum district is 12, which accounts for 27% of sugar mills in Karnataka. Out of the proposed 17 sugar mills likely to be set up in Karnataka 7 are in Belgaum district, which accounts for 41% of the proposed sugar mills being set up. Belgaum district, which is also known as the sugar district of Karnataka, has a potential to tap the export market thereby increasing their profitability.

The key focus of the research work is to understand the working of the WTO and its different agreements, particularly those that affect the agricultural sector, analyse its impact on the Indian agricultural sector and the consequences thereof to the sugar industry in particular. The study would also focus on the different aspects of the functioning of the sugar factories in Belgaum district in order to assess their
competitiveness in exploiting the opportunities thrown open to sugar industry, in the context of WTO.

Hence, the rationale for the selection of the research problem can be summed up as:

i. About 66% of the Indian population is dependent on the rural economy, especially agriculture, for their livelihood. Sugar industry is one of the leading agro-processing industries in India, located in the rural area, which supports the livelihood of millions of dependents on this industry.

ii. WTO is changing the dynamics of the world trade in general and also of the sugar trade. WTO presents a greater scope for the import and export of sugar through the provisions of market access, reduction in subsidies, most favoured nation status clause etc, which will have to be studied, to know their impact in terms of the challenges or opportunities for the Indian sugar industry in general and the Belgaum district sugar industry in particular.

iii. There is a need for sector-specific research on assessing the competitiveness of the sugar industry in the era of WTO.

iv. Lastly, greater academic–industry linkage and co-operation is needed to address many issues concerning the industry. Hence, the role of the management faculty in facilitating this linkage.
1.4 Review of literature

Indian agriculture

M.S. Swaminathan\(^4\) identifies four pillars for sustained agricultural progress and agrarian prosperity viz. technology, training, techno-infrastructure, and trade. Globally two cultures of agriculture are emerging: one prevailing in the industrialised countries where the land holdings is large and where farmers are supported by heavy inputs of technology, machinery, capital and subsidy, viz.\(10\) million large farmers get $1 billion of subsidy every day. In contrast, the \(110\) million farming families of India in general struggle to produce under conditions of small holdings and poor access to technology.

India reaching the number 1 position in the world in milk production has shown that given a systems approach to production, processing and producer-oriented marketing, small scale farming can be strength and will not be a handicap.

Hence there is a need to study sugar industry and develop a systems approach to help it tap the global market.

Gurudev Singh and S.R. Asokan\(^5\) state that contract farming is viewed as an institutional mechanism to overcome various constraints faced by small and

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marginal farmers. Contract farming also has potential to give a fillip to the fledging agro-processing industry in our country.

Hence, there is a need to explore the existence of and the scope for contract farming for cultivation of sugarcane, as it would give an advantage to the sugar industry to improve its competitiveness in era of liberalised global trade.

**WTO and Indian agriculture**

Samar Datta\(^6\) states that globalisation in trade and investment through harmonization of national laws, particularly dealing with intellectual property rights is one of the major impacts of WTO. He has highlighted three areas of conflict regarding Indian agriculture with reference to intellectual property namely:

i. The tension between public need and private control with respect to knowledge as a factor of production.

ii. The conflict between chemical intensive agriculture (despite declining productivity of inputs) and the non-chemical sustainable technological innovations generated by farmers as well as firms (national or international).

iii. The increasing trend towards larger areas under fewer varieties and the need for food security through diversified biological systems.

The author states that India should not view the challenges posed by WTO as if it will remain always an importing country and that it has no substantive intellectual

property to offer to world market. There must be a registration system for encouraging protection of local land races and incentive system should be generated for their conservation. The provisions of TRIPS need to be strengthened to include:

a. Micro-organisms but exclude life forms

b. Registration system of grassroots innovations resembling the product patent for ten years as proposed in the Australian Innovation Patent System.

c. Widespread patent search facility for educational and entrepreneurial networks and centers so that the quality of research and education can be competitive.

d. Just as a global registry has been proposed for wines under the TRIPS, India must insist that a similar global registry must exist for green small innovations too. This will help link innovation, investment and enterprise each vector of which may be in different parts of the world

Prior informed consent of farmers must be ensured while pursuing on farm trials of transgenics. The reciprocity in effective protection must exist i.e.

a. Those who access farmers’ varieties must disclose acknowledge and undertake to provide reasonable share of their revenue with germplasm providers/conservators through appropriate institutions and
b. Patent claimant should unambiguously prove that the materials, in which improvements have been made, had been obtained lawfully and rightfully.

The author discusses the provisions of the International Convention for Protection of New Varieties of Plants (UPOV) and that TRIPS does not explicitly state that sui-generis system should be compatible with provisions of UPOV, it is implied that such should be the case.

The author says that the strategies proposed above would make the Indian agriculture not only globally more competitive but also domestically more progressive by using knowledge as a strategic resource so that agriculture sustains livelihoods of millions of households dependent upon it in an environmentally sustainable manner.

K.K Kaushik and Sanju Karol7 conclude that there has been no substantial boost for agri-exports from developing countries to developed countries as speculated earlier. Promotion of unrestricted exposure to foreign markets overlooks the truth that a majority of rural producers depend on food grains production as their principal source of income and to take a policy approach to 'free trade' in food grains would amount to risk one of the fundamental aspect of food security i.e. sufficient and consistent availability of food grains at affordable prices. Also there is a marked decline in the percentage share of agricultural exports to the total exports i.e. from 20.40 percent in 1996-97 to 14.80 percent in 1999-2000 and the main reason being the growing non-competitiveness and an enormous deceleration in public sector

investment in agriculture. This integrated with a steep fall in the production efficiency and extensive subsidisation by the developed countries has led to a sharp rise in the domestic prices of these goods and has made many of them non-competitive in the world market.

Manickavasagam\footnote{Manickavasagam: 'Patent Laws and Indian Agriculture', Facts For You, August 2003 Page 35 and 36.} highlights the need to safeguard the Indian agriculture by proper legal action in the form of patenting. He mentions about the ‘Protection of Plant Varieties and Farmers Rights Act, 2001’ being enacted by the central government to meet the country’s obligation as a member of WTO under article 27.3 (b) of the TRIPS agreement, which requires member countries to provide for protection of the plant varieties. The article also states that patents of seeds and other breed should not be given to private agencies, as it will be an additional burden to the Indian farmer.

We can check about the awareness of the existence of this law and whether the sugar industry has made use of it to safeguard the new breeds of cane developed by patenting them.

R.S Mishra\footnote{R.S Mishra: " The WTO Agreement on Agriculture (AoA) and Agricultural Crisis in India", Globalisation and Agricultural Crisis in India, edited by Alagh Y.K., Deep and Deep Publications (P) Ltd, New-Delhi, 2003, Page 3-11} states that India is under no obligation under the WTO AoA to reduce any of the subsidies given to our farmers. This is because the total value of subsidies given to our farmers like subsidies on fertilizers, electricity, seeds, pesticides and cost of credit available to all crops as well as agricultural commodities is well
below the ceiling prescribe in the Uruguay round agreement. Developing countries have been provided three additional exemptions, namely,

   i. Investment subsidies which are generally available to agriculture

   ii. Agricultural input subsidies, which are generally available to low income or resource-poor countries.

   iii. Domestic support to producers to encourage diversification from growing illicit narcotic crops.

He also states that the concern about the minimum market access is misplaced because India had a Balance of payments (BoP) problem.

There is a need to assess the above stated facts in light of the changes that have taken place like India now does not have a BoP problem and what would be its consequence to the Indian sugar industry.

Arvind Awasthi and Roli Misra\textsuperscript{10} conclude that

i. The primary purpose of the AoA is to promote global trade by removing Quantitative Restrictions (QRs) with a suitable amount of tariff. Since countries were unaware of its consequences, they set fairly high tariff rates, which resulted in dirty tariffication. In such a situation it will not be easy for India to expand its exports of agricultural commodities. The authors cite the example of rice, whose exports have declined both in terms of value and volume, indicating the negative effect of AoA on India's agri-exports.

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ii. The market access provision has two sub-parts namely minimum access and current access. The minimum access clause makes it mandatory for a country to allow at least five percent of imports of the base period (1986-88) domestic demand of that product. This should be in addition to that five percent, which is allowed to a particular country under the MFN status principle. Thus the total market access that a country would have to provide would be ten percent by the end of the implementation period. However the traditional staple of a country has been exempted from the market access provisions.

iii. The most unfavourable clause of the AoA, from India's viewpoint, is the Aggregate Measure of Support (AMS) while it is highly favourable to USA, EU, and Japan. This hampers the creation of a level playing field for international trade in agricultural commodities.

iv. India is at a disadvantage due to the export subsidy provisions because India cannot provide any export subsidy as per the export subsidy clause of the AoA.

Ramesh Chand\textsuperscript{11} expresses the view that public investments in Indian agriculture have shown a declining trend since 1980-81 based on all kinds of measures. These trends show that infrastructure development for agriculture has lagged far behind the growth of in the sector. The National Agriculture Policy (NAP) merely acknowledges the problem and there is no sign of rechannelising available resources from support measures towards public sector capital formation.

The author also opines that agriculture in India as in several other developing countries has faced an adverse trade environment after the implementation of WTO’s Agreement on Agriculture. Agricultural exports have witnessed a sharp decline but imports have risen sharply. A large segment of the domestic production is feeling threatened due to the low level of international prices. One of the reasons for the international price situation turning adverse to Indian agriculture is the high level of support and subsidies given to agriculture in OECD countries, which have heavily distorted international prices. High subsidies and tariffs effectively protect the domestic market from the efficient producers of other regions and countries and encourages higher production domestically, which creates a surplus over time. The developed countries have been providing export subsidies to dump these surpluses in the world market ruining the ability of the efficient producers of developing countries to compete in other markets. There has been no let up in this support even after the implementation of the AoA; rather there has been a further increase in several cases.

Global sugar industry

Siemen van Berkem, Roza Pirn, Frank van Tongeren\textsuperscript{12} discuss the EU sugar trade regime which provides preferential treatment to several groups of countries of which the major one is the ACP sugar protocol (SP) signatories. This group of former colonies of EU member states benefit from preferential access to EU

\textsuperscript{12} Siemen van Berkem, Roza Pirn, Frank van Tongeren: ‘Impacts of the EU sugar policy reforms on developing countries’, Agricultural Economics Research Institute (LEI), The Hague, June, 2005
markets where they receive high prices for their SP quotas. The July 2004 reform proposal implies a loss in sugar export revenues for all those countries presently benefiting from these EU preferences.

In the case of Brazil, the world’s largest and most competitive producer and exporter of sugar and ethanol, the EU sugar trade reform is expected to allow Brazil to expand on third country markets, as the EU retreats from the export markets. Therefore, there is a need to assess whether Indian sugar mills are competitive enough to take advantage of the above-mentioned emerging scenario and tap the potential export markets.

Donald F. Larson and Brent Borrell\textsuperscript{13} conclude that the long-standing government interventions frequently displace both the markets and the institutions required to produce efficient outcomes. The political economy, trade structures and production characteristics of sugar are different enough from those found in most agricultural markets to warrant special consideration. Chief among these differences are:

a) The degree to which international markets are dominated by policy interventions and the effects of preferential trade agreements

b) The inherent tension between mills and growers created by sugar’s joint-production characteristics

c) The local monopoly relationship between growers and mills; and

d) The effects of that relationship on community, incomes, assets and profitability.

The authors also express their views on the anticipated expansion of EU, the effects of NAFTA on US and Mexican policy, the regional effects of reform on

\textsuperscript{13} Donald F. Larson and Brent Borrell: 'Sugar Policy and reform', FAO, August 2004
Brazil's sugar industry and discussions under World Trade Organisation auspices. But there is no mention regarding the Indian sugar industry and the effects of the changing world order with respect to the sugar trade upon India. Hence, there is a need to assess the impact of WTO regulations and the impact of reforms taking place as a result of WTO agreements on the sugar industry of India in general and Belgaum district in particular.

A.C. Hannah\textsuperscript{14} examines the sugar regimes in Russia and Ukraine, post break up of the Soviet Union. Under the Soviet system both production and consumption of sugar was heavily subsidised. Production suffered from the shift from state planning to commercial decision-making. Factory managers had no longer goals set under a five year plan and no longer received state allocations of inputs such as fuel, fertilizers and machinery. Russia has 23 beet growing areas with 95 mills with total capacity of 276,000 tonnes of beet processing capacity per day-enough to produce 3 million tonnes of sugar a season. Ukraine, once a great beet producer with ideal soils for beet cultivation, which in soviet days often exceeded 6 million tonnes of production, now produces only 1.6 million tonnes, mostly being a net importer with consumption around 1.8 million tonnes.

Poland, Hungary and Czech republic, which are candidates for accession to the EU, are in the process of harmonizing their sugar policy with the EU sugar regime so as to ease the transition process. This system has three quotas for sugar production 'A'

\textsuperscript{14} A.C. Hannah: Head of Economics and Statistics Division, International Sugar Organisation, 'Sugar regimes in major producing and exporting countries in Europe other than the EU and Africa'.
quota is set at domestic consumption; 'B' is set at the allowable level of subsidised exports under the WTO agreement. 'C' sugar is not controlled.

Though Africa is a deficit continent, however southern Africa is a net exporter. South Africa, Swaziland, Mauritius, Malawi, Zambia and Zimbabwe are all net exporters. Mauritius, Swaziland & Zimbabwe have Lome quotas, which allow exports at preferential prices.

Hence, there is a need to assess the possible opportunities that exist for the Indian sugar industrialists to tap the Russian markets and the deficient African countries.

**Indian sugar industry**

B K S Prakash Rao and Venkateswara Rao\textsuperscript{15} state that sugar industry is the second largest agro-based industry in India providing employment to about two million skilled and semi skilled workers. The paper lists the following problems viz. diversion of sugarcane, cyclical fluctuations, high support prices, lopsided policies of the Government, uncertain export outlook while the prospects include increased per capita income, sugar industry being no longer a seasonal industry, retail boom offering an opportunity, benefits from forward trading, diversification, ethanol in fuel blends, cogeneration, counter trade.

Hence, there is a need to analyze the firm level capabilities of sugar factories to assess their competitiveness to tap the global markets in light of the problems and prospects as stated above.

M.V Rama Prasad\textsuperscript{16} states that the substantial increase in the volume of free international trade in sugar presents an excellent opportunity to the Indian sugar industry to embark on a regular plan for sugar exports. But the restrictive sugar policy, along side unstable sugar production, makes it an erratic trader on the world market.

The author mentions that the sugar industry in India follows a typical 4 – 5 year cycle. Bulk consumers like bakeries, candy makers, sweet makers and soft drink manufacturers consume almost 75 % of sugar available in open market.

**WTO and sugar**

Donald Mitchell\textsuperscript{17} says that sugar is one of the most policy-distorted of all commodities and the European Union, Japan and the United States are among the worst offenders. Internal changes occurring in the EU and US sugar and sweeteners markets coupled with international trade commitments, commitments under WTO make change unavoidable. The benefits of sugar policy reform are greatest under multilateral reforms and the global welfare gains of removal of all trade protection are estimated to total as much as US $ 4.7 billion a year.

In countries with highest protection viz., Japan, Western Europe, the US, Indonesia and eastern Europe, the net imports would increase by as much an estimated 15 million tonnes a year, which would create employment for nearly one million workers in developing countries. World sugar prices would increase by as much as


\textsuperscript{17}Donald Mitchell: Sugar policies- Opportunities for Change, Development Prospects Group, The World Bank, February 2004.
40%, while sugar prices in countries that heavily protect their markets would decline. He also states that the cost of sugar produced from beets is nearly twice (as costly) as sugar produced from cane, even though beet and cane sugars are chemically identical and indistinguishable.

Therefore, there is a need to assess whether the Indian sugar industry / Belgaum sugar industry are geared up to meet the challenges thrown open by the changing global sugar trade scenario, on account of the WTO regulations and also whether they are competitive to tap the opportunities effectively. This calls for a need to know the awareness levels among the sugar industrialists regarding the WTO regulations and the likely changes that are to take place as a result of the compliance to WTO norms.

Gopal Naik18 deals with the issue of expiry of peace clause, the crop and product specific support and export subsidies, the extent of subsidies and support to agriculture provided by developed and developing countries, and the effect of these subsidies on the agriculture, food security and livelihood of developing countries. This paper also deals with the likely gainers and losers from the expiry of the 'Peace Clause' and the implications of the expiry.

Article 13 of the AoA titled 'Due Restraint' is commonly referred to as the peace clause and was valid until December 31, 2003. This article indicates the extent of protection available to countries that provide agricultural subsidy and comply with

the AoA, from various other agreements and articles that provide for legal actions against subsidies.

The author states that the industrialised countries account for 88% of the total domestic support payments. Organisation for Economic Co-operation and Development (OECD) countries are the primary users especially the EU, Japan and the USA. In 1999, the total support to agriculture reached an estimated US $ 356 billion, or 1.4% of the GDP of the OECD as a whole. The total support estimate (TSE) for the year 2000 was US $ 360.5 billion accounting for 59% of the agricultural GDP and in 2002 it was US $ 318 billion.

The producer support estimate to farmers (PSE) in OECD countries was US $ 235 billion in 2002, which represents 31% of the total farm receipts. In the EU, the PSE as a percent of the agricultural output has remained at around 40% since 1995. In the US, the share has increased from 15% in 1995-97 to about 25% in 1998-2001. Prices received by EU farmers in 2002 were on an average, 31% above the world prices. The share of the production-linked support in form of output-based support (market price support and out payments) and input subsidies remained at 76% of producer support in 2002. These measures are among the most production and trade distorting, and are least effective in transferring income to farmers or in targeting the benefits of environmental benefits. The magnitude of such support is very high in the EU and USA.

The elimination of agricultural trade and domestic policy distortions could raise world agricultural prices by 12% and in an annual world welfare gain of US $ 56 billion.
According to the author, sugar is one of the most policy-distorted commodities in the world. The EU, Japan and the USA make up the bulk of OECD - zone support to sugar producers, which, at US $ 6.4 billion, is approximately equal to developing country exports. High border barriers in combination with the subsidies keep domestic prices in the US and EU about twice as high as the world market price. The high costs in domestic markets have encouraged high-cost, inefficient domestic production of sugar and sugar subsidies. These countries transformed from net buyers of about half the world's sugar exports during 1970s into net exporters in 1990s. The world price of sugar is now below the costs of production of some of the most efficient producers. Many producers manage to export, either because they have preferential access at high prices in industrial country markets or because they subsidise their exports by selling at higher prices in their domestic markets. The price per pound of sugar in the EU domestic market for the period 2000-02 was over 100% higher than the world price for sugar. Yet the EU is one of the major sugar exporters in the world. Removing all trade protection and support would bring annual global welfare gains of $ 4.7 billion. In countries with the highest protection- EU, Indonesia, Japan and the US-net imports would increase by 15 million tonnes per year. World sugar prices would increase by 40% while prices in heavily protected countries would decline- in Japan by 65%, in Western Europe by 40% and in the US by 25%. According to Global Trade Project Policy (GTAP) model, with liberalisation of the agricultural market, the prices of rice are estimated to increase by 2.3% that of wheat by 7.3%, oil seeds by 9.4% and sugar by 6.1%.
The expiry of the Peace Clause provides greater opportunity to the non-subsidisers to initiate action against heavily subsidizing countries on the basis of the Subsidies and Countervailing Measures (SCM) agreement article 5 and 6. The countries that would benefit from the expiry of the Peace Clause are mainly the Cairns Group countries and others such as the African cotton exporters and the Asian rice producers (Thailand and India). India may be able to export sugar and cotton. India may also be able to export its dairy products to countries in South-East Asia, the Gulf and southern Mediterranean. The major losers are likely to be heavily subsidizing countries such as EU, US, Japan, Korea, Norway and Switzerland.

This paper gives us vital information on the Peace Clause and the effects after it has lapsed and how the subsidies by developed nations have distorted the global agri-trade especially in the sugar trade. Hence, there is a need to understand the implications of WTO regulations on the Indian agricultural sector, especially on the sugar industry.

Paola Fortucci19 discusses about the special and differential treatment (SDT), reductions in domestic support measures, increases in market access, safeguard provisions, reduced value and volume of agricultural export subsidies and WTO's impact on the sugar policy framework.

The author expresses her view that in order to assist the integration of developing countries into the global trading system, the SDT was introduced which provided for tariff reduction rates at two-thirds those of the developed country levels,

19 Paola Fortucci: "An overview of the international trade policy framework for sugar", FAO –Cuba conference, 7-9 December 1999
allowing a ten-year implementation period instead of the six years and exempting certain specific rural support schemes from reduction commitments. In order to reduce the domestic support levels for agriculture, all support measures determined by the AoA to have distorting impacts on trade were to be quantified into one measure called the Aggregate Measure of Support (AMS). Although no commitments on individual agricultural products were made, countries agreed to progressively reduce domestic support measures by 20% from the base period. The AoA divided domestic support measures into three broad groups: one, policies having significant impact on trade patterns (amber box); two, policies with no significant impact on production and trade (green box); and three, support policies which limited production of particular products (blue box). Only those domestic support policies which were determined to have significant impact on trade patterns were included as part of the current AMS calculation.

The AoA called for countries to increase market access by replacing non-tariff barriers, including variable import levies, on agricultural products by tariff and tariff-rate quotas. Base tariff levels were determined using the 1986-88 period. Developed countries agreed too progressively reduce all tariffs by an average of 36% over the six-year implementation period (ending in 2000), with a 15% minimum reduction per tariff line. Developing countries agreed to an average of 24% reduction with a minimum of 10% on each tariff line over a longer ten-year implementation period (ending in 2004). Overall tariff reduction commitments of 10% to 59% on average for all commodities were negotiated. However, tariff
reductions for sugar since the Uruguay Round have proven to be less substantial than originally envisaged, as tariff reductions were negotiated from very high base-period levels. The AoA called for a 36% reduction in the value of export subsidy expenditures for developed countries by 2000 and a 21% reduction in the quantity of export subsidies. Developing countries agreed to 24% reduction in the value of subsidy expenditures by 2004 and a 14% reduction in subsidised export volumes. The most significant SDT provision in regard to export competition was the exemption of domestic subsidies provided for marketing, internal transport and freight costs on agricultural product exports.

The author opines that till date the impact of AoA on the world sugar market has been limited. Reductions in domestic support for sugar have been minimal. Aggregate measurements of support referring to overall agricultural production, high base period support levels and special exemptions (green box and blue box measures) allowed the sugar sector to be precluded from reduction commitments. While increased market access was to be achieved through reductions in tariff levels, the option to use averages to measure tariff cuts as well as high base period rates have resulted in high bound tariffs which continue to insulate domestic sugar support measures. While the reduction in the tariff level for raw sugar was 24 %, the weighted average base period tariff level remained relatively high, falling from 93 % to 72 % over the implementation period. For refined sugar, the reduction in the tariff level for white sugar was 22 % with the weighted average base period tariff level falling from 109 % to 88 %. For developing countries that chose binding
ceiling tariffs, the weighted average tariff level for raw sugar is 110 % and 102 % for refined sugar by the end of the implementation period. Since a considerable amount of sugar trade was undertaken through bilateral arrangements at preferential tariff rates, the AoA legitimized this trade in the form of current access commitments. Quota fill rates at 70 % to 76 % are some of the highest fill rates for all products, especially in EU and USA. There were commitments made to reduce export subsidies and member countries agreed to reduce subsidised export volumes by 1.3 million tonnes or about 20 % of the subsidise tonnage in mid 1990’s.

Hence there is a need to assess the impact of the WTO regulations on the Indian agriculture in general and the sugar industry in particular.

Cristina Schroder\textsuperscript{20} brings out the issues of implementation of commitments, tariff rate quotas, export subsidies and domestic support. The author says that in addition to the rule-based commitments, there is a multitude of member-specific domestic support commitments, 430 individual export subsidy reduction commitments and some 1370 tariff rate quotas of thirty six members, as well as thousands of out-of-quota agricultural tariffs implemented. Twenty-six of these thirty-six members are offering tariff rate quotas for sugar for an initial total amount of 37,60,363 tonnes, increasing to 39,60,722 tonnes at the end of the implementation period i.e. expansion of slightly less than 2,00,000 tonnes. In all, there are 41 tariff rate quotas for sugar, 51 if sugar confectionery is included. Out of the 26 members with tariff rate quotas for sugar, 13 have reserved the right to use the AoA’s special safeguard mechanism. The special safeguard for sugar covers 291 tariff items.

Mainly the price-triggered safeguard has been used by some of these countries post implementation period.

25 members of WTO have export subsidy reduction commitments for agricultural products. Of these 10 members have such commitments for an initial total quantity of 6.5 million tonnes of sugar, decreasing by around 19% to approximately 5.3 million tonnes by the end of the implementation period. Budgetary outlays were to diminish by 24% to 36% in the same period.

Although total supports have to be reduced or kept within the *de minimis* limits, there are no specific product specific, domestic support reduction commitments although there are notification requirements concerning product specific subsidies. The choice of products, which are supported, may therefore change from one year to another. 19 members have filed notifications of domestic support for sugar and many more have notified non-product specific domestic support of a green, blue and amber kind, which also benefit sugar. The product specific sugar notifications are mostly related to market price support and other product specific support such as production and marketing credits.

This article gives us vital information about the sugar trade and commitments by members. Hence, there is scope to explore the impact of these developments, which are a result of the WTO regulations, on the Indian sugar industry.
Samar K Datta and Kirti Bardhan Gupta\textsuperscript{21} estimate the import competitiveness of Indian sugar under alternative assumptions using the Domestic Resource Cost (DRC) analysis. The DRC analysis is performed following a systems approach on a representative sample of 131 sugar mills in India. Three issues are found critical to sugar industry’s long-term survival growth - first, international strategies to get rid of current distortions in the global market, second, short-term domestic strategies to further liberalise and defend the industry against falling import prices, and third, long-term domestic policies to boost up investments in this sector to achieve quality-competitiveness for exports.

The authors also state that the global market of sugar is very thin because the major producers of sugar are also its major consumers. Sometimes only about 17 per cent of world’s total sugar production enters into the international market resulting in a wild fluctuation in international market price even with a small change in global demand or supply situation. Still the global market is quite far from a competitive structure. The market is highly distorted in major developed countries like EU, USA and Japan, in the presence of quota and tariff restriction, besides large export subsidies.

Hence, there is a need to assess the global competitiveness of the sugar industry, by taking the Belgaum district sugar industry, in era of WTO regulations.

\footnotesize{\textsuperscript{21} Samar K Datta and Kirti Bardhan Gupta: Report on "Global competitive analysis of the Indian sugar", December 2001}
Literature review of studies that assess the impact of the WTO agreements

The literature reviews of studies that assess the impact of the WTO agreements contradict each other.

Studies by Anderson and Tyres (1993), Subramanium (1993) and Parikh et al. (1995) use macro economic techniques like computable general equilibrium models to study the effects of policy liberalisation.

Anderson and Tyres predict that Indian farmers, including landless labourers, will benefit to the tune of US $ 1.6 billion and the net increase in the economic welfare would be US $ 1.1 billion. They expect a net change in the foreign exchange earnings to the tune of US $ 3.3 billion from food trade alone.

According to Subramanian's study, India stands to gain from higher world prices in the long run as India also liberalises agricultural trade, however, the increase in the domestic food prices skews the distribution of gains only in favour of large farmers. Real incomes of landless labourers and small farmers fall. This is contrary to what Anderson and Tyres have predicted. If true, this is an important result as the proportion of small farmers and landless labourers is quite large in India.

Further, Parikh et al have reached a still different conclusion. Their study shows that if agriculture alone is liberalised, then terms-of-trade will improve for Indian agriculture by about two percent, and, if both the agriculture and non-agricultural sectors are liberalised, then the terms-of-trade will improve for agriculture by
twenty seven percent. They predict that only the rural poor farmers will gain from liberalisation and the rich and large farmers will lose.

The WTO-agreement-specific models by GATT and Organisation of Economic Cooperation and Development (OECD) estimate that world GDP will rise by 230 to 275 billion US dollars and developing countries will receive 30 to 40 percent of global economic growth (Sharma 1997). A study by National Council of Applied Economic research (NCAER, 1997) estimated that the export demand and supply elasticities to predict the effects WTO agreements on agricultural exports but qualifies the findings by saying that domestic non-price supply constraints may impede agricultural exports. While the direction of the change in the welfare of the developing countries like India, as predicted by the various economic studies may be correct, certainly the same cannot be said about the magnitude and the distribution of these changes. If one takes into account some empirical and some theoretical considerations of the Indian agricultural trade and the WTO agreements, the gains to the Indian agriculture will be severely lower than what has been anticipated.

The above-mentioned predictions rest on the assumption that supply response and productivity growth are price responsive. This may not be the case, as almost all studies conducted on supply response in agriculture in developing countries show that agricultural supply response is highly inelastic to changes or improvement in the terms-of-trade. In fact, some of the studies show that the response is negative,
as shown in the table 1.1 below. Thus, the impact of the improved terms-of-trade is quite ambiguous.

The economic reasoning for this is to be found in substitution effect, income and wealth effect and the impact of non-price factors. The substitution effect will cause agricultural supply to increase and the income and wealth effects will cause it to decline. The net effect is ambiguous. Also, the farmer cannot respond to the higher prices because of constraints due to inadequate irrigation, lack of agricultural extension services and poor transportation facilities. Therefore, gains to agricultural sector will materialize with the improvement in irrigation, research, extension and transport facilities that will do more for agriculture than the liberalisation induced improved terms-of-trade. WTO allows expenditures on such items to be exempt from domestic support reduction commitments. Therefore, India must take advantage of such a provision. Also, expenditure on such items will not be inflationary, as it will promote agricultural productivity.

Table 1.1: Price elasticity of supply response

<table>
<thead>
<tr>
<th>Author (year)</th>
<th>Country</th>
<th>Supply elasticity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Binswanger et al. (1987)</td>
<td>India</td>
<td>0.20</td>
</tr>
<tr>
<td>Chibber (1989)</td>
<td>India</td>
<td>0.30</td>
</tr>
<tr>
<td>Desai (1999) Non-food grains</td>
<td>India</td>
<td>0.30</td>
</tr>
<tr>
<td>Desai (1999) Food grains</td>
<td>India</td>
<td>-0.15</td>
</tr>
<tr>
<td>Yotopoulos and Lau (1974)</td>
<td>India</td>
<td>-0.15</td>
</tr>
<tr>
<td>Herdt (1970)</td>
<td>India</td>
<td>-0.06</td>
</tr>
<tr>
<td>Bond (1983)</td>
<td>Kenya</td>
<td>0.16</td>
</tr>
<tr>
<td>Bond (1983)</td>
<td>Ghana</td>
<td>0.34</td>
</tr>
</tbody>
</table>

22 Deodhar Satish Y., 'WTO Agreements and Indian Agriculture: Retrospection and Prospects', IIMA working paper # 99-11-06, page 4
1.5 Objectives of the research study

The objectives of the research work titled, "WTO and Indian Agricultural Sector: Analysis of Impact on the Sugar Industry in Belgaum district of North Karnataka" are as given below:

i. To know and understand the various agreements and provisions of WTO pertaining to agricultural sector and study their implications for India.

ii. To study the Indian agricultural sector with respect to sugarcane cultivation.

iii. To study the national and international markets for sugar and to assess the position of India’s sugar industry in the global market.

iv. To study the sugar industry of Belgaum district in North Karnataka.

v. To assess the impact of WTO regulations on the sugar industry of Belgaum district.

vi. To assess the competitiveness of the sugar factories in Belgaum district, in terms of their ability to tap the global market.

vii. To determine the awareness and the level of knowledge among sugar industrialists of Belgaum district regarding WTO rules and regulations.

viii. To develop suitable strategies in order to enhance the export competitiveness of Belgaum district sugar industry, while meeting the demand of the domestic (Indian) market.
1.6 Hypotheses of the research study

Based on the literature review and in order to meet the objectives of the study, the following null and alternate hypotheses have been proposed.

**Null Hypotheses**

Ho) 1: Awareness level among the sugar industrialists of Belgaum district about the implications of the various provisions of WTO are very minimal.

Ho) 2: The sugar factories of Belgaum district are not competitive enough to tap the export market.

Ho) 3: The performance of the co-operative sugar mills of Belgaum district has deteriorated during post-implementation period of WTO regulations due to lack of competitiveness.

Ho) 4: The performance of the private sugar mills of Belgaum district has deteriorated during post-implementation period of WTO regulations due to lack of competitiveness.

Ho) 5: There has been no difference between the performance of the co-operative sugar mills and the private sugar mills of Belgaum district during the pre-implementation period of WTO regulations.

Ho) 6: The performance of private sugar mills, of Belgaum district, is better than that of co-operative sugar mills during the post-implementation period of WTO regulations.
Alternate Hypotheses

H1) 1: Awareness level among the sugar industrialists of Belgaum district about the implications of the various provisions of the WTO is high.

H1) 2: The sugar factories of Belgaum district are competitive enough to tap the export market.

H1) 3: The performance of the co-operative sugar mills of Belgaum district has not deteriorated during post-implementation period of WTO regulations.

H1) 4: The performance of the private sugar mills of Belgaum district has not deteriorated during post-implementation period of WTO regulations.

H1) 5: There has been a difference between the performance of the co-operative sugar mills and the private sugar mills of Belgaum district during the pre-implementation period of WTO regulations.

H1) 6: The performance of the private sugar mills, of Belgaum district, is worse than that of the co-operative sugar mills during the post-implementation period of WTO regulations.
1.7 Definitions of important terms

1. Ratoon: Ratoon means re-growth. It is the cane, which grows from the stools, left in the ground after crop has been harvested.

2. Competitiveness: Competitiveness is defined as the degree to which a country can, under free and fair market conditions, produce goods and services which meet the rest of the international markets, while simultaneously maintaining and expanding the real incomes of its people over the long term.

3. ICUMSA: ICUMSA is a short form of the expanded name of an organisation called The International Commission for Uniform Methods of Sugar Analysis. ICUMSA is a worldwide body, which brings together the activities of the National Committees for sugar analysis in over 30 countries. Very dark sugars can have ratings up to ICUMSA 4600, whereas the most refined white sugars have a low ICUMSA rating of 45.

4. OECD: OECD is an acronym for Organisation for Economic Co-operation and Development. It consists of the following countries, which are normally classified as developed countries, Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Mexico, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, UK and USA.
5. Special Safeguard Mechanism (SSM): A mechanism for developing countries to protect their domestic agriculture against import surges. The G-33 are the main proponents of the mechanism. It offers an important protection against dumped imports. The main opponents are agro-exporting countries including the U.S., Australia, New Zealand, Argentina, Chile and Uruguay.

6. Lome Convention: The Lome Convention is a cooperation programme between countries of the European Union and the countries of Africa, the Caribbean and the Pacific (ACP). It is based mainly on a system of tariff preferences which give those countries access to the European market and special funds which maintain price stability in agricultural products and mining products.

7. UPOV: UPOV is the Union for the Protection of New Varieties of Plants, an intergovernmental organisation based in Geneva, Switzerland. The UPOV Convention gives exclusive patent-like protection to corporate plant breeders. This means that companies like Monsanto and Novartis are allowed to extract fees from farmers and other breeders who want to use new seeds.

8. Export competitive: An industry is said to be export competitive if it produces the product for the foreign consumers at a price cheaper than the world export price.

9. Import competitive: An industry is import competitive if it produces the product for the domestic consumers at a price cheaper than the import price.
10. Cairns Group: A group formed in 1986 at Cairns, Australia. The group includes major food exporters from both developed and developing countries: Argentina, Australia, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Fiji, Guatemala, Indonesia, Malaysia, New Zealand, Paraguay, the Philippines, Thailand, South Africa, and Uruguay.

11. Tariffication: The process of converting all import restrictions that did not take the form of tariffs, such as quotas, into tariffs is called as tariffication.

12. Sui generis system: This is a Latin term which means "Of its own kind or class." There is a requirement for WTO Members to extend intellectual property protection (IPP) in agriculture by protecting improved varieties of plants either through an effective sui generis system of protection (the country’s own system), or by patents or both.

13. Compounded Annual Growth Rate (CAGR): The year over year growth rate applied to an investment or other part of a company's activities over a multiple-year period. \[ CAGR = \left( \frac{\text{Current Value}}{\text{Base Value}} \right)^{1/\text{number of years}} - 1. \]

14. Food Security: Food security is defined by FAO as the physical and economic access for all people at all times to enough food for an active, healthy life with no risk of losing such access and as such is directly connected with livelihood in the developing countries.
1.8 Sample design and research methodology

Sample Frame

The sample frame consists of all the working sugar factories in Belgaum district of North Karnataka at the time of conducting the survey.

The sugar factories in Belgaum district can be broadly categorized into co-operative sector sugar factories and private sector sugar factories. The sugar factories of Belgaum district that fall into the above-mentioned two categories are as listed below.

1. Co-operative sugar factories
   i. Shri Malaprabha Sahakari Sakkare Kharkhane Niyamit, M.K Hubli.
   ii. Shri Hiranyakeshi Sahakari Sakkare Kharkhane Niyamit, Sankeshwar
   iii. Shri Doodhaganga Sahakari Sakkare Kharkhane Niyamit, Chikodi.
   iv. The Krishna Sahakari Sakkare Kharkhane Niyamit, Athani
   v. Shri Halasidhanath Sahakari Sakkare Kharkhane Niyamit, Nipani.
   vi. Shri Bhagyalaxmi Sahakari Sakkare Kharkhane Niyamit, Khanapur.
The private sector sugar factories can be categorized as ‘private limited’ sugar factories and ‘public limited’ sugar factories.

a. Private sugar factories

   i. Shri Vishwanath Sugars, Bellad Bagewadi

   ii. Shri Venkateshwara Power Project Private Limited, Bedkihal.

   iii. The Athani Farmers Sugar Factory Limited, Athani.

b. Public Limited sugar factories

   i. The Ugar Sugar Works Limited, Ugar.

   ii. Shri Renuka Sugars Limited, Belgaum

Sampling Unit

The sampling unit for the research study is a sugar factory that is in operation.

Sample Design

The sample design of the research study is as given below.

Population: The total number of working sugar mills in Belgaum district are twelve (at the time of conducting the research survey)

Sample size: The researcher has chosen all the twelve working sugar mills in Belgaum district for the proposed study, which implies a census study.
Sources of Data Collection

For the research study both the primary and secondary data has been collected.

i. Primary data has been collected from the sugar mills by administering a structured questionnaire, through an interview schedule, with open ended, close ended, rank and multiple choice questions.

The questionnaire solicits information on the following broad areas viz. general company information, production, procurement, marketing, research and development, international sugar markets and developments and about WTO.

The questionnaire also contains a table for collecting data on relevant factors, which are mentioned below (point number 42 to 69), for the period 1995-96 to 2005-06, in order to conduct a quantitative analysis to assess the competitiveness of the Belgaum sugar industry to tap the global sugar market.

Secondary data has been collected by researching concerned books, journals, magazines, articles published, departmental publications, newspaper reports, internet, work of other researchers and discussions with the concerned persons in the fields of sugar sector and WTO.

Research methodology

The research methodology adopted for this study is survey research.
Data Analysis

From the literature review it is seen that there is wide scope to analyse the impact of the WTO regulations on the Indian agricultural sector in general and the sugar industry in particular.

To meet the requirements of the research objectives, the study focuses on analyzing the following information obtained from the primary and secondary data viz.,

1. Impact of the Agreement on Agriculture’s process of tariffication on the agricultural imports by India.
2. Impact on India’s farm sector due to tariff reduction.
3. Impact on India’s farm sector, due to imports, as a result of the minimum market access provisions.
4. Impact of WTO agreement on India’s Public Distribution System (PDS).
5. Impact of WTO agreement on India’s ability to follow her own agricultural policies and programmes.
6. Impact of WTO Agreement on Agriculture on domestic support / subsidies provided to our farm sector.
7. Impact of WTO Agreement on Agriculture on export subsidies provided to our farm sector.
8. Impact of WTO Agreement on Agriculture on the issue of food security.
9. Impact of the SPS and TBT norm of WTO Agreement on Agriculture
10. Perceived benefits for developing countries because of the WTO Agreement on Agriculture.

The study of the international sugar industry focuses on gathering the following information and assessing India's position as a player in the international global sugar trade viz.:

11. Sugar production among major producing countries.
12. Sugar consumption among major sugar-consuming countries.
14. Global trade in sugar, both raw and white.
15. World sugar production, consumption, exports, imports, ending stocks Country wise Sugar Production, Import, Export, Ending Stocks.
16. World sugar market trends and prospects
17. Future direction and development of the world sugar market.
18. Assessing the price competitiveness of Indian cane sugar in major importing markets.
The study of the Indian sugar industry focuses on gathering the following information:

19. The growth in installed capacity of sugar and the actual production during various plan periods.
20. Area under sugar cane, yield of sugar cane, production of sugar cane, number of factories in operation, working capacity, cane crushed, recovery, sugar production, duration and molasses production.
23. Sugarcane utilisation.
25. State-wise average duration of crushing season.
26. Comparison of per capita consumption of sugar in world and in India.
27. Size of the Indian sugar market.
28. The cyclical nature of Indian sugar industry.
29. Production, Consumption, Export and Import of Sugar.
32. SWOT analysis of the Indian sugar industry.
The study of the Karnataka sugar industry focuses on gathering the following information:

33. Sugarcane area, yield and varieties for cultivation.
34. Sugarcane crushing season
35. Crushing capacity, sugarcane crushed, sugar production and sugar recovery.
36. Average price realisation for sugar.
37. Statutory minimum price (SMP) for sugarcane.
38. List of sugar factories, both working and non-working, in Karnataka.
39. Number of sugar factories in each district.
40. New sugar factories under erection.
41. Performance of the sugar factories in Karnataka.

A comparison between the sugar industries of India, Brazil, European Union, Australia, Thailand and Belgaum district is done on the basis of the following factors of competitiveness. Also in order to assess the competitiveness of the Belgaum sugar industry to tap the global sugar market, a quantitative analysis is carried out by collecting data on the following factors of competitiveness for each sugar factory for the period 1995-96 to 2005-06.

42. Recovery rate (%).
43. Crushing period / season.
44. Average Crushing capacity (TCD).
45. Average number of crushing days in a year.
46. Cost of production per tonne of white sugar (US $).
47. Quality of refined sugar (ICUMSA).
48. Manufacture of raw sugar (for export).
49. Quality of raw sugar (ICUMSA).
50. Own factories in other countries.
51. Induced cyclicity.
52. Retail price of sugar per metric tonne (MT).
53. Export Price per MT of refined sugar.
54. Export Price per MT of raw sugar.
55. Sugar production in million metric tonnes.
56. Area under sugarcane (or beet) cultivation (million hectares).
57. Productivity of cane (or beet) cultivation (tonnes/ha).
58. Sugarcane (or beet) production (million tonnes).
59. Per capita consumption (kilograms per annum).
60. Type of sugar exported.
61. Percentage of World's total production.
62. Percentage of World's total exports.
63. Size of land holdings.
64. Dependence on exports compared to domestic market.
65. Exports as a percentage of total production.
66. Compounded Annual Growth Rate (CAGR) of production.
67. Percentage of world's consumption.
The qualitative analysis carried out for the Indian sugar industry can be generalized and applied to the Belgaum district sugar industry, as there are many common features between the Indian sugar industry in general and the Belgaum district sugar industry in particular.

Strategies for the Indian sugar industry (which are also applicable for the Belgaum district sugar industry) are developed based on the comparative SWOT analysis of India, Brazil, Australia, EU and Thailand, incorporating the impact of WTO regulations.
Methodology adopted for testing of hypotheses

Since the survey conducted, to collect the primary data, included all the operational sugar factories of Belgaum district (12 at the time of conducting the survey) i.e. the population or census survey, the hypotheses are tested by using the aggregate values or average values, of the parameters, that are applicable for the respective hypotheses. The data for the respective parameters are collected over a 11 year period from 1995-96 to 2005-06. The year 2000-01 was the year when the implementations of most of the WTO regulations were to be brought into force by the member countries. Hence the year 2000-01 is considered as the implementation year, the years 1995-96 to 1999-2000 have been called as the pre-implementation period and the years 2001-02 to 2005-06 have been called as the post implementation period.
1.9 Scope and limitations of the study

Scope of the study

The study assesses the impact of WTO regulations on the Indian agricultural sector at a macro level and at the micro level, an attempt is made to assess the competitiveness of the sugar mills located in Belgaum district of North Karnataka, in order to determine whether they are capable of tapping the export market, in light of the developments in the global sugar trade regime, as a consequence of the WTO regulations. Since there are variations in the climatic conditions, characteristics of sugarcane farming and characteristics of the sugar mills located in various parts of our country, all conclusions drawn may not be applicable to the sugar mills spread across the various states. However, broad conclusions can be drawn by all the sugar mills, in our country, while formulating strategies to tap the export market.

Limitations of the study

1. The study pertains to sugar industry in Belgaum district of North Karnataka.
2. The data solicited in the questionnaire, to assess the competitiveness of the Belgaum district sugar industry, is for the period of 1995-96 to 2005-06. Hence, any changes in the parameters of assessment that might have taken place after 2005-06 has not been incorporated.
3. Data could not be solicited from a sugar mill that was not in operation during the time of conducting the survey, even though it was in operation a few years prior to conducting the survey. This may affect the results of the analysis to some extent.
1.10 Chapter scheme

Chapter 1 deals with the Introduction and research design. The introduction, statement of the research problem, rationale for selection of the research problem, review of literature, objectives, hypotheses, definitions of important terms, sample design and research methodology, scope and limitations of the study are covered in this chapter.

Chapter 2 deals with the conceptual framework of WTO. The chapter covers the principles of trading system, reasons for emergence of WTO, agreements under WTO, relevant agreements/provisions related to agriculture, dispute settlement mechanism at WTO and the Singapore ministerial conference.

Chapter 3 discusses the impact of WTO regulations on Indian agriculture.

Chapter 4 titled, 'Sugar industry- An overview' is divided into three parts viz.:
4.1: Profile of the international sugar industry. Here an analysis of the top 20 sugar exporting and importing countries from 1994-2004 is carried out to assess India’s position as an exporter and importer of sugar.
4.2: Profile of the Indian sugar industry and
4.3: Profile of the Karnataka state sugar industry.

Chapter 5 focuses on the study area and profile of the Belgaum district sugar industry.
Chapter 6 provides a comparison between the sugar industry of India, Brazil, European Union, Thailand and Australia on factors of competitiveness.

Chapter 7 deals with the analysis of data. In this chapter, the following analysis is carried out viz.: Comparison of the performance of co-operative and private sugar factories in Belgaum district during the pre-implementation period and post-implementation period of WTO (7.1), PESTLE analysis of Indian, Brazilian, Australian, European Union and Thailand sugar industry (7.2), SWOT analysis of the sugar industry of India, Brazil, Australia, EU and Thailand (7.3) and assessing the competitiveness of the Indian sugar industry by applying Porter's Diamond model (7.4). The testing of hypotheses is carried out in part 7.5.

Chapter 8 elaborates the impact of WTO regulations on the sugar industry in Belgaum district of north Karnataka.

Chapter 9 contains the strategies evolved to enhance the export competitiveness of the Belgaum district sugar industry.

Chapter 10 deals with the findings of the research study.

Chapter 11 contains the suggestions, conclusions and scope for further research.

Bibliography
Annexure
Questionnaire