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"Horticulture in North Goa Problems and Prospects – A Geographical Analysis"

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Abstract
Goa is tiny emerald land situated well on the western coast of India known as Konkan. Agriculture is one of the major economic activities of the people of Goa, contributing about 9% to the state domestic product.In recent years agriculture is on a decline due to trends of urbanization affecting both horticulture and agriculture, diverting from primary to secondary as well as tertiary occupation. Hence there is need arises for promoting horticulture for the growth of the economy etc. Horticulture is a traditional occupation of Goa. The recent developments in industrial trading and commercial activities and tourism industry has enabled to study the growth of horticulture which provides a linkage between industrial and commercial activities eventually leading to the development of the state's economy. "*Horticulture in North Goa Problems and Prospects – A Geographical Analysis'*This topic will enable me to have greater emphasis on the detail study of horticulture and other aspects in North Goa.

Keywords: Horticulture, Economic activity, Prospects, traditional occupation, urbanization,

INTRODUCTION:
The country as well as Goa possesses diversified soil and climatic condition and holds a pride place with regard to the production of tropic to temperate fruits. The area under fruit and vegetable cultivation in India is increasing, therefore; there is an increase in fruit and vegetable production. The **word horticulture** comes from the **Latin** word **'hortus'** which means garden and horticulture includes the art and science of gardening. Most horticultural crops were originally grown in gardens. Today, they are raised commercially in farms, orchards, greenhouses and nurseries.Horticultural crops also play a unique role in India's economy by improving the income of rural people. Cultivation of these crops is labour intensive and as such they generate a lot of employment opportunities for the rural population.

REVIEW OF LITERATURE:
S. A. Sujata (2008) in her paper" Concept and strategies of sustainable Agriculture" sustainable Agriculture development is not only a responsibility, if any individual but also it is the responsibility of the govt. The central govt. Has to declare at alternative models as the official policy for agriculture. The need for wide spread training, the promotion of better cooperation among farmers both within and between communities and reneval of the rural areas. Sustainable agriculture needs more than new technologies and practices.

G. Rajalakshmi, (2009) in her paper" Sustained Growth in Agriculture, Innovation and Diversification. States, The productivity enchancement plays key role in bringing about a turnaround in the dismal agricultural scenario. This calls for steps like technology up gradation, education and implementation, better organization in the form of public partnership and contract farming. Encouraging diversified activities like livestock keeping, poultry, aquaculture

Dr. Satya sundaram (2005) in his research paper" Areca nut A promising commercial crop."India ranks first in the world in cultivation and production of areca nuts. It is also the largest consumer of areca nuts. Around six million people are engaged in production processing

and marketing of areca nuts it is estimated that small and marginal farmers hold around 85% of the area under areca nut.

Dr .M THAMRAIKANAN G PALANIAPPAN AND S DHARMALINGAM, (2009) in his paper *"Can we Reclaim Top Spot in card mom exports"?*

India was the world's largest exporter of card mom till 1985, However ,recently Gaute mala emerged as the a major competitor to India card mom. We can reclaim our status for sure, provided the government steps up support to the card mom growers.

Study area-North Goa:

There are 6 talukas in North Goa namely Pernem , Bardez, Bicholim, Sattari, Tiswadi and Ponda . Its has a total geographical area of 1736 Sq. Kms having 213 villages and 27 towns. Panaji is the Headquarters of North Goa. The population of North Goa is 758573 as per the 2001 census survey. The density per Sq. Km is 437. In North Goa the annual rainfall is 3188 mm and actual rainfall is 2809.9 mm.

The following table below shows the geographical area of each taluka in North Goa

Table -1

Taluka	Pernem	Bardez	Bicholim	Satari	Tiswadi	Ponda
Area(Sq,Kms)	251.69	263.97	238.80	489.46	213.57	292.78

Source: Directorate of Agriculture, Government of Goa(2009)

Objectives of the Study and Research Methodology

The following are the various objectives undertaken for study:

- To study the factors influencing horticulture in North Goa
- To evaluate the growth of horticulture in North Goa
- To deal with the impacts of horticulture development in North Goa
- To deal with the necessary easures to resolve various problems of horticulture.

Sources of Data:

The necessary information i.e. secondary data is obtained from the Directorate of Agriculture, Government of Goa. and zonal agricultural offices. Primary data through questionnaire, journals, magazines. Books etc. The data has been analyzed and interpreted with the help of necessary statistical techniques.

Hypothesis:

1) That the Horticulture potentialities is the outcome of the nature with physical setting rather than socio economic causes of the region.

2) That the Horticulture activities developed not only for the physical setting but also for socio economic needs of the people.

3) The planning for the Horticulture activities not only prosperity of the farming community but also related to the development of the region.

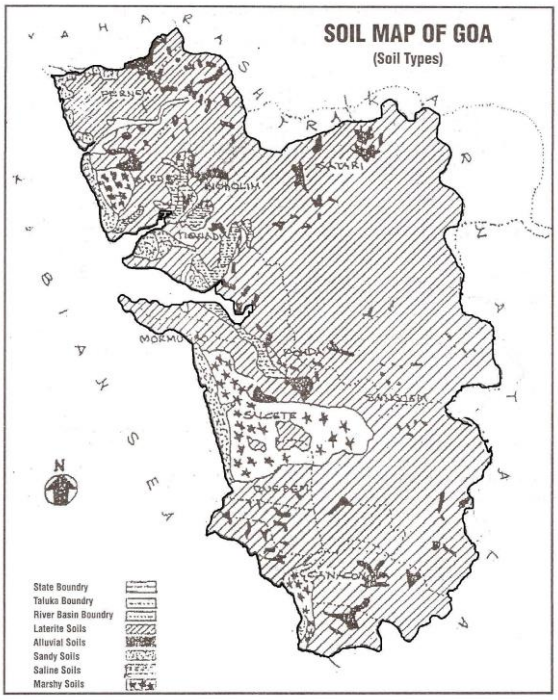
Factors Influencing Horticulture In North Goa

Some of the factors the influence horticulture to a large extent are: Natural, Economic, Political And Social/Religious Factors:

Natural Factors:

The natural factors that affect horticulture are:

- **Soil**



Map 1: Source :(Regional plan of Goa-2001)

Goa has a mostly laterite soil (81%). they are sandy loams to slit loams in texture, well drained and highly acidic. These soils have moderate organic carbon but are poor in phosphorus and on the basis of topography andfertility of the soil land is classified into:

a) Khazan lands:
It consists of low lying areas often below sea level, along the estuaries. this land is used for monsoon paddy crops followed by rabi vegetables.

b) Kher land:
This is flat land at low elevation above sea level and having a high water table.aerable sandy to sandy loam are fit for multiple cropping through irrigation.

c) Morod land:
It refers to upland or traced fields suitable for horticulture crops or single rainfall crop of rice.

- **Climate**: Goa receives rain from the southwest monsoons. the average rainfall is 2777mm. Goa experiences warm and humid tropical climate. The summer temperature ranges from 24°C to 36°C and in winter the mercury lowers between 21°C to 30°C. The turnout of moisture required by crops varies directly with the amount of heat received by the area where they are grown..
- **Topography**: Mountainous regions also present difficulties of tilling and transportation. Plain surfaces are most suitable for horticulture. They contain rich and fertile soil. Plains also support dense population which provides cheap labour for horticulture. Even the plains, river-deltas are suitable for horticultural processes.
- **Fertilizers -**For increasing crops manures and fertilizers have to be applied regularly to soils..

There are major economic factors which have an influence on horticulture. Some of them are as follows:

- **Market** Majority of Goans were engaged in agriculture from the ancient times till the last decade of the 20th century. During the last 15 years, Goan horticulture underwent a considerable change and to much extend it was also affected by the current economic changes and also because

of various trends chosen by the Goan people. Most of horticulture in Goa is carried out in rural areas which are away from the main market. This makes it very difficult for the horticulturist to incur the expenses marked out towards the growth of various horticultural products.

Transportation Facilities-Transportation factor plays a vital role in boosting the horticulture activities

- **Capital-** Modern horticulture is done with the help of costly machinery and equipment. the land has to be constantly provided with costly chemical fertilizers. All this involves large capital.
- **Labour-**Labour supply determines the type and character of horticulture. It requires a skilled and adequate supply of labour. It also determines the timely horticultural processes. Neighboring states of Goa other states of India with dense population provides cheap labor for horticulture and agricultural purposes.

Political factors-Government policies regarding land holdings also affect the horticultural practices . The table given below shows the land use pattern of North Goa .Directorate planning and statistics, Panaji- GoaThe development of horticulture under area of cultivation can be understood better in the form of table and graph shown below.Development of area under horticulture cultivation in North Goa

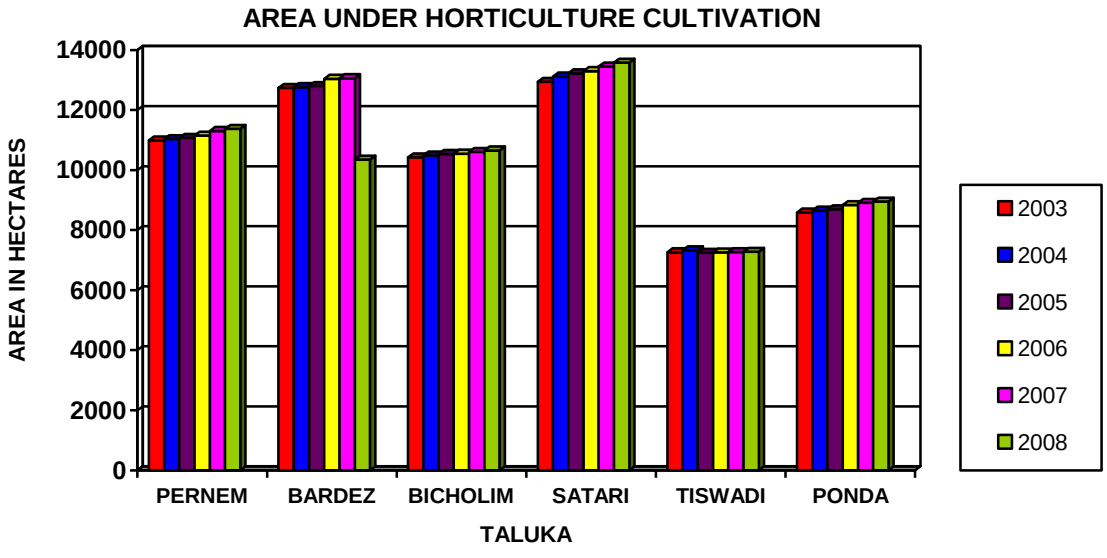
Table :2

Area in hectares

TALUKA	2003	2004	2005	2006	2007	2008
PERNEM	10987	11035	11075	11150	11302	11374
BARDEZ	12735	12765	12803	13041	13065	10346
BICHOLIM	10423	10485	10537	10548	10605	10654
SATARI	12941	13118	13224	13298	13453	13581
TISWADI	7261	7324	7243	7255	7263	7275
PONDA	8584	8649	8691	8832	8906	8954

Source: Directorate of Agriculture, Government of Goa(2009)

Fig-1



Above graphs shows the area under horticulture cultivation in 6 talukas.We have seen that talukas namely Pernem, Bicholim, Satari, Ponda shown increasing trend every years, except Tiswadi which came down in the year 2005 and Bardez in which area under cultivation decreased in the year 2008.

Development of area under mango/banana/pineapple cultivation in North Goa

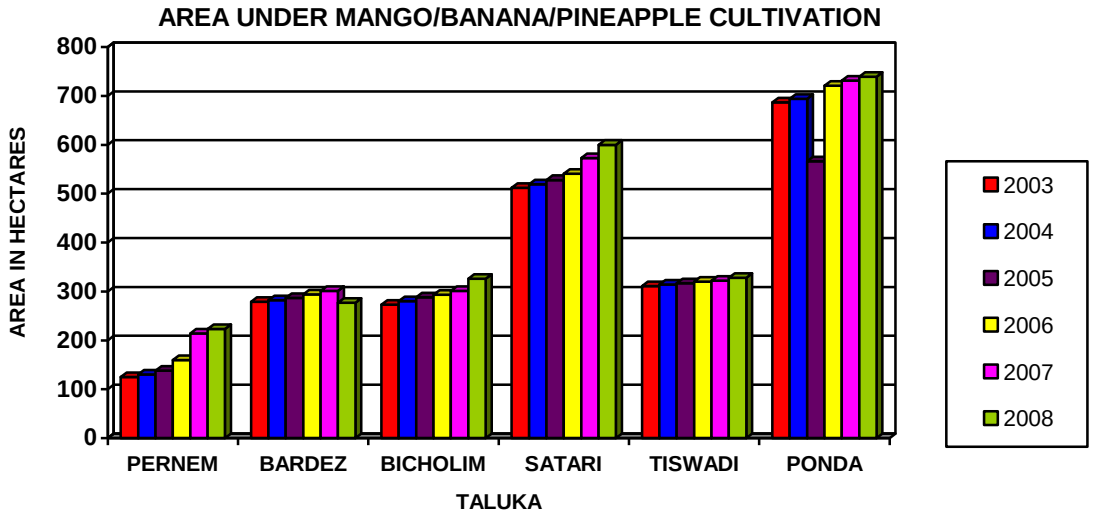
Table-3

Area in hectares

TALUKA	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*
PERNEM	*125*	*130*	*138*	*160*	*214*	*223*
BARDEZ	*279*	*282*	*287*	*294*	*301*	*277*
BICHOLIM	*273*	*280*	*288*	*293*	*301*	*326*
SATARI	*512*	*519*	*528*	*541*	*573*	*600*
TISWADI	*311*	*314*	*317*	*320*	*322*	*328*
PONDA	*687*	*694*	*566*	*721*	*731*	*739*

Source: Directorate of Agriculture, Government of Goa

Fig-2



Above graph shows that area under Mango,Banana.Pineapple cultivation for last 6 years.
Out of all talukas Ponda taluka has maximum area.Except Bardez and Ponda rest all talukas show either constant or increasing trend.

Development of area under other fruit crops cultivation in North Goa

Table -4

Area in hectares

TALUKA	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*
PERNEM	*208*	*210*	*212*	*217*	*222*	*223*
BARDEZ	*254*	*255*	*256*	*257*	*259*	*277*
BICHOLIM	*359*	*361*	*361*	*361*	*362*	*326*
SATARI	*494*	*498*	*500*	*506*	*506*	*600*
TISWADI	*211*	*212*	*212*	*212*	*212*	*328*
PONDA	*563*	*565*	*566*	*584*	*588*	*739*

Source: Directorate of Agriculture, Government of Goa

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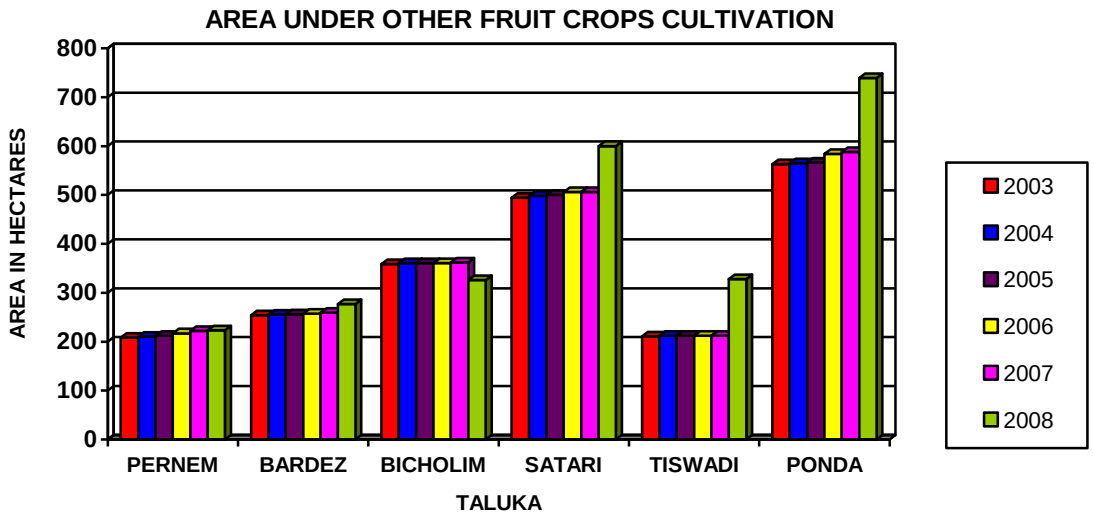
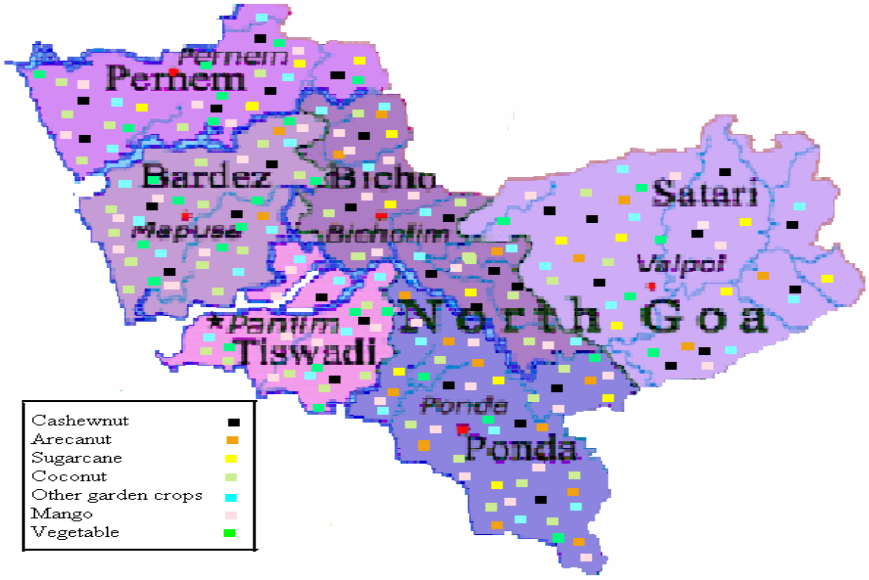
Fig-3



The above graph reveals the maximum area under other fruits crops cultivation is in Ponda followed by Satari, Bicholim, Bardez, Pernem and Tiswadi.
We found that for last 5 years that is from 2003-2007 areas under fruit crop. Cultivation was almost constant according to talukas but in the year 2008 talukas namely Satari, Tiswadi and Ponda have shown tremendous increase in area.

PRODUCTION OF SELECT HORTICULTURAL CROPS – MAP-2- NORTH GOA- SOURCE- Dir of Agri.
With an increase in area under cultivation there has been a tremendous change in the level of production. The production depends on various factors including rainfall, soil use of fertilizers, etc. Production of some of the main crops grown in Goa is shown.

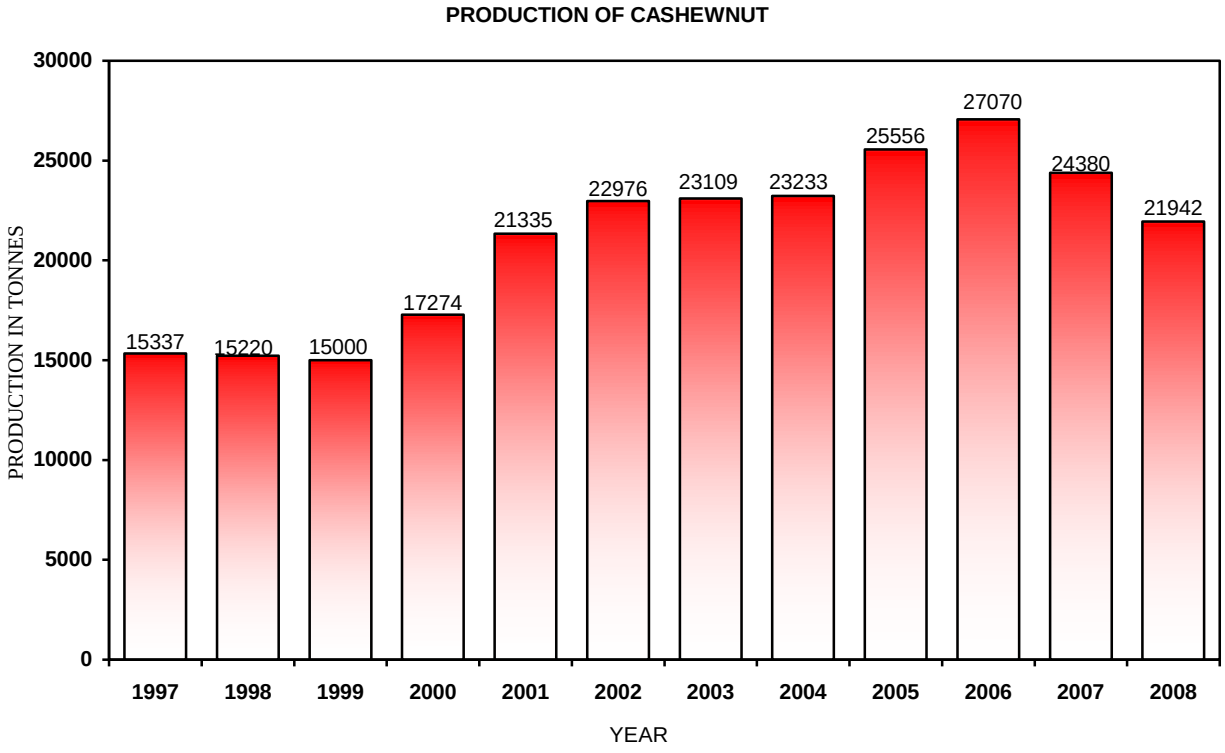


CASHEWNUT IN GOA-Table -5

YEAR	1997	1998	1999	2000	2001	2002
PRODUCTION(tonnes)	15337	15220	15000	17274	21335	22976

YEAR	2003	2004	2005	2006	2007	2008
PRODUCTION(tonnes)	23109	23233	25556	27070	24380	21942

Source: Directorate Of Agriculture, Government of Goa-2009
In the above table, production of cashew nut has been shown for the past 12 years. We have seen that a decade ago production was comparatively low as compared to the recent years. Production yield was maximum in the period 2005-2006, and then led to a decline in the following year. We have also noticed that there was a gradual increase in production over the years until 2005 where the production fell 3 year low. The current status of production of cashew nut is on a decline. Fig-4



Coconut in Goa:

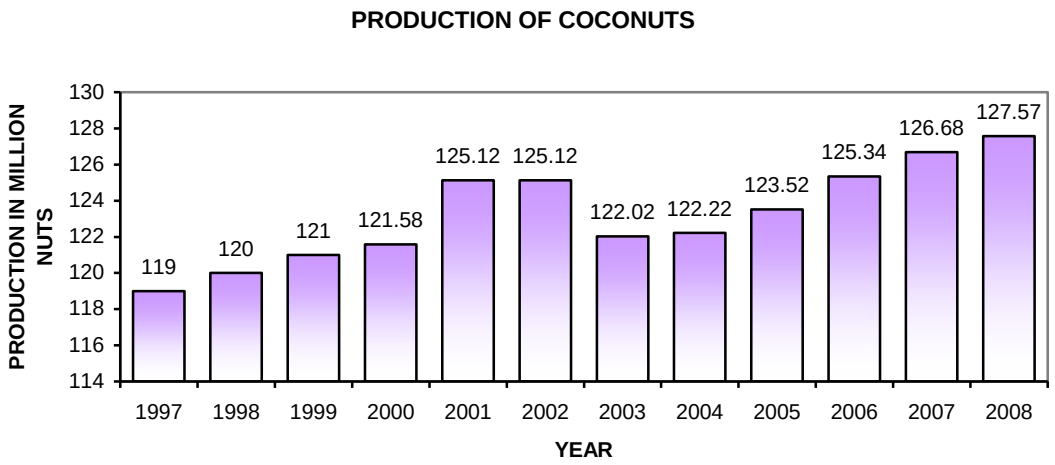
Table -6

YEAR	1997	1998	1999	2000	2001	2002
PRODUCTION (million nuts)	119.00	120.00	121.00	121.58	125.12	125.12
YEAR	2003	2004	2005	2006	2007	2008
PRODUCTION (million nuts)	122.02	122.22	123.52	125.34	126.68	127.57

Source: Directorate Of Agriculture, Government of Goa

The above table shows the production of coconuts in Goa during the last 12 years. It has been a very unevenly distributed journey of the production of coconuts in the state. During the last decade the yield was very low with a production of 119million nuts as compared to the current production of 127.57million nuts. There was a steady increase in production with a sudden increase during the period 2000-2002. And then a decline in the following year. Since then, there has been an increase in the production of coconuts with the current production being the maximum in the last 12 years.

The following is the graphical representation of production of coconuts in Goa.Fig-5



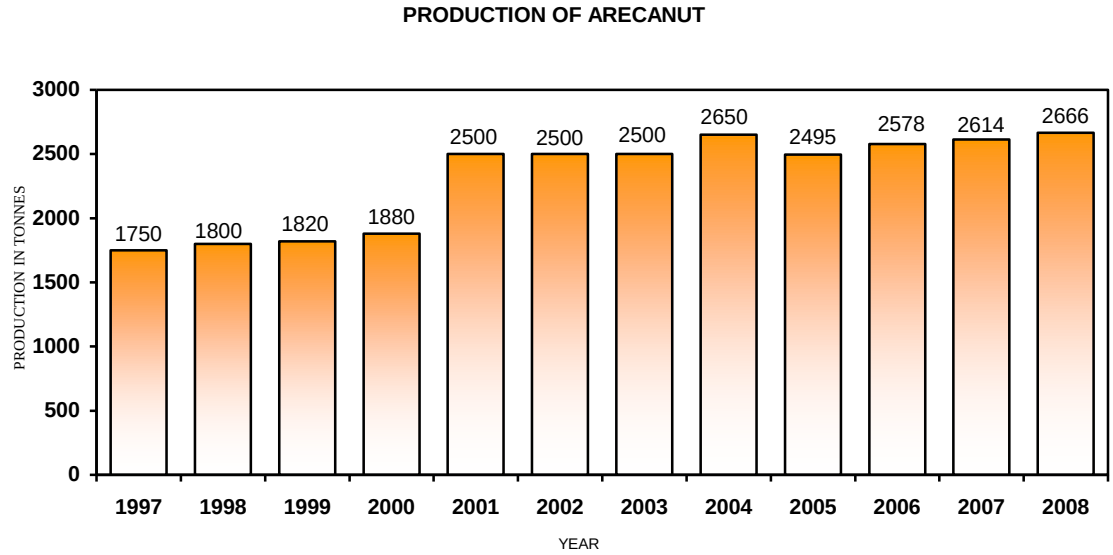
Arecanut in Goa.:

Table :5

YEAR	1997	1998	1999	2000	2001	2002
PRODUCTION(tonnes)	1750	1800	1820	1880	2500	2500

YEAR	2003	2004	2005	2006	2007	2008
PRODUCTION(tonnes)	2500	2650	2495	2578	2614	2666

Source: Directorate Of Agriculture, Government of Goa**.** In the above table, it shows the production of Areca nut for the past 12 years. We found that there was a steady growth of Areca nut for first 6 years. Then in the year 2005, it has declined by small margin and again there was an increase in the production for the remaining 3 years. Fig-6

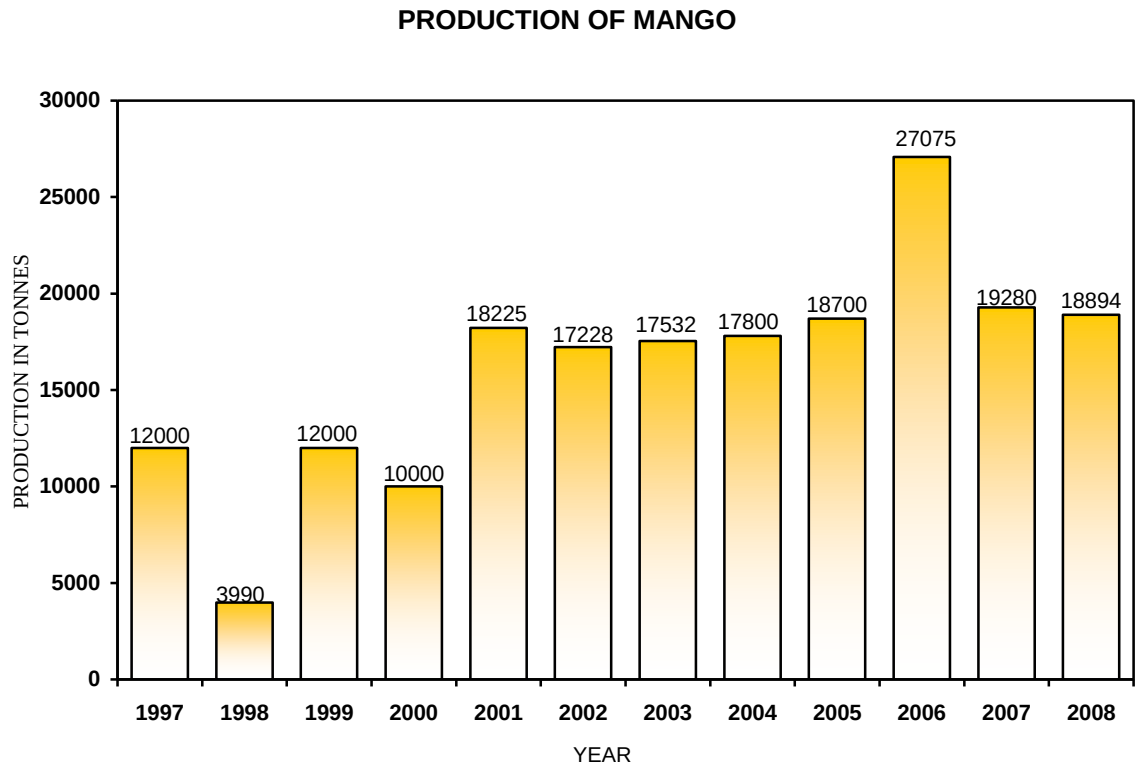


. Mango in Goa. – Table-6 Source: Directorate Of Agriculture, Government of Goa

YEAR	1997	1998	1999	2000	2001	2002
PRODUCTION(tonnes)	12000	3990	12000	10000	18225	17228

YEAR	2003	2004	2005	2006	2007	2008
PRODUCTION(tonnes)	17532	17800	18700	27075	19280	18894

The above table shows the production of mango in Goa during the last 12 years. The record shows that there was an uneven production of mango for last 12 years. In the years 2006 production was maximum. Fig-6



Economic significance of Major horticulture crops:

Mango

The rate of mango depends on the variety and on the peak period or seasonal varieties like in the case of '*mankurat'*- the king of mango cost about Rs. 1000-Rs 1200 a dozen especially this year. Sometimes the rate may differ depending on productivity.

Banana:

Different varieties of banana cost different rates like the more mondolichi rates between Rs. 60-Rs. 80 whereas rarely found velchi variety cost about Rs. 18 – Rs 20 per dozen

Coconut:

The benaulim variety of coconut produces around 80-110 nuts per year per tree which rates at Rs.10per coconut.while the other variety is the calangute variety which produces 70-90 nuts per year per tree which rates at Rs. 12- Rs. 15 per nut .

Cashew:

Cashew seed rates from Rs. 50- Rs. 60 per Kg. each cashew tree produces about 8 – 10 Kgs of nuts and the alcohol such as feni is distilled from the juice of cashew. This gives about 22-24 litres of alcohol which rates at Rs.1000- Rs.1500 per gallon.

The other significance of horticultural products is mentioned below:
Horticulture produce have so many products which can be used in many ways. Some of them are mentioned below:

Cashew:
Cashew nut, nectar is removed from juice, liquor. The kernels extracted from nuts are often consumed as such are used in confectionery items and various kinds of dishes. The kernel oil of pale yellow color is used in pharmaceutical and cosmetic industries. Cashew nut shell liquid extracted from its shell has many industrial application for making paints, resins, flame, etc. The cashew apple, the Pseudo fruit is rich in vitamin c it is used to curve scurvy, diarrhea, etc.

Coconut:
Coconut is the most versatile among the world 2700 species of palms. It provides ropes, floor mats, mattresses and brushes are made from coir obtained from coconut husk. The kennel is used for curries or dried copra to extract edible and industrial oils. The oil cake is used as cattle feed. The coconut water is a natural food which is protein rich in milk, tender coconut water. Its trunk is used as timber fibre, roofing while the stump and apex can be used as fire fuel. The mid rubs are used to make brooms while the leaves are used as thatch. Coconut is also used to make sweet dishes and different showpieces are made out of the shell.

Arecanut;
Arecanut is an important crop grown for its kennel. The kennel is used in tender ripped and processed forms. Chewing of arecanut increases production of saliva and gastric juices, thus aiding in digestion. It is also an appetizer and stimulant. In addition to this, it is also used for treatment of leucoderma, cough, fits, worms, anemia and obesity. It is also used as a purgative and in ointment along with other ingredients for the treatment of nasal ulcers.

Mango:
It is known for its delicious taste and high vitamin content.The fruit besides consumption is also processed in jams, syrup, pickles, sweet products, soft drinks, canned products.

Banana:
Banana has good nutritional and medicinal value and is very rich in proteins and carbohydrates. It is also further processed and used as wafer, papad, and also as a sweet dish. The dry powder of banana is used for babies.

Pineapple:
Pineapple is mostly flavoured for its juicy pulp which is canned or preserved as jams. It is also used as Nectar, squash, halva, etc

Kokum:
A drink made out of Bhirand (solam) is an integral part of lunch of the konkan region including Goa. It has many medicinal properties and aids digestion. Highly saturated oil can be extracted from kokum seeds. It is white in colour known as bindle in Goa (and Goa butter elsewhere). This oil has medicinal value specially in relieving muscular pains. Kokum is also processed into syrup, solam, kokum wax.

Cardamon:
Popularly known as chhoti elaichi, cardamom is an aromatic spice commonly used in Indian curries, gravies and desserts. It has a sharp and stimulating flavour. Sprinkle some on your coffee and it's sure to act as a great aphrodisiac. Cardamon helps counter stomach acidity. It generates appetite,

aids nausea and cures halitosis or bad breath. Its fragrant seed also contains certain oils that help stimulate digestion and relieves flatulence.

Cinnamon:
A common ingredient in toothpaste, mouthwashes and chewing gum, Cinnamon works best to strengthen and clean your teeth with its anti-bacterial qualities. Cinnamon has health-boosting compounds including eugenol, and therefore can be used as a quick pain reliever. A good dose of cinnamon in your diet will provide calcium and fibre to your body. Useful for improving blood circulation and memory, cinnamon also has blood-thinning properties.

Cumin:
Popularly known as jeera, the flavourful cumin is an essential ingredient in the kitchen. Traditionally used in cooking curries, stews and breads, it acts as a good source of iron that strengthens immunity. Cumin can be used to cure dyspeptic headaches, nausea, morning sickness, flatulence and many other stomach disorders. It relieves pain and cramping in the abdomen (also acting as an antispasmodic) and alleviates abdominal bloating and distention. Its antiseptic properties cure sore throat. It is also widely used in ayurvedic medicine to improve liver function and boost metabolism.

Pepper:
A mainstay in most soups and main course dishes around the world, pepper is one of the tastiest spices in our kitchen. Most ayurveda medicines use a certain amount of pepper as it has tremendous antioxidant and anti-bacterial properties. It improves digestion, wipes out worms, treats coughs & colds, sinusitis, heart problems, colic, diabetes, anaemia and piles. It also has anti-fever properties, so a peppery soup on a feverish night is best prescribed. Chewing raw pepper reduces throat inflammation. Similarly, pepper oils cure scalp infection or insect's bites.

Bay Leaf:
Unlike other species, bay leaves have medicinal properties that help cure external infection and skin diseases. They have a strong and distinctive fragrance so, keep some in your grain jar to keep the bugs away. The best medicine for insect's bites or minor cuts would application of bay leaf paste. In case you experience muscular soreness, massage bay leaf oil to enhance blood circulation. The essential oil also has antibacterial and antifungal properties that can cure dandruff. A regular intake of these leaves in your diet cures cold and urinary infection.

PROBLEMS OF COMMERCIAL HORTICULTURE
The major reason of people to shy away from agriculture is because of various difficulties faced while practicing farming activity. Some of the major problems faced are:

i] Poor irrigation facilities
Goan farmers have to depend upon the rainfall to sow their seeds. Late arrivals of monsoons leave the farmers helpless who are forced to sow late and get a low yield. Many a times rainfall is not certain, it leaves a drought for at least a month and the crops grown withers. Though the farmers try to save their crop by use of water from storage tanks, wells, springs, etc. it is not sufficient and is more costly.

ii] Poor drainage system
Goa has a poor drainage system. This is because of increase in residential areas, buildings, dumping of mud and rubbles in unwanted areas, widening of roads, etc. as such rain water gets clogged and remains in the field instead of rushing into the sea. As a result of this farmers do not cultivate this land as they find that improving the drainage system would cost him a big amount, which he cannot afford and prefers to keep it fallow. Many such fields are seen in Saligao, Mapusa, Panaji and other areas in North Goa.

iii] Use of agricultural land for non agricultural purposes

Diversion of highly productive irrigated land to non agriculture uses such industry, housing, etc., especially at rural-urban interface needs to be viewed seriously. Many a times fertile lands is used to build highways, hotels, bus stands, market places restaurants, buildings, sports stadiums, etc. this makes the agriculture land all the more scarce. Some of the examples are construction of KTC bus stands at Mapusa, Panaji, Ponda, tourist's hostels in various places and many other constructions in North Goa.

iv]Transportation cost

Due to a hike in petroleum prices in April 2008, farmers find it difficult to transport their products into the market as they incur an extra cost burden. Sometimes they also need to travel over large distances to buy quality seeds and sell their produce.

v]High labor cost

Nowadays, agricultural labour demand Rs.150 to Rs.250 per day to work in the fields. Manual labor is absolutely necessary as the farmers cannot afford to purchase expensive tractors and automatic machinery available in the market and are forced to employ this expensive labor. However, Government gives tractors and weed cutters on subsidy. But some farmers are not fortunate to get this benefit as the tractors available are in short supply during the peak season or there are breakdowns which force the farmer to seek manual laborers.

vi]Tourism And Industry

Agriculture provides employment on a seasonal basis. Moreover income earned by way of agriculture is very low as compared to ther nonagricultural occupations. Many farmers hence find employment in the tourism and hotel industry which has a more attractive income. Industry provides the laborers with regular employment and various benefits like TA, DA, Leave Holiday, Medicinal allowances, etc. so there is a turnover of agricultural labor to non agricultural purposes.

vii]Poor speed of legal disputes in courts

Court takes a long time to settle legal disputes of the farmers and they do not follow rule properly. Hence till the case is over the land will remain idle without any production.

viii]Lack of co-operative movement between farmers and also between the departments

There is no cooperation between farmers. Different farmers own the land and make good profit but they try to compete with each other and they fight among themselves.

Also where the Departments are concerned they lack cooperation between various Departments, Government agencies, financial institution, administrators, etc.

ix] Erratic pattern of monsoon or season

Most of the farmers depend on monsoon. Monsoon is not arriving at regular intervals and hence the production of crop suffers. Sometimes rains start early or late or even prolonged rains which damage the crops.

x] Lack of knowledge with regard to cattle menace

Crops are damaged due to cattle menace and other animals and birds. They either eat or destroy and damage the crop. It is not possible to prevent the animals entering the crop area at all the times nor can we kill them.

xi] Unfriendly schemes

If a farmer wants to cultivate any crop, say cashews, he has to first approach the Employment Guarantee Scheme which gives finance to dig pits. He has then to apply for Central Scheme for irrigation facilities. Further the supply of plants and pesticides is given by Avid Zone Programmes.

A farmer who is uneducated is afraid of the paper work involved in it and because of this complex nature, no farmer wants to avail these schemes. Only the educated or well to do farmers who have some influence with the authority get these facilities very easily. Thus, the rich get richer and the poor become poorer.

xii] Non availability of quality seeds

Good or high yield quality seeds are not available in Goa; hence, the farmers have to travel all the way to Belgaum to purchase quality seeds. Seeds are provided by the Government but not always of good quality. So the farmers prefer to purchase the seeds in bulk from outside the state.

xiii] The nature of present youth

The unwilling nature of present youth to take up horticulture related ventures is adversely affecting the horticulture sector. Every educated person tries to seek white collared jobs (officers). They do not want to take agricultural jobs and hence it difficult to find people working for the production of horticulture.

MEASURES TO SOLVE HORTICULTURAL PROBLEMS

Fruits

- The productivity will have to be increased to the level of 15 tonnes/ha by the end of the X Plan through measures like production and distribution of improved seeds & planting material, rejuvenation of senile orchards, judicious use of natural resources like land, water and light, integrated pest management, mechanization of farm operations, disease surveillance, plant health clinics etc. Assistance for these activities will have to be extended to the public as well as private sector.
- Emphasis has to be given to minimize the cost of production by improving productivity and wasteful expenditure for maximizing the income from existing orchards. Special emphasis should be given on proper irrigation and drainage of areas under fruit crops. Area expansion by promoting use of wasteland and dry-land for growing suitable fruit crops.
- Proper research support is needed for identification/promotion of cultivation of native under exploited fruits of commerce, management of problematic diseases like malformation, alternate bearing, spongy tissue of mango, decline in citrus, wilt in guava etc.
- Research is needed to develop fool proof leaf analysis standards and setting up of at least a state level fully equipped plant health clinic and tissue nutrient analysis laboratory for fruits crops, in each state.
- Quality improvement, product diversification/ value addition will also have to be encouraged.
- Special efforts are needed for promoting organic fruit cultivation for reducing the cost of cultivation and to catch up global market of organic products. To achieve this adoption of vermiculture, bio-fertilizers, mycorrhiza and FYM /compost/enriched compost need to be promoted.
- There is vast scope of increasing production of a variety of nut crops,
- Special efforts are needed for data base management of fruits i.e. area, production, exports, etc.
- Promotion of frontier technologies (Hi-Tech horticulture) like high-density planting, use of micro-irrigation, fertilization, integrated nutrient pest and disease management for improving productivity with some kind of assistance to the growers needs emphasis.
- Training programmes for the farmers to educate them about the efficacy of improved/ modern techniques for increasing productivity and quality maintenance have to be taken up.
- Assistance for technology dissemination through demonstrations, training of farmers, publicity through print and electronic media, use of Information Technology will have to be continued.

Findings and suggestions: The following are the important facts found in primary survey report

Majority of the talukas are specializing in production of gardening crops like cashew nut, coconut and areca nut.

- The area under cultivation of cashew and coconut has been increasing over the years due to high yielding varieties of grafts and better irrigational facilities.

- Most of the farmers are ancestral, practicing agriculture over a longer period of time and land holdings are small.
- Rich farmers are getting maximum benefits from state government while the poor farmers are neglected. Goa Government is encouraging only rich farmers for increasing their productivity as there exist a lot of formalities to avail the schemes. And most of the farmers are not educated
- Most of the farmers complained against government for unnecessary delay in providing farming incentives.
- It has been observed specially in Tiswadi taluka area under cultivation goes on declining every year due to development of infrastructure.
- Majority of farmers are using traditional agricultural equipments with the exception of few wealthy modern farmers.
- Majority of farmers are facing problem of scarce and costly labour in all the talukas and other problems such as cattle, disease caused by insects and lack of proper practices and irrigational facilities.
- No youths are interested in continuing this activity as other occupation rewarded them in a better manner.

An important point may be reviewed that most of the farmers earn an excellent income on their horticulture produce. The following are the appropriate measures have been taken to tackle the various problems of horticulture crops in North Goa**:**

Fruits: training programme for the farmers to educate them about the efficiency of improved/modern techniques.

Vegetables crops: here is need for developing and integrated approach for production and availability of fresh and vegetables for a longer period.

Spices: farmers need to be motivated and It leads to high production and better export demand.

Medicinal and Areca nut: incidence of diseases like yellow leaf and lack of irrigation facilities.

Oil palm: poor water management in the palm growing and maintenance of seed gardens.

Cashew nut: increasing level of sensitivity of the existing plantation and poor management of pests. And **Infrastructure** for horticulture: emphasis should be laid on increasing production by providing technical and financial support. The Government play a vital role in promoting horticulture The Government of Goa has taken keen interest in developmental programmes to boost agriculture with regard to soil & water conservation, use of organic manure and bio-gas, providing fertilizers and seeds at subsidized rates.

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