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Vol II

1275

AGRICULTURAL EXPORT FROM INDIA

By

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(2001-11-34)

M.Sc.Agricultural Economics

SEMINAR REPORT

Submitted in partial fulfillment for the requirement of the course no:
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ABSTRACT

The share of agriculture and sectors in India's GDP has fallen from 42.3% in 1970-70 to 35.7% in 1980-81 and then to 24% in 2000-01. But more than 70% of Indian population still depends on the agricultural sector directly or indirectly. Hence the performance of the agricultural sector is very important in the economic scenario of India (Dattatreya, M. 2001).

Agricultural export earnings in India shows an increasing trend over the years but the share of agricultural export earnings to the total export has declined from 44.2% in 1960-61 to 14.0% in 2000-01. In the global scene India does not occupy an important position in the trade of agricultural commodities. Its share is only around one percentage. These resultant consequences are hence indicative of India's losing importance in agricultural export front.

The agricultural export basket constitutes about 13 commodities of which of which the most important seven commodities will be discussed in detail. In quantity the major commodities are oil cake, rice, sugar & molasses, fish & fish preparations and spices where as in value terms they are fish & fish preparations, rice, oil cake, tea and cashew. The export performances of these seven commodities with respect to quantity, export earnings and relative share to the total agricultural export in value terms are discussed here. The major destinations of export and major competitors are also specified.

Commodities such as tea, sugar & molasses, cashew and spices were once the most important commodities in the export basket but now their relative share to the total agricultural export in value terms has declined to fourth, twelfth, fifth and sixth positions respectively. But on the contrary fish & fish preparations, rice and oil cake emerged as the major commodities in percentage share. Upto 1960-61 we were an importer of rice and only in 1970-71 rice figured in the export basket. But by 2000-01 rice has emerged as the second largest commodities both in terms of quantity exported and export earnings. The reason for the change in the composition of the export basket is to be further explored in depth and appropriate steps are to be streamlined to promote India's agricultural export.

AGRICULTURAL EXPORT FROM INDIA

Introduction

Agriculture is the backbone of Indian economy. So the contribution of the agricultural sector to the Indian economy is very important. The share of agriculture and allied activities in India's GDP has fallen from 42.3% in 1970-71 to 35.7% in 1980-81 and even further to 24% in 2000-01. At the same time 70% of the Indian population still continues to depend on the agricultural sector directly or indirectly. (Banik, 2001) This implies that agricultural growth has a wider direct impact across India, compared to the trickled down effect from growth in the secondary and tertiary sectors. Hence the performance of agricultural sector with respect to production and export is very important in the economic scenario of India. (Dattetreyula, 2001)

Agricultural export from India

India's agricultural exports has increased from US \$ 3.5 billion in 1990-91, to US \$ 6 billion in 2000-01, which implies a 71.4% increase in the period. In the same period India's total exports has increased by 145 %. (Economic Survey, 2002)

The total exports in value terms has increased 33 fold in 2001 compared to 1960. The share of agricultural exports has declined from 44.2% in 1960 to 31.7 % in 1970 to 30.7 % in 1980 to 19.7% in 1990 and touched the lowest level in 2000-01 i.e. 14 %. These results indicate that agriculture is losing its importance in exports. (Kumara, 2001)

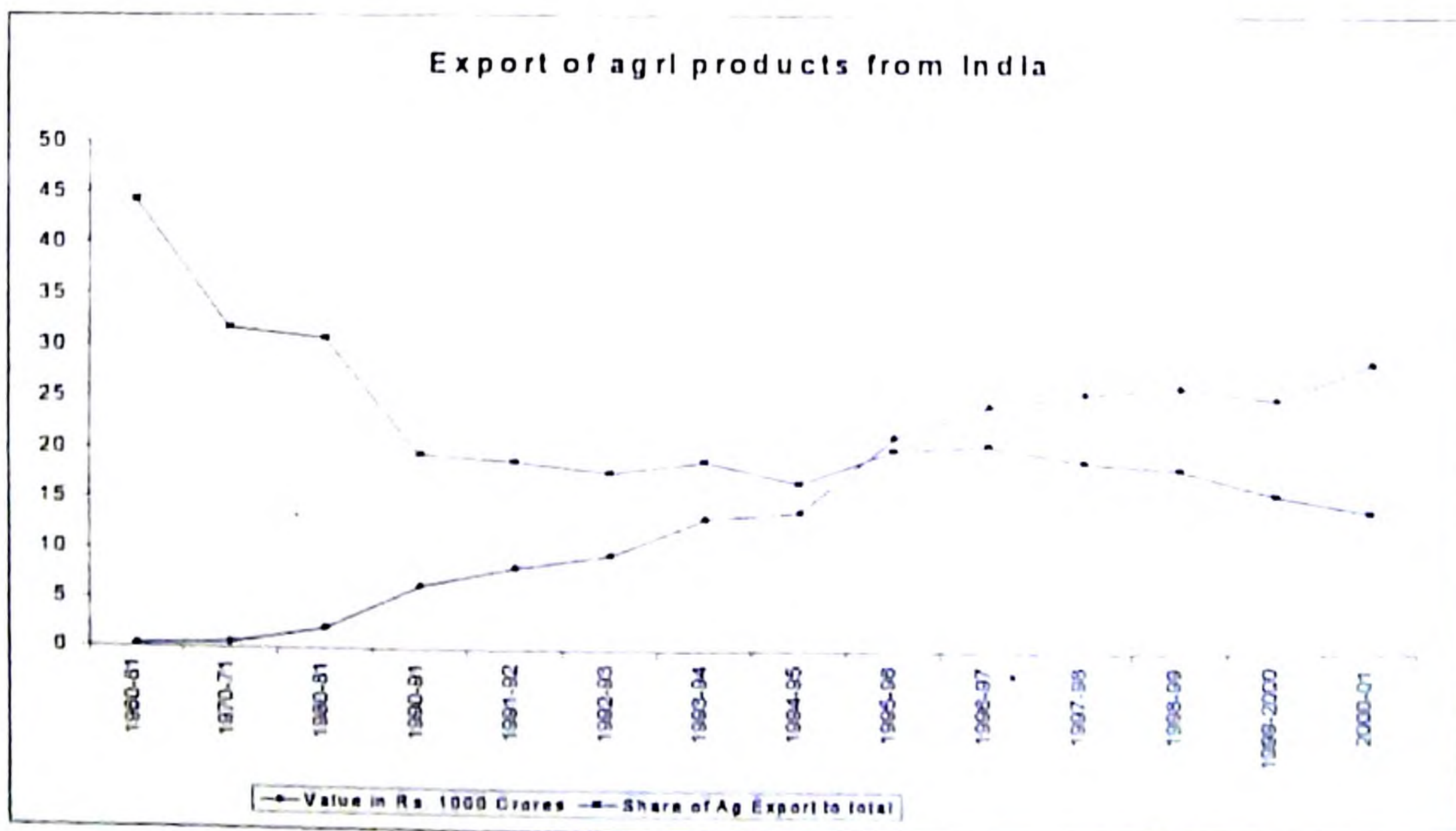


Table showing details of agricultural export from India

Year	Value in Rs. Crores	Value in US \$ million	% Share to total agrl.export
1960-61	284	596	44.2
1970-71	487	644	31.7
1980-81	2057	2601	30.7
1990-91	6317	3521	19.4
1991-92	8228	3337	18.7
1992-93	9457	3265	17.6
1993-94	13021	4151	18.7
1994-95	13712	4367	16.6
1995-96	21138	6320	19.9
1996-97	24239	6828	20.4
1997-98	25419	6840	18.8
1998-99	26104	6205	18.1
1999-2000	25016	5773	15.7
2000-01	28535	6246	14

Source: Economic survey, 2001.

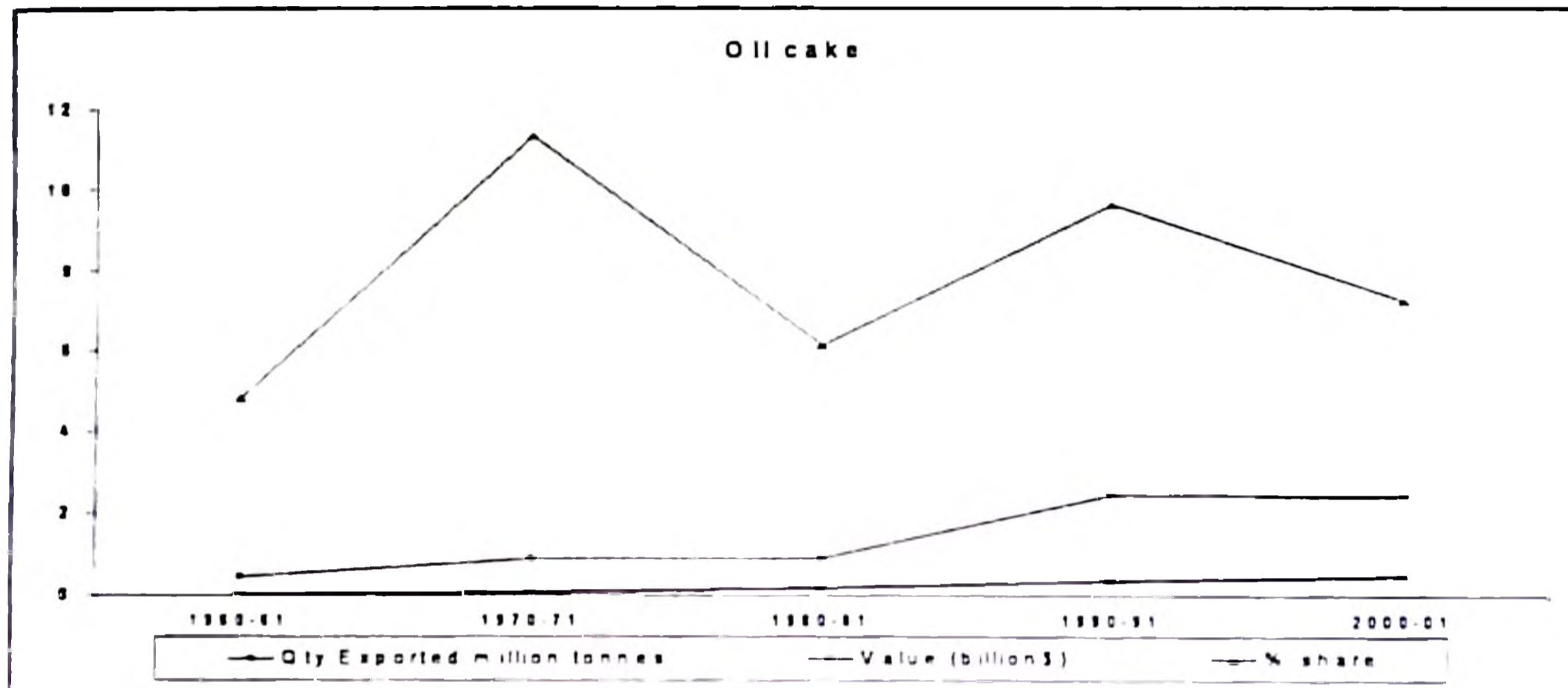
'Agricultural export from India', is a very vast topic. It is not possible to cover all aspects about this topic within the stipulated time of 25 minutes. So I will be confining to the most important aspects only.

Export basket

Here we are analyzing the export performance of the first five agricultural commodities both in value terms and quantity terms. In quantity terms the major commodities are oil cake, rice, sugar & Molasses, fish & fish preparations and spices where as in value terms they are fish & fish preparations, rice, oil cake, tea and cashew. So totally we will be covering seven major commodities

a) Oilcake .

In the year 2000-01 oilcake has the first position in the case of quantity exported (2.42 MT) and in the value terms it is in third position (0.45 billion) and in percentage share to total agricultural export in value terms is 7.2%.



In the chart we can see that in the case of quantity exported and in export earnings of oilcake there is a steep increase. This is because there is an increase in the area of production (17.6 to 24.1 Mha) and productivity and there by resulting in an increase in the exportable surplus of oilcake. Increase in the international price of oilcake is also a stimulating factor for increase in export. But the graph of percentage share to the total agricultural export in value terms shows large fluctuations.

The export of oilcake is increasing at a fast rate. It got boosted due to the decision to allow import of oilseeds under Open Generalized System (OGS) which is a major step to meet the increasing demand of the oil crushing industry. Similarly the policy of making rapeseed, mustard seed and sunflower seeds freely exportable made by the government has some positive impact in this direction.

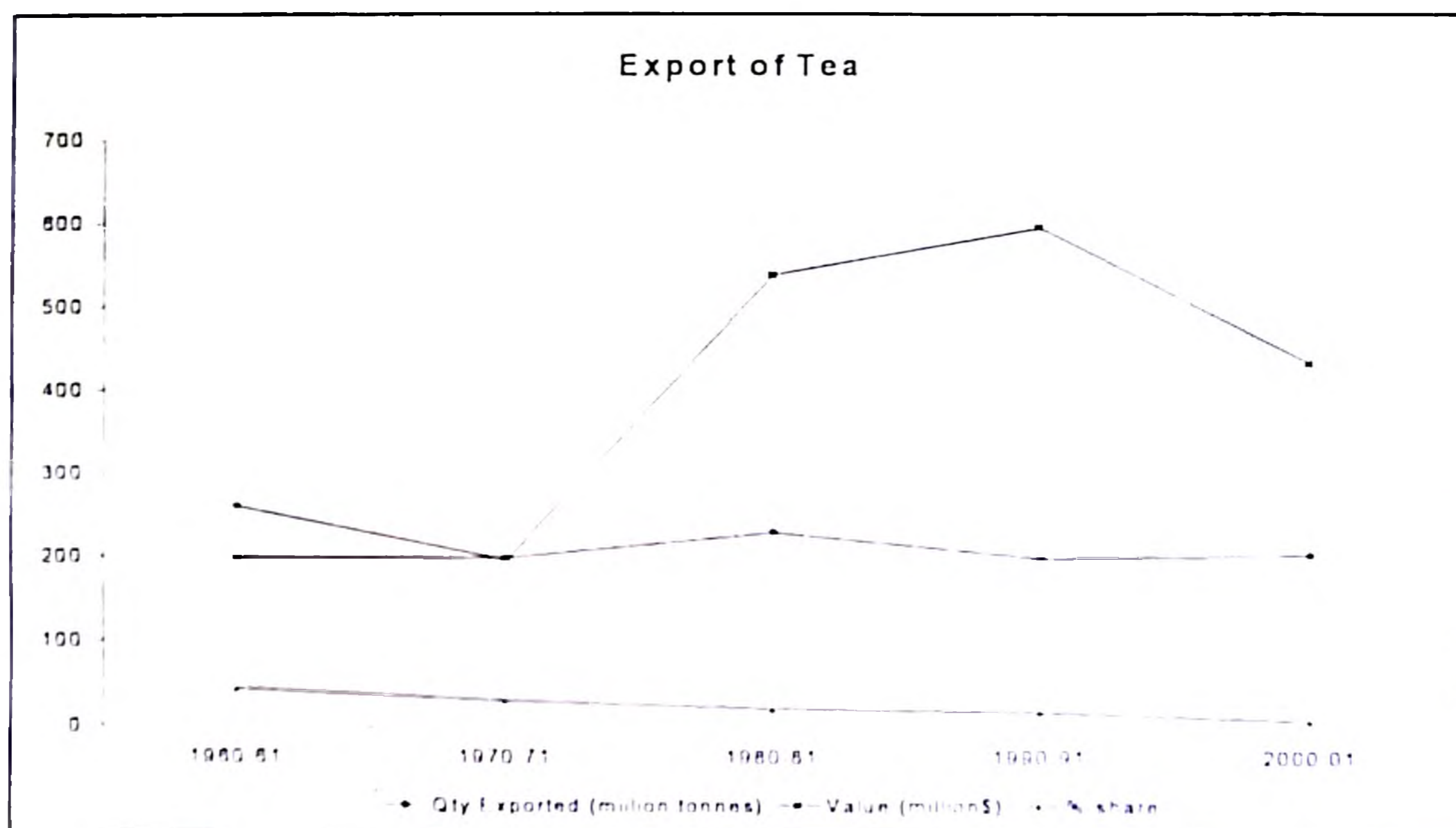
The major destinations of oilcake export from India are Singapore, N.Korea, Indonesia, Philippines and Japan. And major competitors are USA, Argentina and Brazil.

b) Tea

During 2000-01, in the case of quantity exported tea is in the sixth position (200 thousand tonnes) where as in export earnings it is in the fourth position with 433US\$

million. In the case of percentage share to total agricultural export in value terms also it is in the fourth position (6.9%).

In the chart we can see that there is a decrease in value terms during 1970-71 because of the low international price for tea. In 1980-81 there is a steep increase in both the value and quantity exported because there is increase in productivity and there by increase in exportable surplus. From 1990-91 onwards we can see a steep decline in the export earnings even though there is increase in the quantity exported. This is because of the low international price. (Madan .et al ,2001)



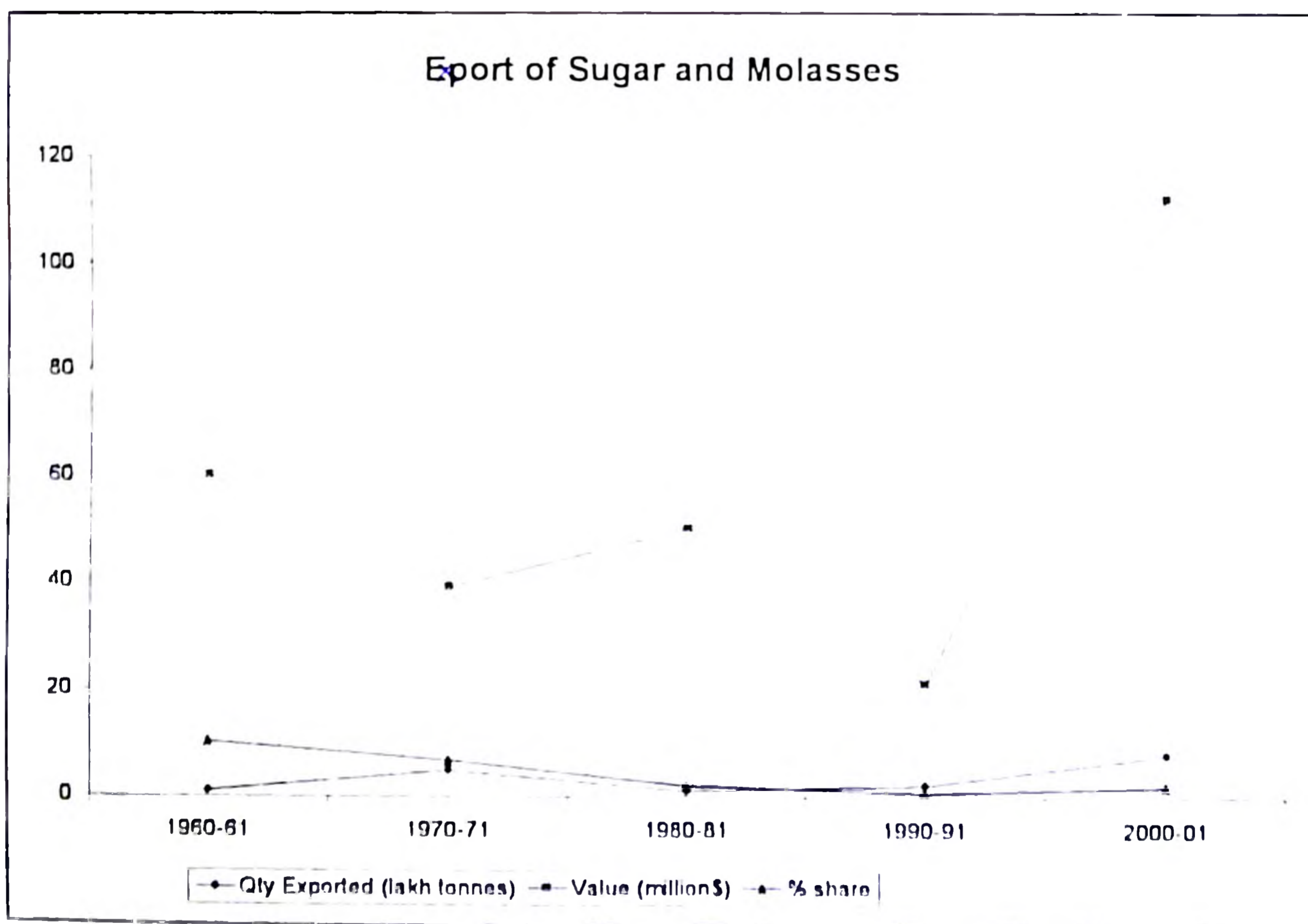
In the case of percentage share to total agricultural export in value terms we can see a gradual decline from 43.6% in 1960-61 to 6.9% in 2000-01. In the 1990's the unfavourable weather in South India has effected the quality of tea and depressed the export earnings. The competition with Sri Lanka which is the largest exporter of tea in the world and the very low cost of production for tea in this country reduced our export earnings. The tea export has earned highest share of agricultural export earnings and has been the most important item till 1990-91. (Economic survey, 1997) Later in 2000-01 it was relegated to the fourth position as the export earnings witnessed a fall.

The major countries to which tea is exported from India are Egypt , Iran , Iraq , Kuwait and Russia . And the major competitors are Sri Lanka , Kenya and China .

c). Sugar & molasses

During 2000-01 sugar and molasses is in the third position (7.69 LT) in the case of quantity exported. But in export earnings it is not a major commodity at all. Its percentage share in the total agricultural export is only 1.8%.

In the chart, we can see that in 1970-71 there is a steep decrease in the export earnings even though the quantity exported is high. This is because of the decline in the international price of sugar & molasses. This is the reason for the lowest export earning in 1990-91. In 2000-01 the quantity exported and export earnings increase steeply (112 US\$ million) because the area under production has increased very much (3.7 to 4.3 Mha) and the production also increased and therefore more exportable surplus was there. In the case of percentage share to total agricultural export in value terms has decreased drastically from 10.1 % in 1960-61 to 1.8 % in 2000-01. (APEDA, 2001)



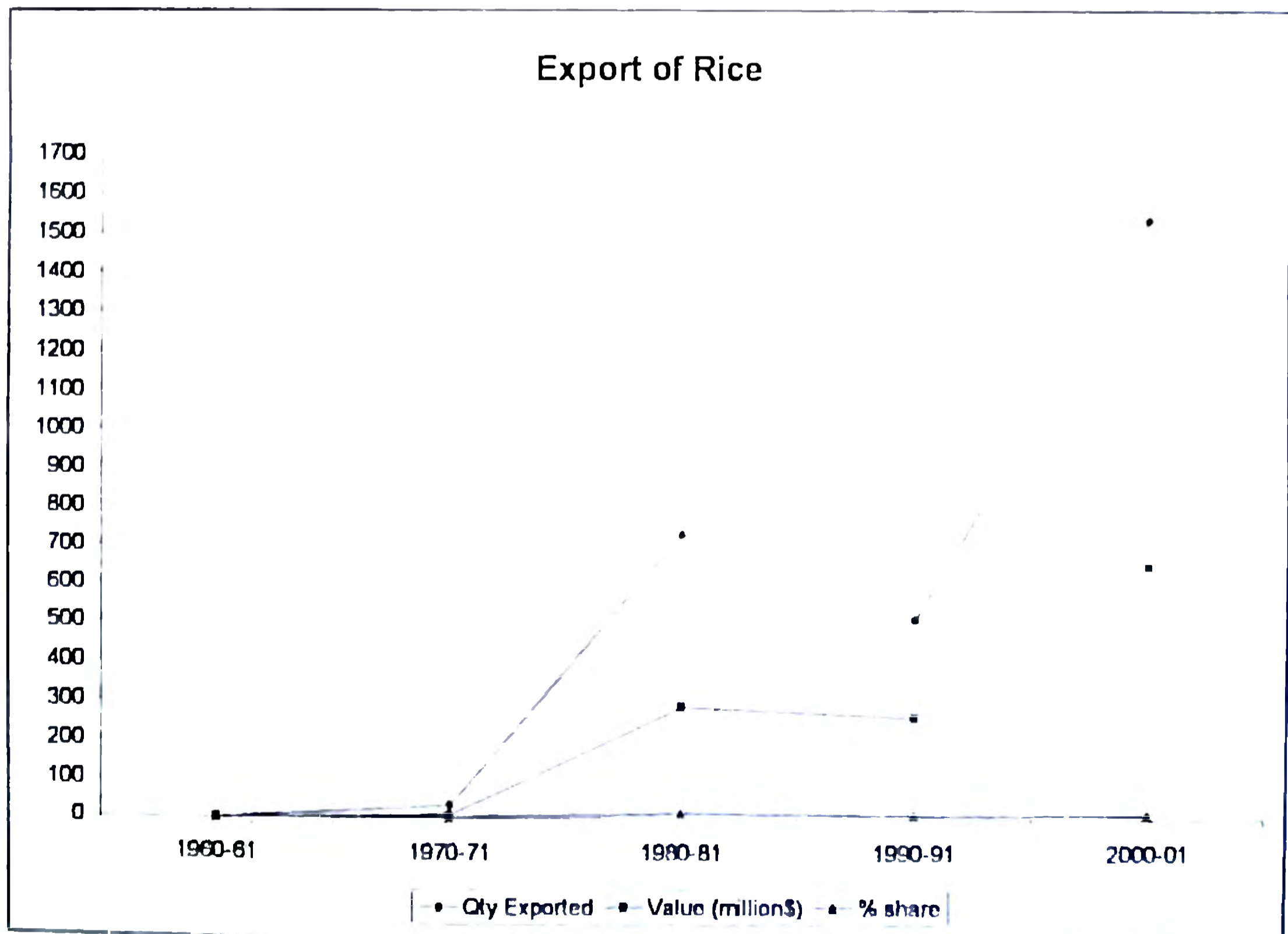
India exports mainly three forms of sugar namely raw sugar, refined sugar and centrifuged sugar. Refined sugar is the most exported variant followed by raw sugar. Indian gur has a wide acceptance in terms of quality in a number of countries including

EU & USA. However Pakistan and Portugal are our major export markets for gur accounting for about 70% of the total export.

The major destinations are Indonesia, Pakistan, Sri Lanka, Russia, EU& USA. And the major competitors are Cuba, Brazil, Thailand, Australia and France.

d). Rice

In 2000-01 rice had the second position in terms of quantity exported (1534.4 thousand tonnes), in terms of export earnings (644 US\$ million) and in percentage share to the total agricultural export in value terms (10.3 %). In the chart we can see upto 1960-61 we were an importer of rice. Only in 1970-71 rice figured in the export basket. From 1970-71 to 1980-81 we can see a steep increase in both quantity exported and export earnings because during this period the area under production increased from 37.6 M ha to 40.1 M ha and the production also increased by using high yielding varieties. This resulted in the generation of more exportable surplus. In 1990-91 the quantity exported decreased due to increase in the domestic consumption and thereby reduced the



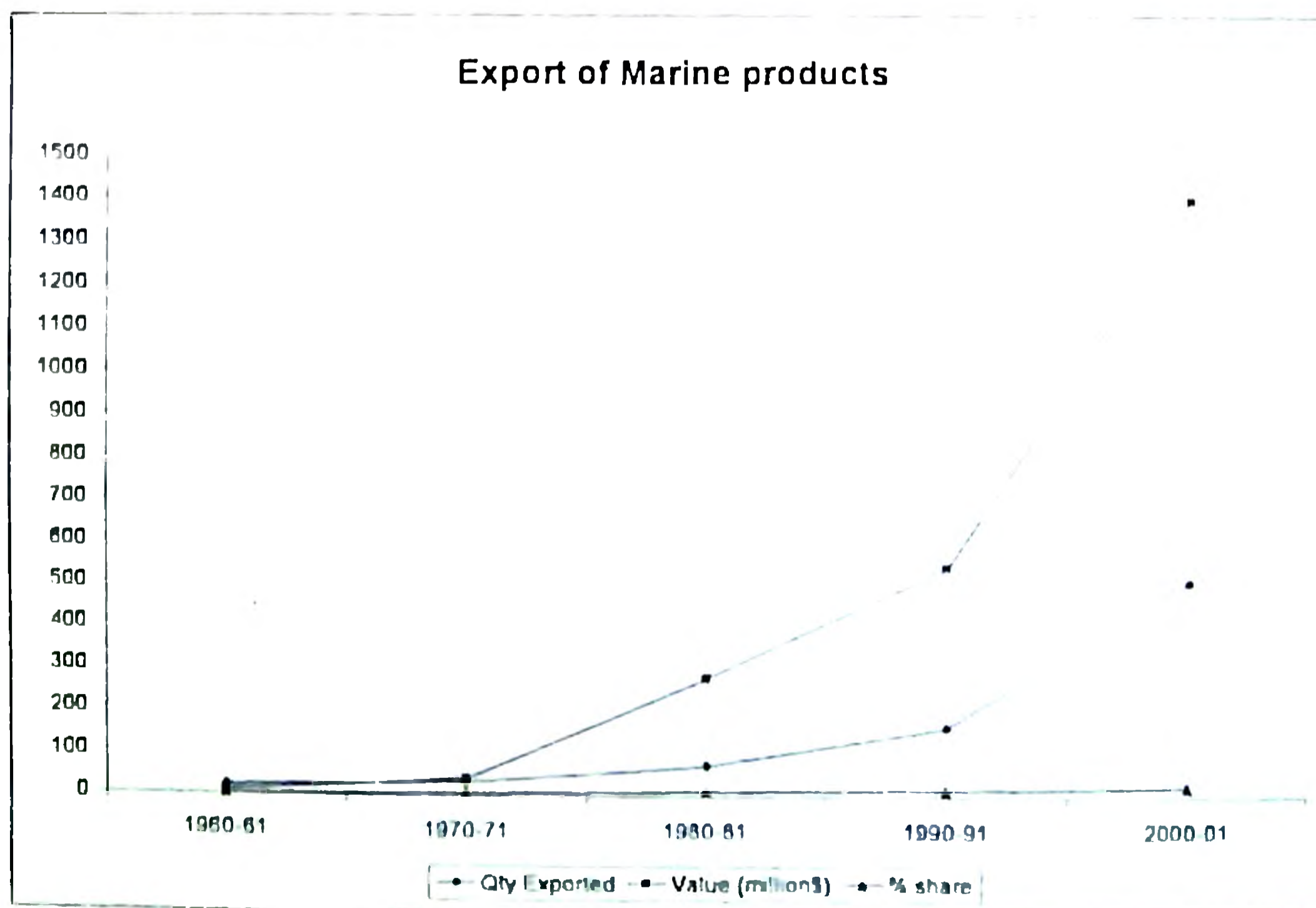
export earnings. In 2000-01 the quantities exported and export earning showed a three-fold increase due to increase in the area and production of rice, which created more

exportable surplus. High international price is also a stimulating factor for this. In the case of percentage share to total agricultural export in value terms. We can see that from 1980-81 onwards the percentage share remained around 10%. (Economic survey , 2000)

World trade in rice is less than 5% of the total production. Yet it is an important commodity traded in the international market, which is dominated by Thailand, USA, Pakistan, China, Australia and Vietnam. Despite the fact that India has the largest area under rice and is the second biggest rice producer, its share in export is less than 4%. Currently India exports rice to about 80 countries in the world. India exports both basmati and nonbasmati rice. The major export of rice from India is of basmati variety, which is more than 70% of the total export of rice in value terms. In India 70 % of basmati rice export is from Punjab and the rest from Haryana. Of the major destinations of basmati, Saudi Arabia accounts for 40-50 %, while Kuwait and UAE account for 15-20 % and European and North American markets capture 9%. (Ministry of commerce, 2002)

e). Marine products

Quantity wise marine products do not appear as a major item of export from India. In value terms it occupies the first position in 2000-01, which was a steady rise from the



third position in 1980-81 .The share of marine products export earnings was a mere 1-6 % in 1960-61 and is now 22.3 % of the total agricultural export earning. (Economic survey, 1999)

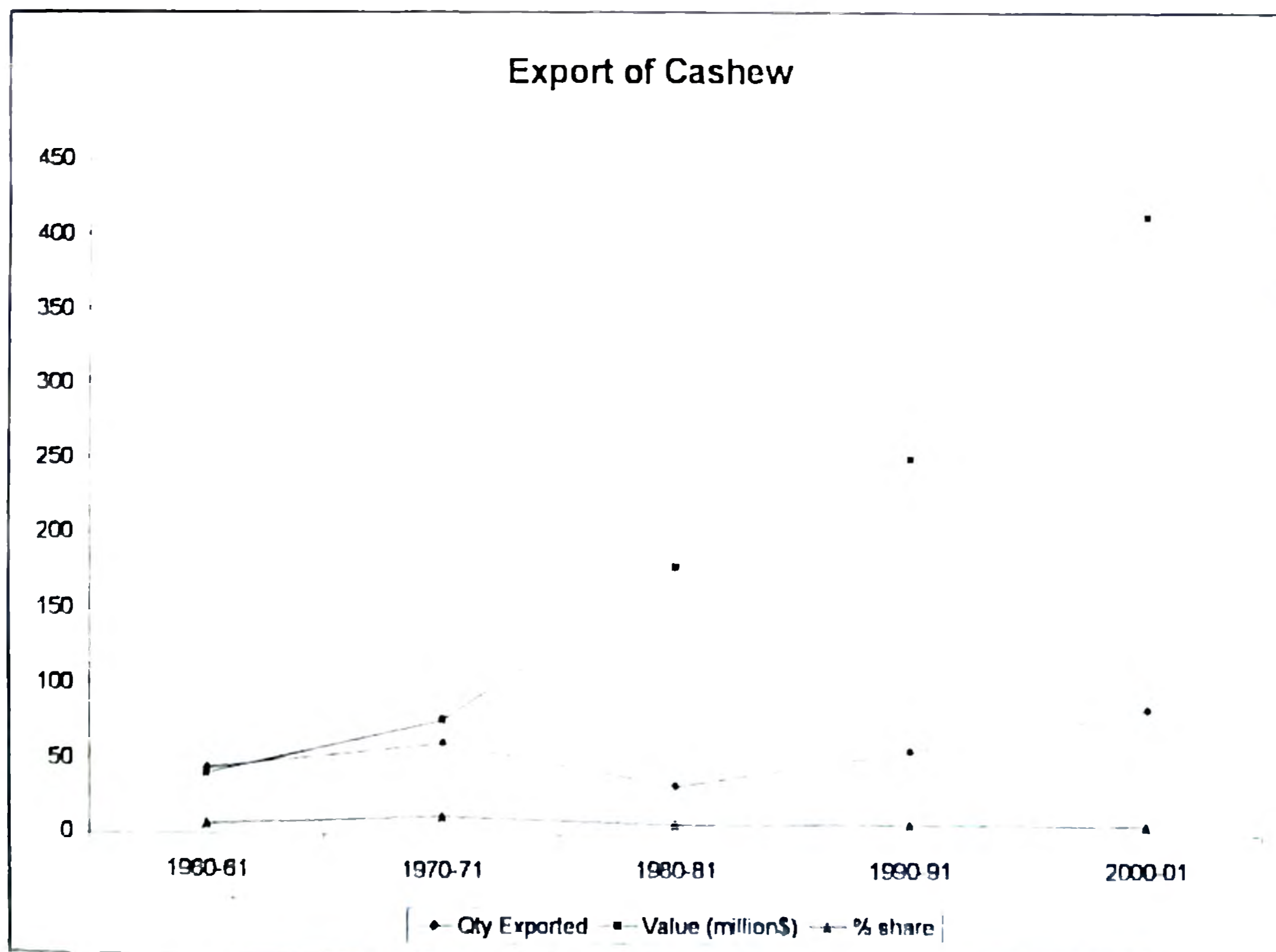
In global market major buyers from India are Malaysia, UAE, Mauritius, Jordan, Turkey and Saudi Arabia .We have to face stiff competition from countries like China, Thailand, Republic of Korea and Israel.

This sector plays an important role in the socio-economic development of the country since it is an important source of livelihood for a large section of the economically backward population of the country particularly the coastal areas.

F) Cashew

In 2000-01 the export earnings from cashew is in the fifth position (412 million US \$) but in the quantity exported it is very low and in the case of percentage share to the total agricultural export in value terms also it is in the fifth position (6.6%).

In the chart we can see that in 1980-81 the quantity exported is less while the export



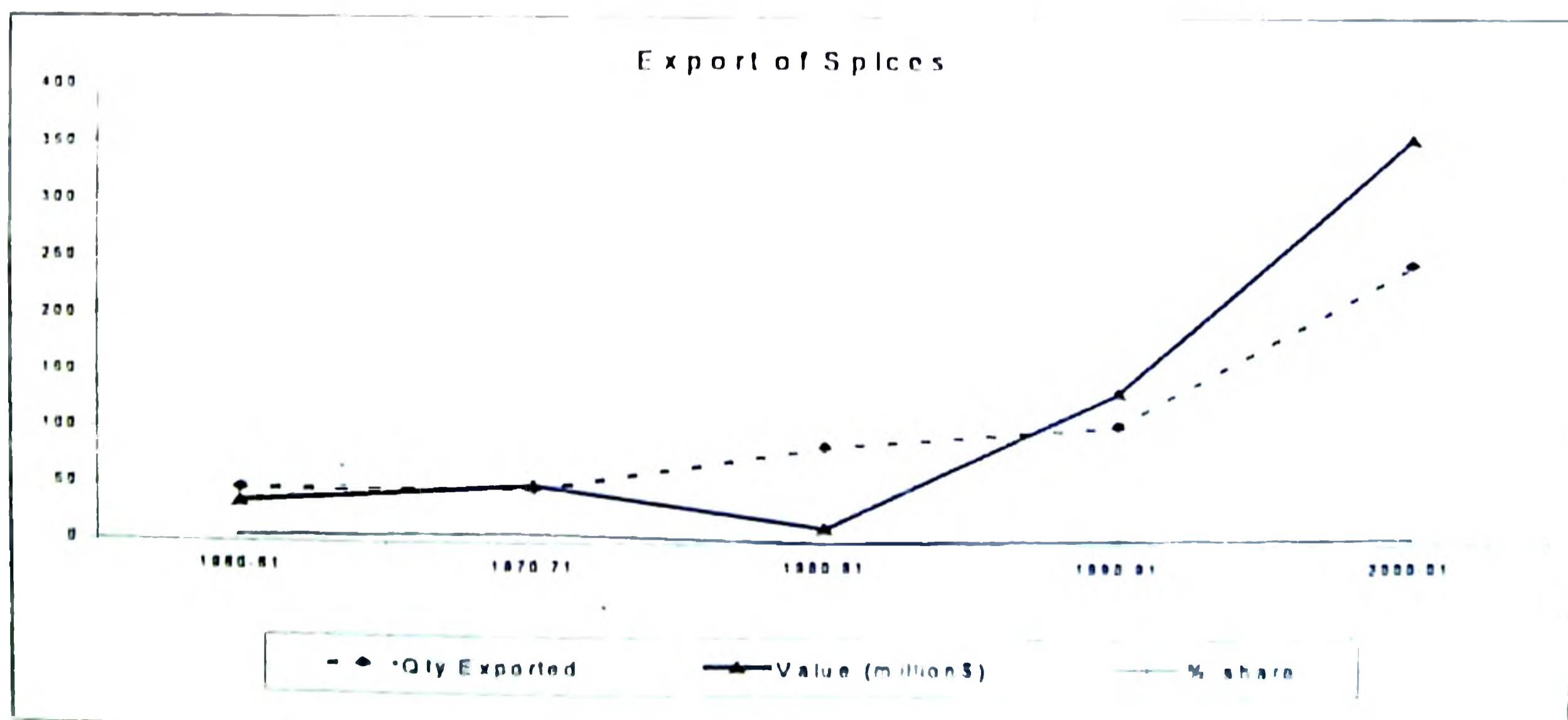
earnings are showing a steep increase. Because of the increase in domestic consumption the exportable surplus decreased even though there was a high price in the international market. After 1980-81 we increased the total area under cultivation and the production

was increased. We also began importing raw cashewnut and re-exporting it after processing. This is why we can see a steep increase in quantity exported and export earnings in 1990-91 and 2000-01. (Economic Survey, 1998)

We are exporting cashew as cashew kernel and Cashewnut Shell Liquid (CNSL). Until the middle of seventies India has been maintaining a near monopoly in the global trade. Towards the later part of seventies other countries also intercepted into our business and India's share in global market gradually reduced to around 50%. Now we are depending on the import of raw cashewnut from more than 20 countries and the major ones are Tanzania, Indonesia, Mozambique, Ivory Coast, Singapore and Nigeria. Now these countries also increasing production along with processing capacities. Major destinations of cashewnut are USA(40%), Netherlands(24%), UK(6%), Japan and France and that of CSNL are Japan(63%), Korea(25%), UK(12%) and USA.

g) Spices

In 2000-01 in terms of quantity exported spices is in the fifth position (244.9 thousand tonnes) But in export earnings it is in the sixth position (354 million US \$) and in the percentage share to the total agricultural export in value terms it is in the sixth position(5.6%) In the total export earnings of spices ,spice oil and oleoresin including mint oil contributed around 30%, followed by black pepper(20%) and chilli (12%). India has lost its price competitiveness to other countries due to drastic price fall Indonesia and Vietnam supplied black pepper at \$ 1000/tonne less than Indian pepper in the world



market. Low productivity and high cost of production makes Indian spices costlier in the world market. In the case of cardamom India has lost its competitiveness to Guatemala in the international trade because of low productivity and high wage rate here. The main challenges India facing is the ever increasing domestic demand and production not catching up at a fast rate.

Demand constraints

1. price competitiveness

The change in price competitiveness is certainly an important determinant in explaining our slack export demand. India's export profile is quite similar to that of SE.Asian nations. With the start of SE.Asian currency crisis, many countries in this region were forced to devalue their currency. Consequently dollar price of exportables registered negative growth rate in these (%) countries. India lost its competitiveness to these countries despite maintaining a low inflation rate. (Gopal, 2001)

2. Potential demand.

Value of total imports into industrial countries like Japan & Germany declined sharply. The sharp fall in international prices of manufactured products is believed to be the cause of slowdown in the growth rate of nominal world trade.

3. Trade barriers

Non-tariff barriers [NTB] can hinder exports. As tariff increase is not permissible many countries are now imposing NTBs to protect their domestic economy. Some of the major NTBs are antidumping procedures, countervailing procedures, quantitative restrictions or quotas, export subsidies, investment barriers, sanitary and phytosanitary measures, Intellectual Property Rights, import licensing, service barriers etc.

Supply constraints

1. procedural bottlenecks

Government orders, regulations, rules and procedures have certainly played an important role in slowing down the growth rate of Indian exports by raising cost of production.

2. Domestic distortions.

a) Product market distortions

In India most of the antidumping duties are imposed following petitions from producers who are monopolists. Production externality can occur because of government decision to promote growth in certain sectors at the expense of others.

b) Factor market distortions

It occurs when prices of various inputs are higher than their respective marginal products. Presence of trade unions, rigid labour laws & land laws will form factor market distortions.

3. Infrastructure

Over utilized Indian ports ill-equipped air ports, poor roads (both national highway & other roads), less penetration of telephone lines.

Export prospects in the light of WTO agreement

WTO agreement on agriculture primarily focuses on reduction of tariffs increased market access, reduction in Aggregate Measures of Support (AMS) in the form of subsidies. (Sharma et al.1999)

WTO has stipulated that AMS should not exceed 5 % of total value of agricultural products in the case of developed countries and 10 % in the case of developing countries. But AMS in India is much below its ceiling level. Developing countries like India, are free to provide certain subsidies, such as subsidizing of export marketing cost, internal and international transport and freight charges etc. India is making use of these subsidies in certain schemes of APEDA. Reduction in subsidies will naturally raise international prices and would therefore help Indian exports.

India had bound its tariffs at 100 % for primary products, 150 % for processed products and 300 % for edible oils. India can take safeguard action under the WTO Agreement on Safeguards if there is a surge in imports causing serious injury or if there is a threat of serious injury to the domestic producers. Therefore, despite phasing out of QRs, the possibility of higher levels of agro-imports is considerably low.

Market access of all products would be governed by tariffs only. All tariff rates has to be reduced to 36 % over six years in the case of developed countries. However, a plethora of NTBs like SPS have restricted access of India's agro-exports into developed countries markets.

Conclusion

India, with its large production of agricultural and allied products, vast domestic market, well-developed institutional mechanisms, low cost of production can play a significant role in post-WTO international trade in agro-products. Export orientation should not result in deficiency in domestic supply. Therefore, what is required is a judicious mix of policies and initiatives towards enhancing production as well as exports of India's agricultural and allied products. The aim of this seminar is to give only a peripheral idea about India's agricultural exports.

Discussion

1. What is your opinion about SEZ.

SEZ are Special Economic Zones. These are formed for promoting the agricultural export from our country.

2. Why % share is decreasing while the quantity exported is increasing.

This is because the other countries are also increasing their export quantity and day by day new countries came to the export picture.

3. Why are we depending on the crops like rice and wheat for our export. Why we can't depend on other crops and increase our earnings.

We are also depending on other crops like spices, cashew, tea, coffee, oilcake, sugar etc which forms a very good part of our export share.

4. What are the different forms of sugar we are exporting.

We are exporting mainly three forms of sugar namely ordinary sugar, refined sugar and centrifuged sugar.

5. What is your opinion about organic farming. Will it effect the agricultural export.

Now a days organically produced agricultural products got a very good demand in the market especially in the western markets and they are also fetching a very high price than the other products. So organic farming will necessarily increase our agricultural export market

6. Why are we exporting low quality tea to other countries. Why can't we export only quality tea so that we can increase our price in the international market.

Actually the low quality tea is reaching our country through the black market and this is used to adulterate our high quality tea by the exporters with the intention to make more profit.

7. You have taken 10 years interval for analyzing the data, why can't you take 5 years interval.

If 5 years interval has been taken the data would be bulky and so it will not be possible to complete the analysis within time.

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WTO AND THE SPICES ECONOMY OF KERALA

1991

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SEMINAR REPORT

**Submitted in the partial fulfillment for the requirement of the course
AgEcon. 651 Seminar**

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ABSTRACT

India is reputed as the land of spices. Spices, were major items of trade between India and the Middle East in the ancient and medieval times. Even today spices from India are considered to be best in the world. India is the largest producer, consumer and exporter of spices in the world. The present annual production of spices in the country is 3 million tonnes from over 2.5 million hectares. India's share in the world export of spices have increased from 7.7 per cent in 1991-92 to 11.2 per cent in 1998-99. The share of spices in India's agricultural export also is increased from 3.8 per cent to 7.16 per cent during the same time period.

WTO agreement on trade in agricultural commodities is a matter of concern and point of discussion world over. World Trade Organisation (WTO) came into existence on 1st January 1995, mostly as a result of Uruguay round of trade negotiations. WTO's agreement on agriculture necessitates reduction of distortions in agricultural trade and gradual establishment of a free and fair market oriented agricultural trading system by adopting the disciplinary rule with respect to market access, domestic support, export subsidy, sanitary and phytosanitary measures and other trade related agreements.

The major spice crops grown in Kerala are pepper, cardamom, ginger and turmeric. Kerala retains the lead in black pepper production in the country contributing 96 percent of area and 97 percent of production. In the case of cardamom it accounts for 66 percent of area and 85 percent of production. Trade performance of pepper, cardamom, ginger and turmeric during the period 1996-2000 showed that in the case of pepper, even though quantity exported is decreasing, value earned is showing an increasing trend. Cardamom, turmeric, spice oils and oleoresins has exhibited an increasing trend both in quantity exported and value.

Even though we are in an advantageous position in the case of pepper, cardamom and turmeric we are facing stiff competition from other spice producing countries. Some developed countries are using sanitary and phytosanitary measures as a non-tariff barrier to restrict the import of our spices. Hence our future strategy should be directed towards assurance of quality, increased productivity, product diversification and organic spices.

WTO AND THE SPICES ECONOMY OF KERALA

INTRODUCTION

India has a record history of foreign trade sustained mainly by spices. Spices were major items of trade between India and Middle East in the ancient and medieval times. Even today spices from India is considered to be the best in the world. India is reputed as the "Land of Spices" and about 63 spice crops are being grown in the country at present. India is the largest producer, consumer and exporter of spices in the world. 90% of the spices produced in our country is absorbed in the domestic market and only 10% is exported to over 150 countries. India's share in the world export of spices has increased from 7.7% in 1991-92 to 11.2% in 1998-99. Percent share of spices in India's agricultural export also increased from 3.8% to 7.16% during the same time period (Chand, 2001) Globalisation and liberalisation of world trade in agriculture has opened up new vistas of growth. Spice sector is one of the key areas in which India has an inherent strength to dominate.

Globalisation is the process of transnationalisation of production and capital, and standardisation of consumer tastes and their legitimisation with the help of international institutions like World Bank, International Monetary Fund (IMF) and World Trade Organisation (WTO). Obviously the process is a move towards a borderless regime of free trade and transaction based on competition (Oommen, 2001).

The process of liberalisation to integrate Indian economy with world economy has started in the early nineties. The WTO came into existence on January 1, 1995 as a result of the Uruguay round of trade negotiations. The agreement on Agriculture, Sanitary and phytosanitary measures, Technical barriers to trade, Agreement on TRIPS, Safeguards, Subsidies and countervailing measures are major agreements under WTO.

AGREEMENT ON AGRICULTURE

It necessitates reduction of distortions in agricultural trade and gradual establishment of a free and fair market oriented agricultural trading system. The objective of the agriculture agreement is to reform trade in the sector and to make policies more market oriented. This would improve predictability and security for importing and exporting countries alike.

Rules and commitments of agreement on agriculture are

1. Market access
2. Domestic support
3. Export subsidies

The agreement does allow governments to support their rural economies, but preferably through policies that cause less distortion to trade. It also allows some flexibility in the way commitments are implemented. Developing countries do not have to cut their subsidies or lower their tariffs as much as developed countries and they are given extra time to complete their obligations. Special provisions deal with

the interests of countries that rely on imports for their food supplies, and the least developed economies.

Market access

It primarily envisages tariffication of all non-tariff barriers. In other words, non-tariff barriers such as quantitative restrictions are to be replaced by tariffs to provide same level of protection and their progressive reduction of tariffs. Developed countries would cut the tariffs by an average of 36 %, in equal steps over six years. Developing countries would make 24% cut over ten years. Least developed countries do not have to cut their tariffs. For products whose non-tariff restrictions have been converted to tariffs, governments are allowed to take special emergency actions in order to prevent swiftly falling prices or surges in imports from hurting their farmers.

WTO specifies minimum access commitment that would maintain the existing level of market access and create additional access in markets with low imports. Minimum access commitment was sought to be achieved through two types of tariff quotas. First type of tariff quota was set up to establish minimum access opportunities where there was no significant import in the base period. The size of the quota was to increase from 3% of domestic consumption in the base period (1986-88) in 1995 to 5% by 2001 for developed countries and by 2005 for developing countries. Second tariff quotas were constituted to maintain current access opportunities where the process of tariffication would otherwise have resulted in a deterioration of market access conditions.

The tariffs that have been bound by India for primary agricultural products, processed products and edible oils with few exceptions are at 100%, 150%, and 300% respectively without breaking the WTO agreement.

Domestic support

This agreement establishes a ceiling on the total domestic support that governments may provide to agricultural producers. It is referred to as Total Aggregate Measure of Support. The agreement distinguishes between support programmes that stimulate production directly, and those that are considered to have no direct effect. Domestic policies that do have a direct effect on production and trade have to be cut back. Developed countries have to reduce these total AMS by 20% of base year (1986-88) over six years starting in 1995. Developing countries have to make 13% cut over 10 years. Least developed countries do not need to make any cuts. AMS consists of product specific and non- product specific supports. Under the *de minimis rule*, countries are exempted from reducing product specific support that does not exceed 5% of the total value of production of a product (10 % for developing countries) and non- product specific support that does not exceed 5% (10 % for developing countries) of the value of total agricultural output.

Aggregate measure of support has to be calculated separately for each basic product taking into account non-product specific support. Domestic support measures that have a minimal impact on trade are excluded from reduction commitments. These support measures are categorized into three different coloured boxes, Green, Blue, and Amber. The Green box contains support measures that either have no or almost

minimal trade distorting effects on production. They include government services such as research, disease control, infrastructure and food security. They also include payments made directly to farmers that do not stimulate production, such as certain forms of direct income support, assistance to help farmers restructure agriculture, and direct payments under environmental and regional assistance programmes. Green box measures are not subject to reductions. Blue box measures include direct payments to farmers where the farmers are required to limit production. The domestic support policies that distort market prices such as price supports, direct payments and non-exempt subsidies are put in amber box. The amber box support is subject to reduction. Developing countries are also exempted from reducing support for agricultural investment, input subsidies for low-income farmers and support to encourage diversification from growing illicit crops. These types of support are allowed under special and differential treatment.

Export subsidies

This agreement requires WTO members to cut both the amount they spend on export subsidies and the quantities of exports that receive subsidies. Taking averages for 1986-90 as the base level, developed countries have to cut the value of export subsidies by 36% of the base year value over the six years starting in 1995 (24 % over ten years for developing countries). Developed countries have to reduce the quantities of subsidised exports by 21% of base year quantity over the six years (14 % over ten years for developing countries). Least developed countries do not need to make any cuts. During the six years implementation period, developing countries are allowed under certain conditions to use subsidies to reduce the costs of marketing and transporting exports.

Sanitary and Phyto-sanitary measures (SPS)

It is a non-tariff measure, which can be invoked to refuse imports from different countries to protect human, animal or plant life or health. Member countries are encouraged to use international standards, guidelines and recommendations where they exist, however members may use measures, which result in higher standards if there is scientific justification. If an exporting country can demonstrate that the measures it applies on its exports achieve the same level of health protection as in the importing country, then the importing country is expected to accept the exporting country's standards and methods. Government must provide advance notice of new or changed sanitary and phytosanitary regulations, and establish a national enquiry point to provide information.

Technical Barriers to trade

Most countries have regulations, which prescribe mandatory standards for the safety and protection of their people or the environment. Agreement requires mandatory standards to be based on scientific information and evidence, and it should not become unnecessary barriers to trade. The common non-tariff barriers are tariff quotas, seasonal tariff low rates, seasonal tariff high rates, product characteristic requirements to protect human health, labelling requirements for human health etc. The conversion of specific and mixed tariffs provides a higher level of protection against lower priced imports typically supplied by developing countries.

Agreement on Trade related aspects of Intellectual Property Rights (TRIPS)

The agreement on TRIPS lays down minimum standards of protection, which countries must provide for intellectual property rights (IPRs)

The areas covered by TRIPS agreement are

1. Copy rights and related rights
Here the concept of originality is important.
2. Trade marks, including service marks
Trademark is a symbol that helps to distinguish one product or company from another. The agreement defines what types of signs must be eligible for protection as trademarks, and what the minimum rights conferred on their owners must be.
3. Geographical indications
It inform consumers that the goods concerned have the quality, reputation or other characteristic which are essentially attributable to their geographical origins.
4. Industrial designs
Under the TRIPS agreement, industrial designs must be protected for at least ten years. Owners of protected designs must be able to prevent the manufacture, sale or importation of articles bearing or embodying a design, which is a copy of the protected design.
5. Patents
A patent is an exclusive right given to an inventor to exclude all others from making, using and/or selling the invention. The agreement says patent protection must be available for inventions for at least 20 years and patents are available for both products and processes, in almost all fields of technology. Diagnostic, therapeutic and surgical methods, plants and animals (other than microorganisms), and biological processes for the production of plants or animals (other than microbiological processes) are exempt from patentability.
6. Lay out designs of integrated circuits
Measures for protecting integrated circuit designs (topographies) in the TRIPS agreement was adopted in 1989, but has not yet entered into force.
7. Undisclosed information, including trade secrets
Trade secrets and other types of "undisclosed information" which have commercial value must be protected against breach of confidence and other acts contrary to honest commercial practices. Reasonable steps must have been taken to keep the information secret.

The agreement provides a transitional period of 5 years for developing and transition economies to bring their IPR legislation in conformity with its provisions. For least developed countries the transitional period is 10 years

Agreement on Safeguards

A WTO member may restrict imports of a product temporarily if its domestic industry is injured or threatened with injury caused by a surge in imports. Here, the injury has to be serious. Safeguard measures cannot be targeted at imports from a

particular country. An importing country can only apply a safeguard measure to a product from a developing country if the developing country is supplying more than 3% of the imports of the that product, or if developing country members with less than 3% import share collectively account for more than 9% of total imports of the product concerned.

Agreement on Subsidies and Countervailing Measures

The agreement defines three categories of subsidies: prohibited, actionable and non-actionable. It applies to agricultural goods as well as industrial products, except when the subsidies conform to the Agriculture Agreement.

- **Prohibited subsidies**

Subsidies that require recipients to meet certain export targets, or to use domestic goods instead of imported goods. They are prohibited because they are specifically designed to distort international trade, and are therefore likely to hurt other countries' trade

- **Actionable subsidies**

In this category the complaining country has to show that the subsidy has an adverse effect on its interests. Otherwise the subsidy is permitted.

- **Non-actionable subsidies**

These can either be non-specific subsidies, or specific subsidies for industrial research and pre-competitive development activity, assistance to disadvantaged regions, or certain types of assistance for adapting existing facilities to new environmental laws or regulations

India has moved considerably towards opening up its market for spices and has liberalised imports. Our tariff level (70%) is comparable with WTO norms and most spice items have now been listed under the items kept for free import. After the removal of quantitative restrictions, tariff rates are the only instrument for India's trade policy.

Kerala climate is suitable for growing a variety of spices. The major spice crops grown in Kerala are pepper, cardamom, ginger and turmeric.

Pepper

Pepper is known as the " King of Spices " and India accounts for 49.66% of world area and 31% of world production and 21.47% of the world export (quantity) of pepper during the triennium ending 2000. Kerala is the major pepper growing state in India contributing 96% of area and 92.16% of production in the triennium ending 2000.

Table 1. Area, production and yield of black pepper in Kerala (1990-2000)

Year	Area (lakh ha)	Production ('000 tonnes)	Yield (kg/ha)
1989-90	1.6710	54.14	323
	(97.4401)	(98.0975)	(100.310559)
1990-91	1.6850	46.8	277
	(97.1574)	(97.6017)	100.3623188
1991-92	1.7810	50.31	282
	(96.6884)	(96.7314)	(100)
1992-93	1.8350	49.67	271
	(96.8900)	(97.8526)	(101.1194)
1993-94	1.8440	49.55	269
	(96.5496)	(96.5511)	(100)
1994-95	1.8670	59.26	317
	(96.6006)	(97.5634)	(100.955414)
Mean	1.78	51.62	289.83
CV (%)	4.7388	8.5655	8.2415
GR 90-95	2.6486	1.8994	-0.7224
1995-96	1.9084	59.94	314
	(96.3692)	(97.3368)	(100.9646)
1996-97	1.7260	53.77	312
	(95.7506)	(96.726)	(101.2987)
1997-98	1.7386	55.52	319
	(95.7748)	(96.8428)	(100.9493)
1998-99	2.3089	64.34	279
	(96.2844)	(85.0271)	(88.2911)
1999-00	1.8437	56.43	306
	(95.8912)	(96.8091)	(100.9901)
Mean	1.90512	58	306
CV (%)	12.4943	7.2366	5.1620
GR 96-00	2.2447	0.5895	-1.6208

Source : Directorate of Arecanut and Spices Development, 2002, Arecanut and Spices Database, Calicut

Compound annual rate of growth of area (2.7%) and production (1.9%) under pepper in Kerala was faster in pre WTO period compared to area (2.24 %); production (0.59%) in post WTO period. Compound annual rate of growth of yield under pepper in post WTO period (-1.62%) is decreasing at a faster rate than in pre WTO period (-0.72%).

Export performance of black pepper

Though production of black pepper is limited to India, Indonesia, Thailand, Malaysia, Vietnam, Sri Lanka, China, Brazil and Madagascar, it is sourced from as many as 50 countries world-wide. India's share in the world export of black pepper during the triennium ending 2000 was 14.6 per cent in quantity terms. In the post WTO period, India's share (in quantity terms) in world exports of black pepper was found to be nearly halved from 27 per cent in 1996 to 12.7 per cent in 2000.

Figure 1. Area, production and yield of black pepper in Kerala during 1990-2000

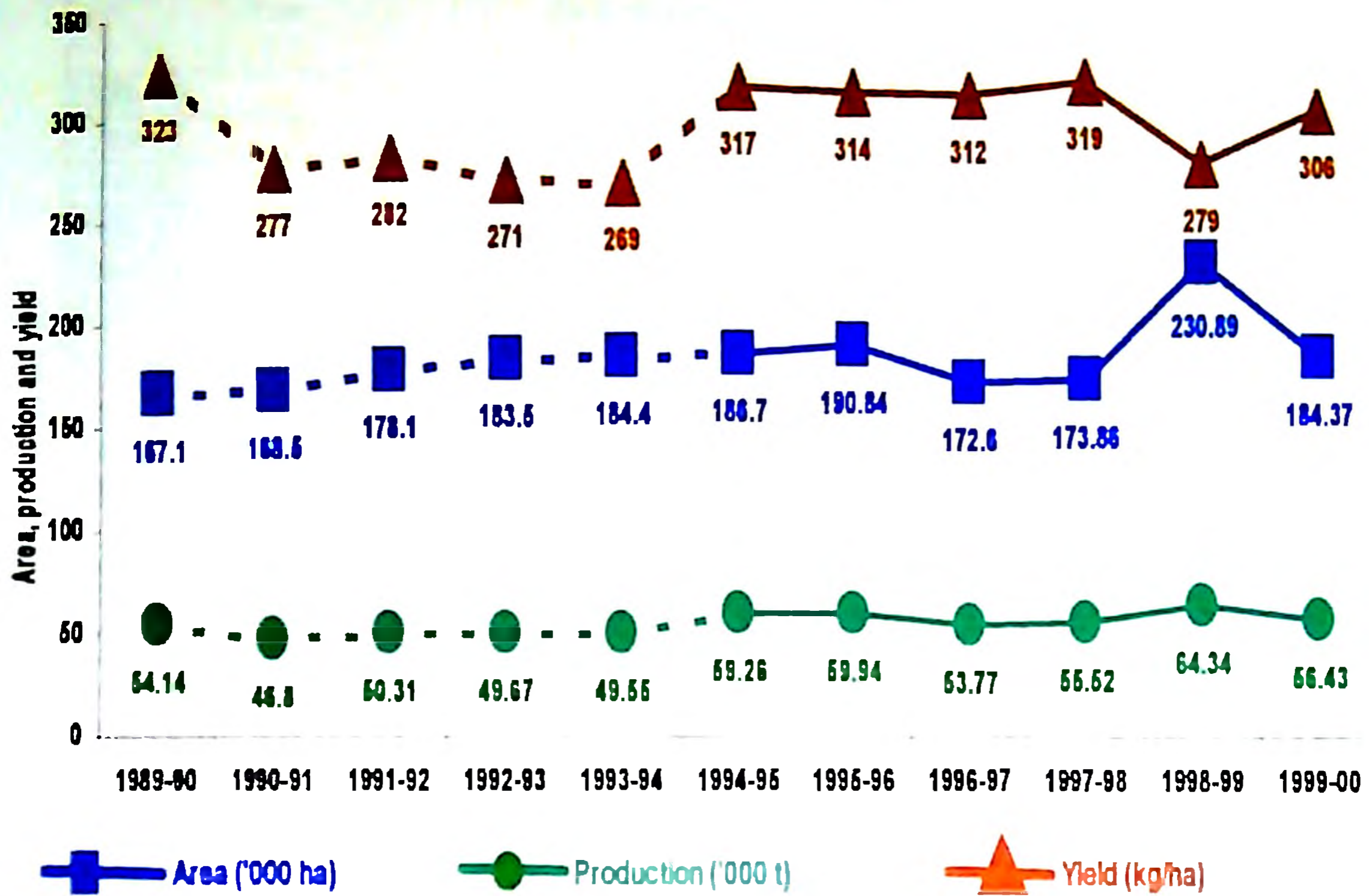


Figure 2. Area, production and yield of cardamom in Kerala during 1990-2000

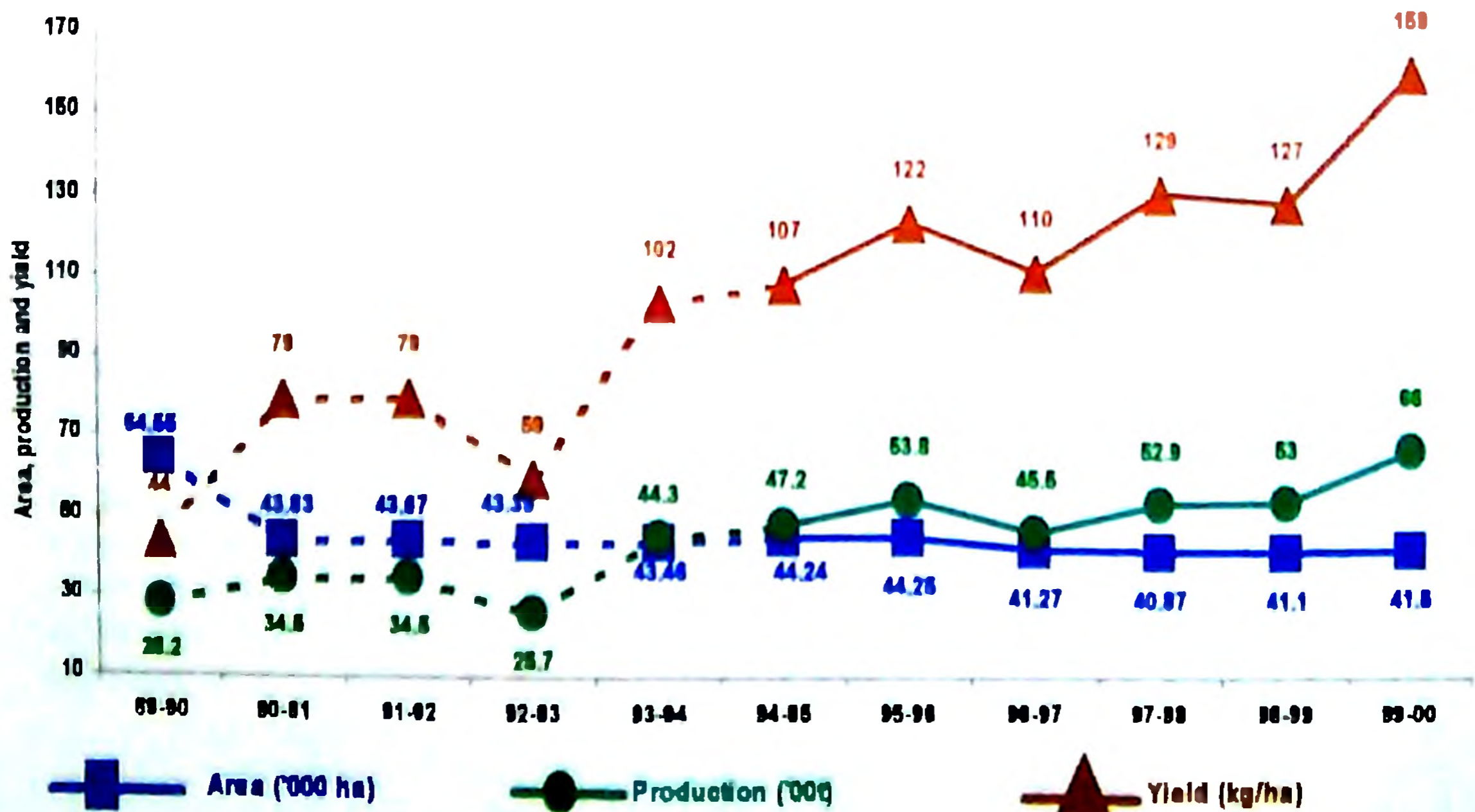


Table 2. Quantity exported and export earnings of black pepper from India (1990-2001)

Year	Quantity exported (tonnes)	Export earning (Rs. Lakhs)
1989-90	34650	15335
1990-91	29985	10240
1991-92	20535	7432
1992-93	23821	7894
1993-94	48743	18910
1994-95	37264	23664
Average	32499.6667	13912.5000
Co-efficient of variation (%)	31.2569	47.0014
CARG (%)	5.7890	12.3303
1995-96	26244	19630
1996-97	47893	41232
1997-98	35907	49636
1998-99	35121	63491
1999-00	42806	88488
2000-01	19250	32633
Average	34536.8333	49185.0000
Co-efficient of variation (%)	30.4077	49.4710
CARG (%)	-5.3072	15.6154

CARG = Compound annual rate of growth

Source : Directorate of Arecanut and Spices Development, 2002, Arecanut and Spices Database, Calicut

Calculations are of the author.

From table 2, it can be observed that the variability in quantity exported and export earnings from black pepper remained nearly the same in both pre WTO period and post WTO period. While quantity exported of black pepper registered a compound annual growth rate of 5.79 per cent in the pre WTO period, it was an alarming -5.31 per cent in the post WTO period. But still, export earnings grew at a faster compound annual rate of 15.61 per cent in the post WTO period compared to 12.33 per cent in the pre WTO period, because of a faster growth in the international price of black pepper compared to its domestic price.

While variability in international price of black pepper (28.74%) was less than that of domestic price (31.6%) in the pre WTO period, the situation reversed in the post WTO period, where international price (46.91%) showed greater variability compared to the domestic price (38.4%). It was observed that while the difference between international price and domestic price widened in the pre WTO period, the same narrowed down in the post WTO period. In the year 1997-98, international price was lower than the domestic price. Such situations erode the incentive for Indian exporters.

Figure 3. Quantity exported and export earnings of black pepper - India during 1990 - 2001

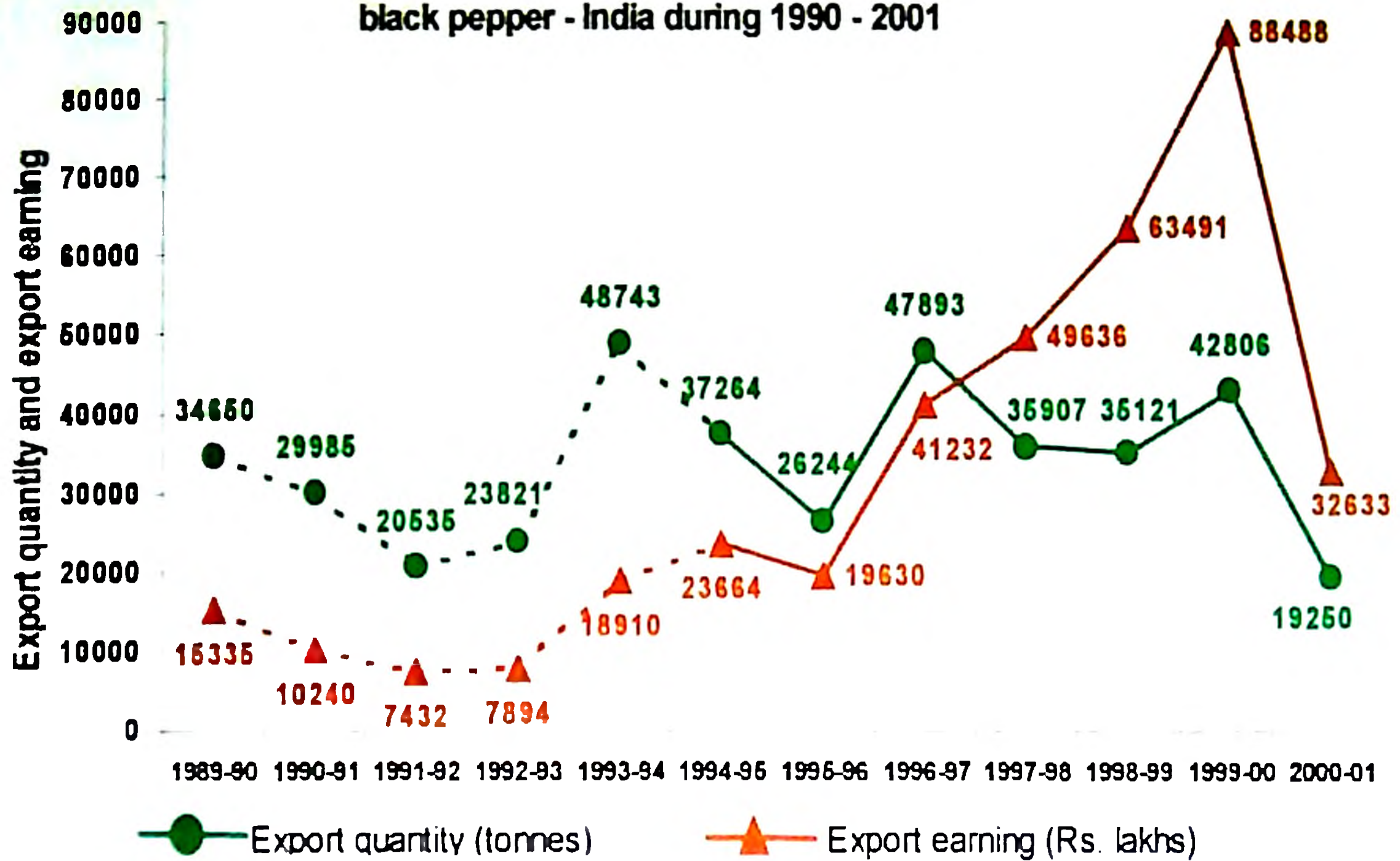


Figure 4. Indian price and international price of black pepper during 1990 - 2001

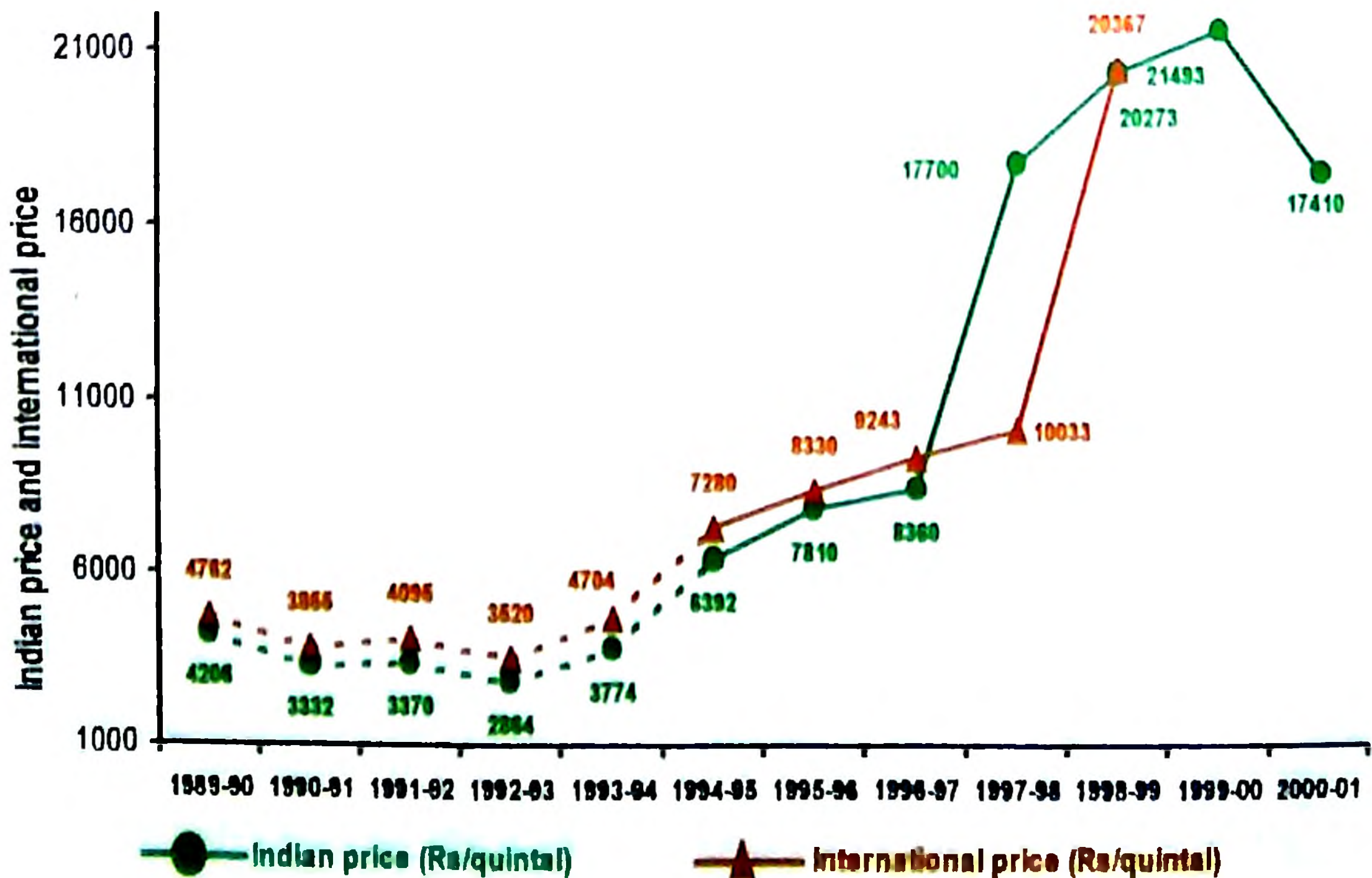


Table 3. Domestic and international prices - Pepper

YEAR	Domestic price (Rs/quintal)	International price (Rs/quintal)
1989-90	4206	4762
1990-91	3332	3855
1991-92	3370	4095
1992-93	2864	3520
1993-94	3774	4704
1994-95	6392	7280
Mean	3989.6667	4702.6667
CV (%)	31.6018	28.7389
CARG (%)	6.8034	7.6134
1995-96	7810	8330
1996-97	8360	9243
1997-98	17700	10033
1998-99	20273	20367
1999-00	21493	-
2000-01	17410	-
Mean	15507.6667	11993.2500
CV (%)	38.3994	46.9072
CARG (%)	22.0591	31.8398

Source : Directorate of Arecanut and Spices Development, 2002, Arecanut and Spices Database, Calicut

Cardamom

Cardamom is known as the "Queen of spices". Our cardamom enjoys a premium preference in the international market due to its green colour and boldness of capsule. Kerala contribute 62.63% of area and 81.62 % of production of small cardamom in India during triennium ending 2000. Productivity of cardamom in Kerala (138 Kg/ha) is much higher than the national average (107 Kg/ha) during the triennium ending 2000 due to suitable climatic condition of Kerala.

Compound annual growth rate of area under cardamom (-5.34%) was decreasing at a faster rate in the pre WTO period than (-1.32%) in the post WTO period. Production and yield of cardamom grew in the pre WTO period at a faster compound annual growth rate (9 % and 15.1% respectively): the same grew at a lesser compound annual growth rate (5.8 % and 6.97% respectively) in the post WTO period.

Export performance of cardamom

Export performance of small cardamom was found to be encouraging in the post WTO period compared to the pre WTO period. Export of small cardamom increased from 173 tonnes in 1989-90 by more than six times to 1100 tonnes in 2000-01. The compound annual growth rate of quantity of small cardamom exported in the post WTO period (23.2%) was much greater than that in the pre WTO period (2.4%). The compound annual growth rate of export earnings was also greater in the post WTO

period (41.44%) compared to that in the pre WTO period (14%). Variability in both domestic price and international price was more in the post WTO period than in the pre WTO period. While the difference between international price and domestic price was wide in the pre WTO period, it narrowed down in the post WTO period.

Table 4. Area, production and yield of cardamom in Kerala(1990-2000)

Year	Area (lakh ha)	Production ('000 tonnes)	Yield (kg/ha)
89-90	0.6455	2.82	44
90-91	0.4383	3.45	79
91-92	0.4367	3.45	79
92-93	0.4339	2.57	59
93-94	0.4346	4.43	102
94-95	0.4424	4.72	107
Mean	0.4719	3.5733333	78.333333
CV(%)	18.033594	23.921374	30.931224
CARG (%)	-5.340448	9.045939	15.086093
95-96	0.4425	5.38	122
96-97	0.4127	4.55	110
97-98	0.4087	5.29	129
98-99	0.411	5.3	127
99-00	0.415	6.6	159
Mean	0.418725	5.13	122
CV(%)	3.805487	7.578142	6.987274
CARG (%)	-1.315783	5.773964	6.966691

Source : 1. State Planning Board, Government of Kerala, 2000, Data Book on Agriculture, Thiruvananthapuram

2. Directorate of Arecanut and Spices Development, 2002, Arecanut and Spices Database, Calicut

Ginger

Ginger is one of the oldest known spices in the world and Indian ginger has high preference in the global market because of its characteristic lemon like flavour. Being an annual crop the area and production are highly influenced by price fluctuation. Kerala contribute 17.4% of area and 17.98% of production of ginger in India during the triennium ending 2000. Per hectare yield of ginger in Kerala (3491 kg/ha) is higher than the national average (3373 kg/ha) during the triennium ending 2000.

Compound annual rate of growth of ginger in area and production in pre WTO period was an alarming -2.86% and -1.2% respectively, while the same grew at a faster rate of 2.965% and 1.58% in the post WTO period. It is due to prevalence of high price in the market. Compound annual rate of growth of yield was 1.46% in pre WTO period, which became an alarming -1.36% in post WTO period due to the pest and disease incidence.

Table 5. Quantity exported and export earnings of small cardamom from India (1990-2001)

Year	Quantity exported (tonnes)	Export earning (Rs. lakhs)
1989-90	173	314.11
1990-91	400	1086.61
1991-92	544	1557.41
1992-93	190	750.57
1993-94	387	1454.83
1994-95	257	762.61
Average	325.1667	987.6900
Co-efficient of variation (%)	44.2215	47.7725
CARG (%)	2.3936	13.9823
1995-96	527	1296.97
1996-97	226	869.67
1997-98	297	1063.71
1998-99	475	2521.21
1999-00	646	3201.84
2000-01	1100	5654.7
Average	545.1667	2434.6833
Co-efficient of variation (%)	57.2299	74.8111
CARG (%)	23.1906	41.4427

CARG = Compound annual rate of growth

Source : Directorate of Arecanut and Spices Development, 2002, Arecanut and Spices Database, Calicut

Calculations are of the author.

Export performance of ginger was found to be distressing in the post WTO period, while it was good in the pre WTO period. Export of ginger decreased from 8135 tonnes in 1989-90 to 6580 tonnes in 2000-01. While quantity exported and export earnings grew in the pre WTO period at compound annual rates of 14.32 per cent and 10.15 per cent respectively, the same grew at an alarming -24.87 per cent and -13.81 per cent respectively in the post WTO period, indicating that India is losing to its competitors in ginger exports. Both domestic price and international price of ginger grew at an annual compound rate of 10 per cent in the pre WTO period. But the same fell nearly by nearly half to less than 5 per cent in the post WTO period. Even though the mean difference between international price and domestic price was more in the (Rs. 19.76 per kg) in the post WTO period compared to that in the pre WTO period (Rs. 17.56 per kg), India could not exploit it.

Turmeric

Turmeric is a multipurpose crop, valued for its colouring pigment, spicy flavour and medicinal properties. Kerala contribute 2.45 of area and 1.39% of production of turmeric in India during the triennium ending 2000. Per hectare yield of turmeric in Kerala (2223 kg/ha) is about half (56%) of that of the national average (3941.3 kg/ha) during the triennium ending 2000.

Figure 5. Quantity exported and export earnings of small cardamom - India during 1990 - 2001

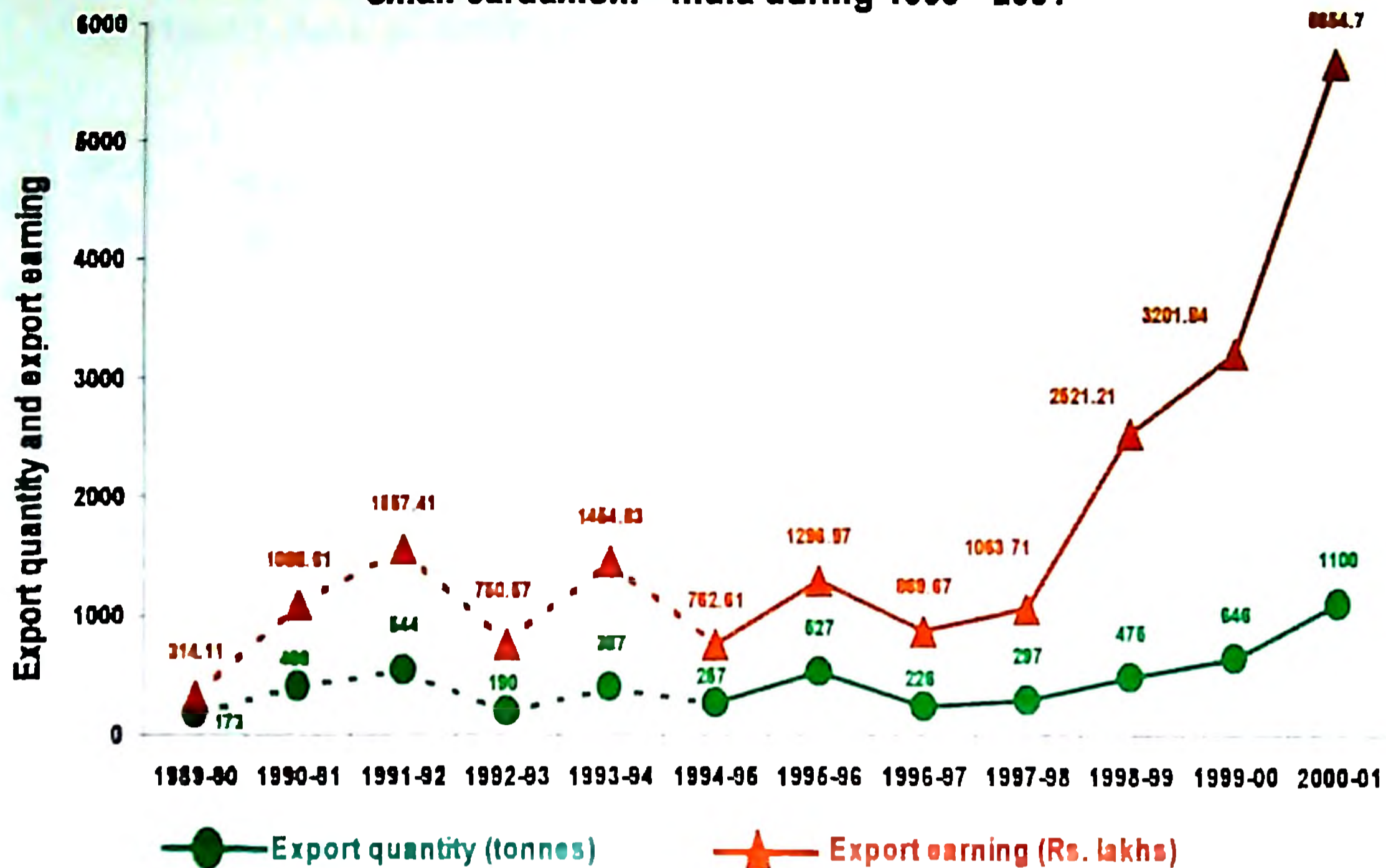


Figure 6. Indian price and international price of small cardamom during 1990 - 2001

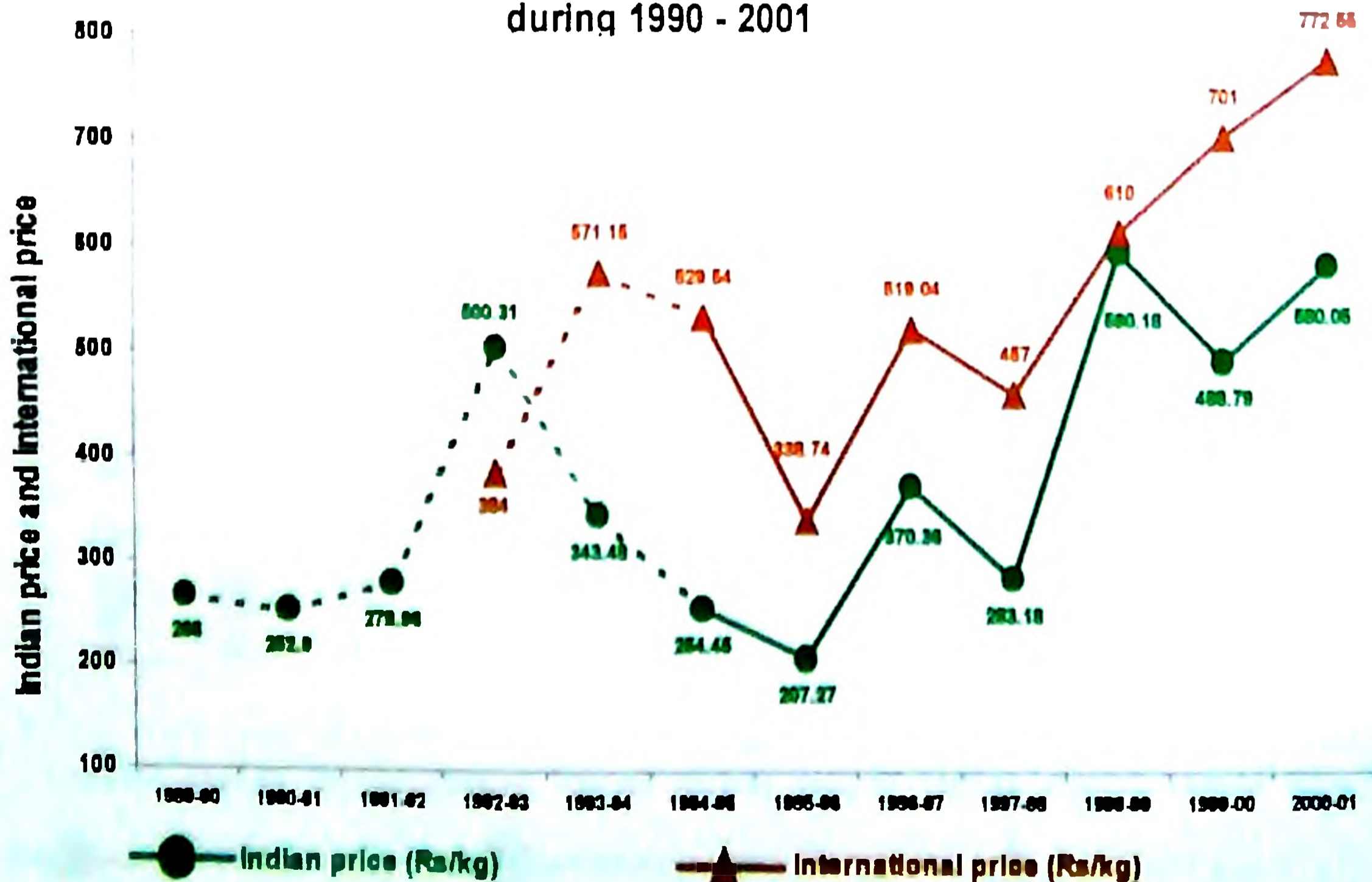


Figure 7. Area, production and yield of ginger in Kerala during 1990-99

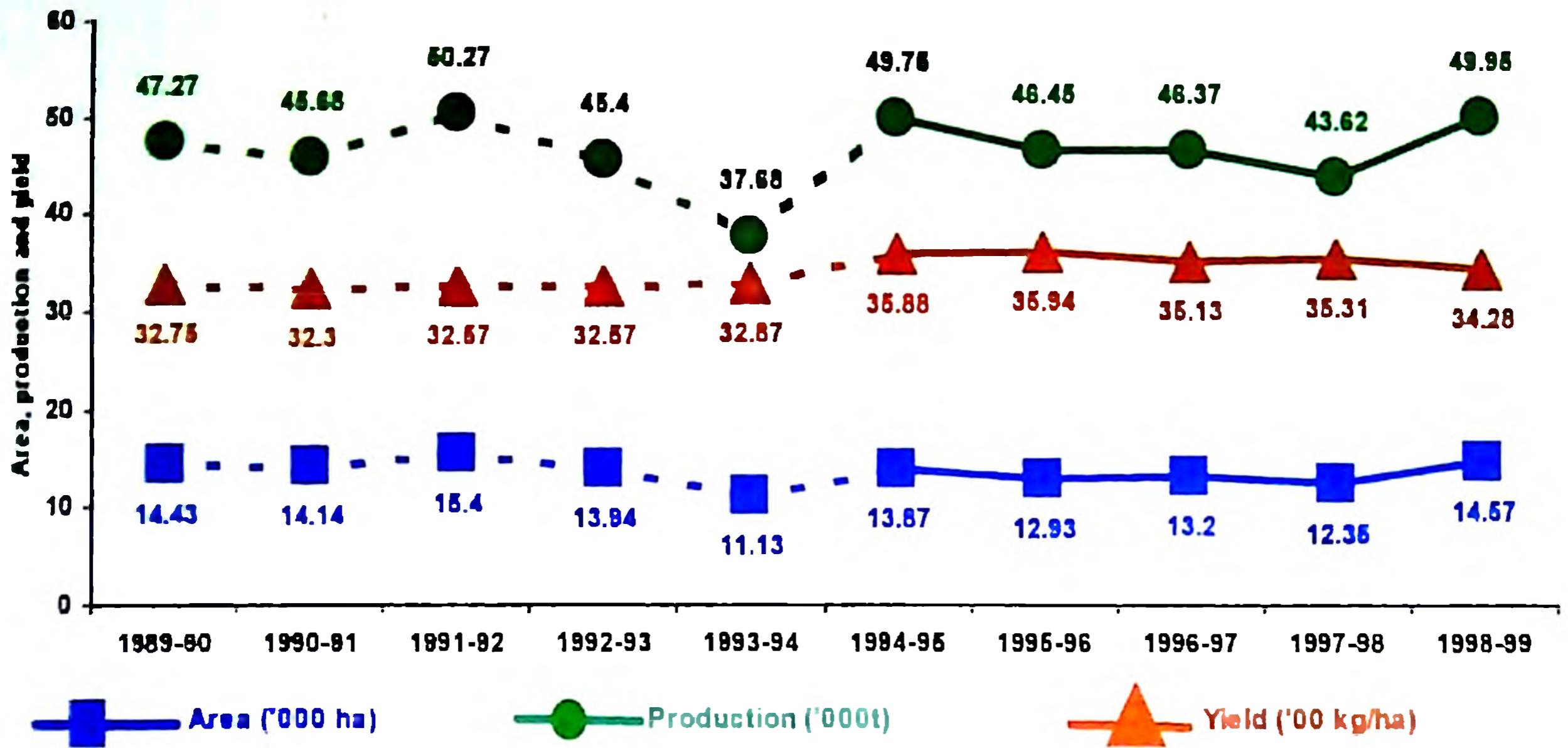


Figure 8. Area, production and yield of turmeric in Kerala during 1991-2001

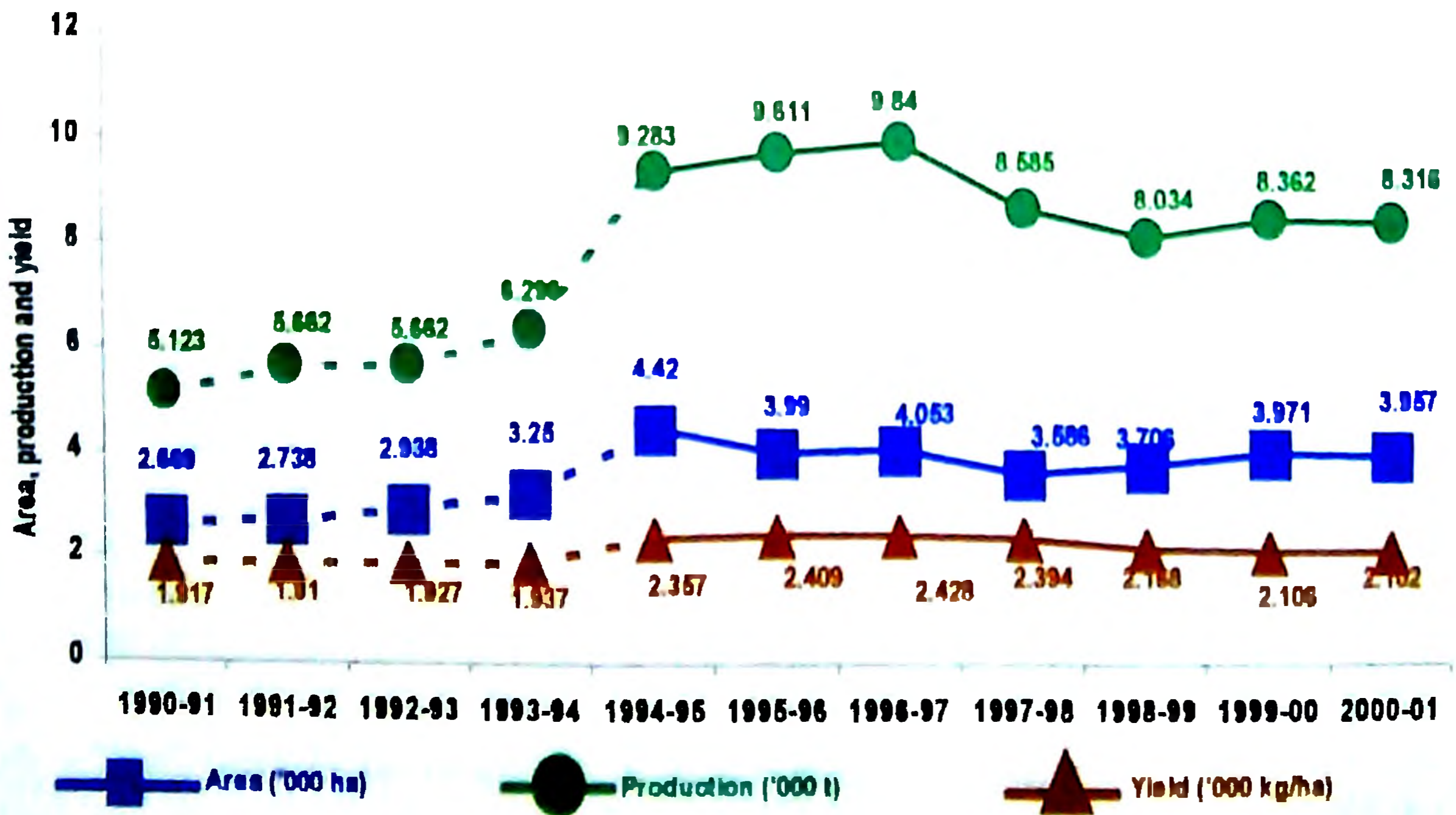


Table 6. Domestic and international prices-cardamom

Year	Domestic price (Rs/quintal)	International price (Rs/kg)
1989-90	26643	-
1990-91	25290	-
1991-92	27896	-
1992-93	50031	384
1993-94	34348	571.15
1994-95	25445	529.54
Mean	31608.8333	494.8967
CV (%)	30.4517	19.8561
CARG (%)	3.7027	17.4313
1995-96	20727	338.74
1996-97	37036	519.04
1997-98	28318	457
1998-99	59018	610
1999-00	48879	701
2000-01	58005	772.55
Mean	41997.1667	566.3883
CV (%)	37.7611	28.3105
CARG (%)	21.1385	16.3917

Source : 1. Directorate of Arecanut and Spices Development, Government of India, 2002, Arecanut and Spices Database, Calicut
2. Various issues of Spice India

Compound annual rate of growth in area in post WTO period (0.54%) is slower compared to pre WTO period. Production and yield shown a compound annual growth rate of 13.83% and 4.37% respectively in pre WTO period while it is an alarming -3.56% and -4.08% in post WTO period. Faster decrease in compound annual rate of growth in production is due to faster decrease of growth in per hectare yield

Export performance of turmeric

Export performance of turmeric was found to be not as good in the post WTO period as in the pre WTO period. Both quantity exported (8.42%) and export earnings (18.81%) at a lesser compound annual rate in the post WTO period compared to that in the pre WTO period (13.55 per cent for quantity exported and 29.58 per cent for export earnings). Both international price and domestic price grew only at a marginally higher annual rate in the post WTO period compared to that in the pre WTO period. It was found that the difference between international price and domestic price has widened more in the post WTO period (Rs. 31.43 per kg) than in the pre WTO period (Rs. 19.16 per kg).

Table 7. Area, production and yield of ginger in Kerala (1990-2000)

Year	Area ('000 ha)	Production ('000 tonnes)	Yield (kg/ha)
1989-90	14.43	47.27	3275
1990-91	14.14	45.68	3230
1991-92	15.4	50.27	3257
1992-93	13.94	45.40	3257
1993-94	11.13	37.68	3287
1994-95	13.87	49.75	3588
Mean	13.8183	46.0083	3315.67
CV(%)	10.3483	9.8933	4.0657
CARG (%)	-2.8600	-1.2036	1.4645
1995-96	12.93	46.45	3594
1996-97	13.2	46.37	3513
1997-98	12.35	43.62	3531
1998-99	14.57	49.95	3428
Mean	13.2625	46.5975	3516.5
CV(%)	7.0955	5.565686934	1.94687
CARG (%)	2.9597	1.5803	-1.3582

Source : State Planning Board, Government of Kerala, 2000, Data Book on Agriculture, Thiruvananthapuram

Table 8. Quantity exported and export earnings of ginger from India (1990-2001)

Year	Quantity exported (tonnes)	Export earning (Rs. lakhs)
1989-90	8135	1262.44
1990-91	6555	1175.79
1991-92	14259	2188.1
1992-93	9825	1687.37
1993-94	18442	2478.12
1994-95	12022	1673.03
Average	11539.6667	1744.1417
Co-efficient of variation (%)	37.7032	29.2257
CARG (%)	14.3183	10.1538
1995-96	18483	3892.13
1996-97	29737	5924.41
1997-98	28268	7262.73
1998-99	8683	4058.32
1999-00	8773	3060.15
2000-01	6580	2295.4
Average	16754.0000	4415.5233
Co-efficient of variation (%)	61.8256	41.9029
CARG (%)	-24.8664	-13.8162

CARG = Compound annual rate of growth

Source : Directorate of Arecanut and Spices Development, 2002, Arecanut and Spices Database, Calicut

Calculations are of the author.

Figure 10 Indian price and International price of ginger during 1990 - 2001

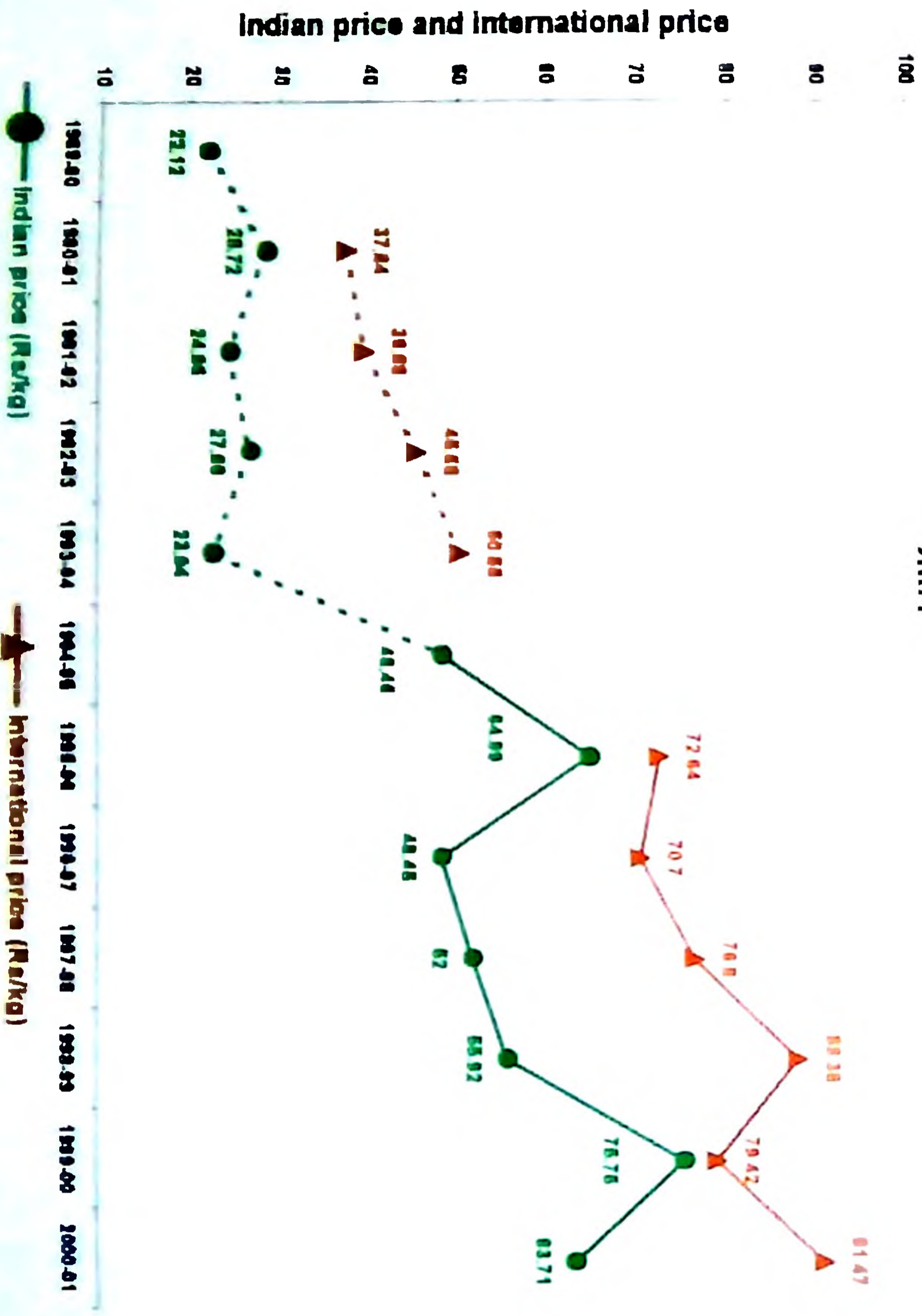


Figure 9. Quantity exported and export earnings of ginger - India during 1990 - 2001

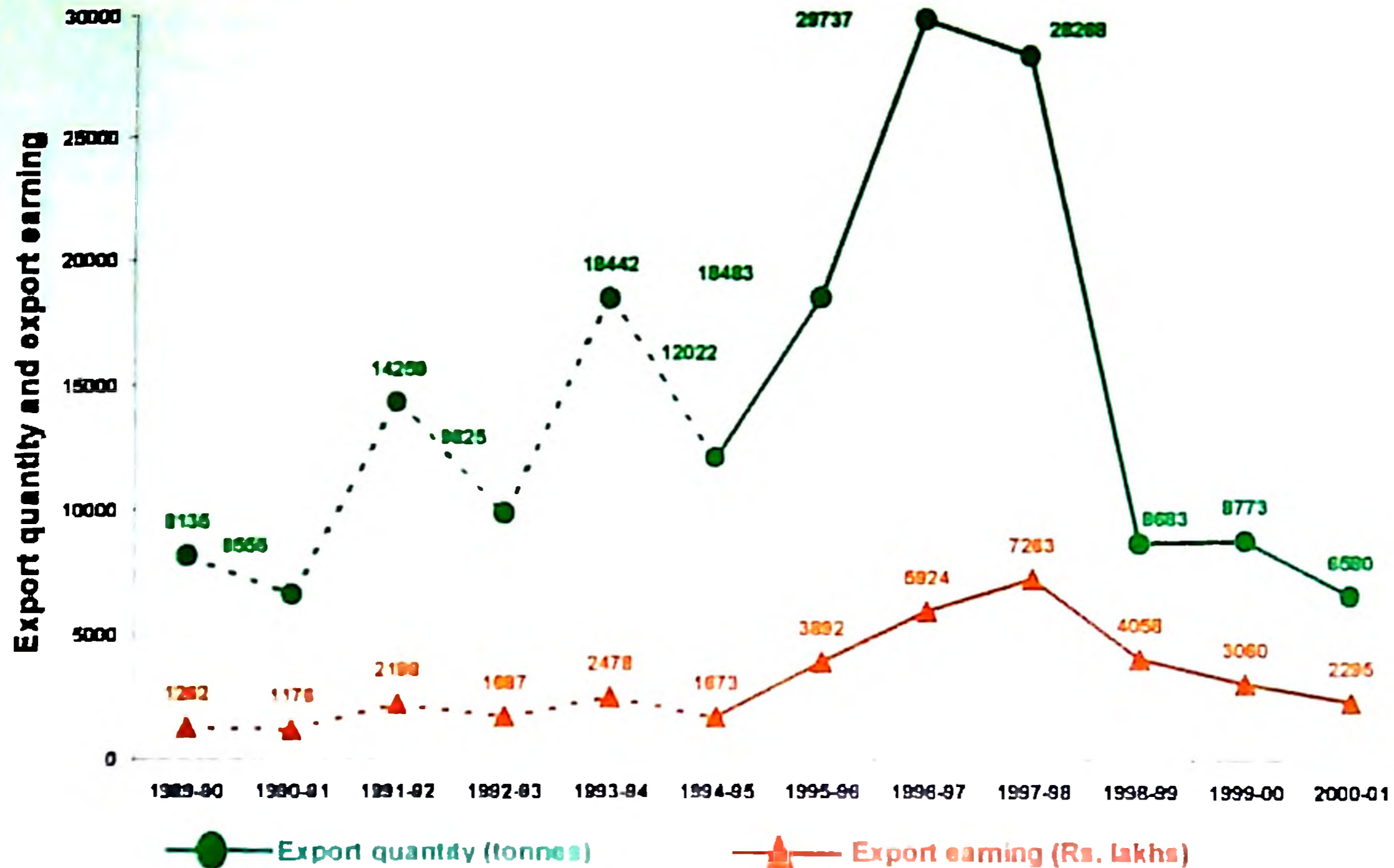


Table 9. Domestic price and international price of ginger (1990-2001)

Year	Domestic price (Rs/kg)	International price (Rs/kg)
1989-90	22.12	-
1990-91	28.72	37.84
1991-92	24.86	39.88
1992-93	27.09	45.68
1993-94	23.04	50.55
1994-95	48.46	-
Average	29.0483	43.4875
Co-efficient of variation (%)	33.8141	13.2493
CARG (%)	10.0322	10.5677
1995-96	64.99	72.64
1996-97	48.45	70.7
1997-98	52	76.8
1998-99	55.92	88.38
1999-00	75.75	79.42
2000-01	63.71	91.47
Average	60.1367	79.9017
Co-efficient of variation (%)	16.6398	10.5154
CARG (%)	3.8255	4.8027

CARG = Compound annual rate of growth

Source : 1. Directorate of Arecanut and Spices Development, Government of India, 2002. Arecanut and Spices Database, Calicut.

2. Various issues of Spice India

Calculations are of the author.

Export performance of spice oils and oleoresins

Pepper oil, ginger oil, mustard seed oil, celery seed oil and nutmeg oil are the prominent spice oils; while pepper oleoresin, paprika oleoresin, capsicum oleoresin and turmeric oleoresin are the prominent spice oleoresins that are exported. The quantity of spice oils and oleoresins exported increased by five times from 717 tonnes in 1989-90 to 3625 tonnes in 2000-01. Both quantity exported (13.32%) and export earnings (26.26%) grew at a lesser compound annual rate in the post WTO period compared to that in the pre WTO period (16.7 per cent for quantity exported and 30 per cent for export earnings).

Organic spices

Organic spices are gaining great momentum in the world market. There is a very good scope for production and export of organic spices from India. The major consumers of organic spices in world are U. S, Europe and Japan. Organic cultivation being more expensive, the grower should get premium price at the same time affordable to the consumers. Cost of certification for organic spices is very high and beyond the capability of the average Indian farmer. Now Spices Board has launched programmes to create awareness among farmers for organic spices production and it provides 50% of the cost of inspection and certification charges.

Table 10. Area, production and yield of turmeric in Kerala (1990-2000)

Year	Area ('000 ha)	Production ('000 tonnes)	Yield (kg/ha)
1990-91	2.669	5.123	1917
1991-92	2.738	5.662	1910
1992-93	2.938	5.662	1927
1993-94	3.25	6.296	1937
1994-95	4.42	9.283	2357
Average	3.203	6.4052	2009.6
CV (%)	22.3774	25.9399	9.6771
CARG (%)	12.5278	13.8262	4.3655
1995-96	3.99	9.611	2409
1996-97	4.053	9.84	2428
1997-98	3.586	8.585	2394
1998-99	3.706	8.034	2168
1999-00	3.971	8.362	2106
2000-01	3.957	8.316	2102
Average	3.8546	8.6274	2239.6
CV (%)	5.1500	8.1791	7.1037
CARG (%)	0.54184	-3.5636	-4.0797

Source 1. Farm Information Bureau, Government of Kerala, 2001, Farm Guide 2001, Thiruvanthapuram

2. Farm Information Bureau, Government of Kerala, 2002, Farm Guide 2002, Thiruvanthapuram

3. State Planning Board, Government of Kerala, 2001, Economic Review 2000-01, Thiruvanthapuram

Quality standards

We have to harmonise the quality of our product to internationally accepted standards *i.e.*, those of Codex Alimentarius Commission. There are reports of complaints from Germany about the presence of high BHC residue in pepper and chilli oleoresins exported from India. Australia too had begun rejecting consignments on these grounds. Germany and Netherlands are the largest exporter of spice oleoresins in the European market and they have a strong temptation to use SPS as a non-tariff barriers to deny India its share of value added exports.

India lacks desired infrastructure, institution and legislation to adopt HACCP. India has to go long way to harmonise its quality standards with other WTO member countries. In fact SPS has emerged as a major constraint in enhancing export from India

Cost of cultivation and productivity of spices

Cost of cultivation of spices in Kerala is high due to high labour charge. Labour charge accounts for 60% of cost of cultivation of pepper. Agricultural labour wages in

Figure 12. Indian price and international price of turmeric during 1990 - 2001

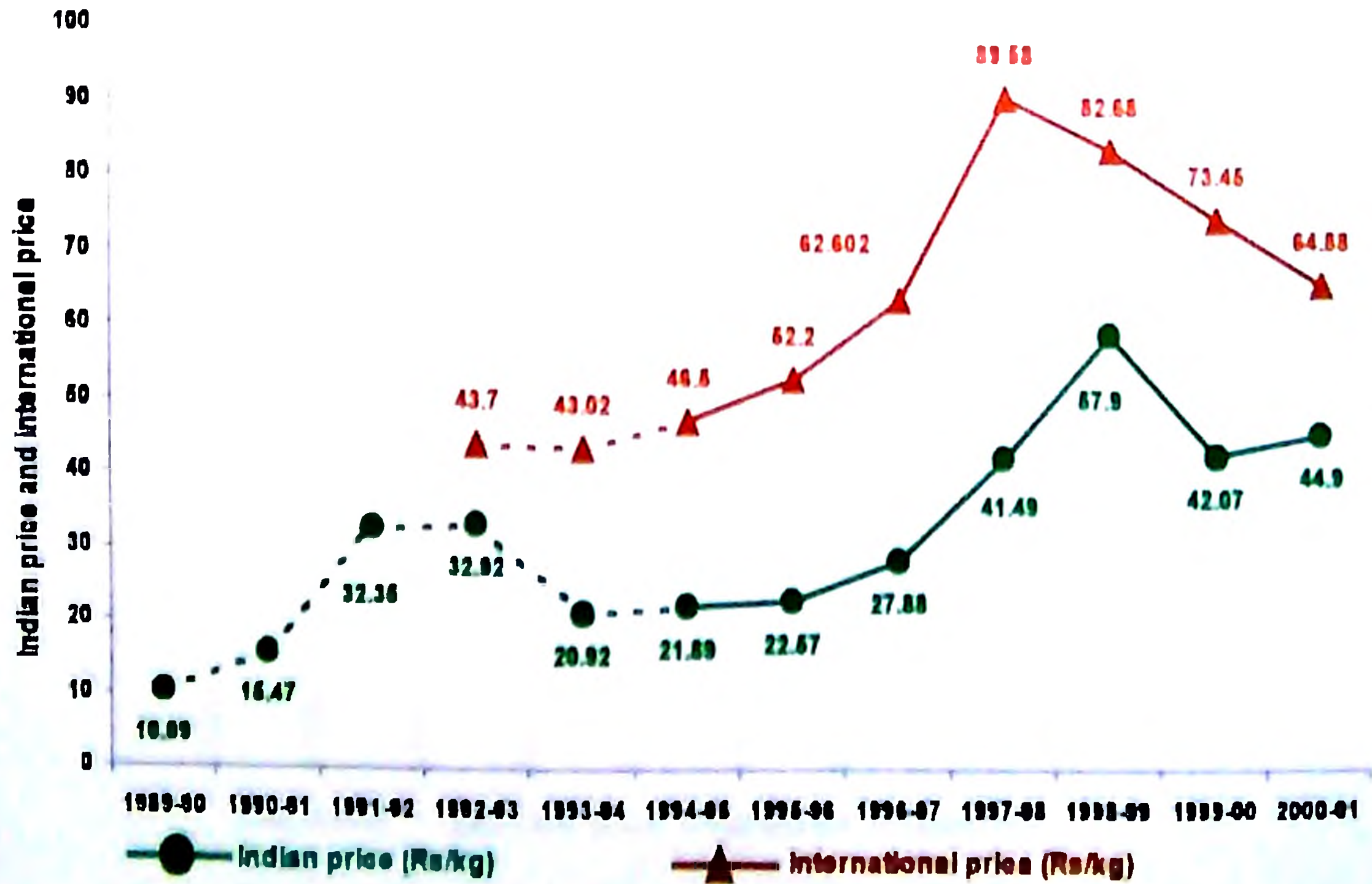


Figure 11. Quantity exported and export earnings of turmeric - India during 1990 - 2001

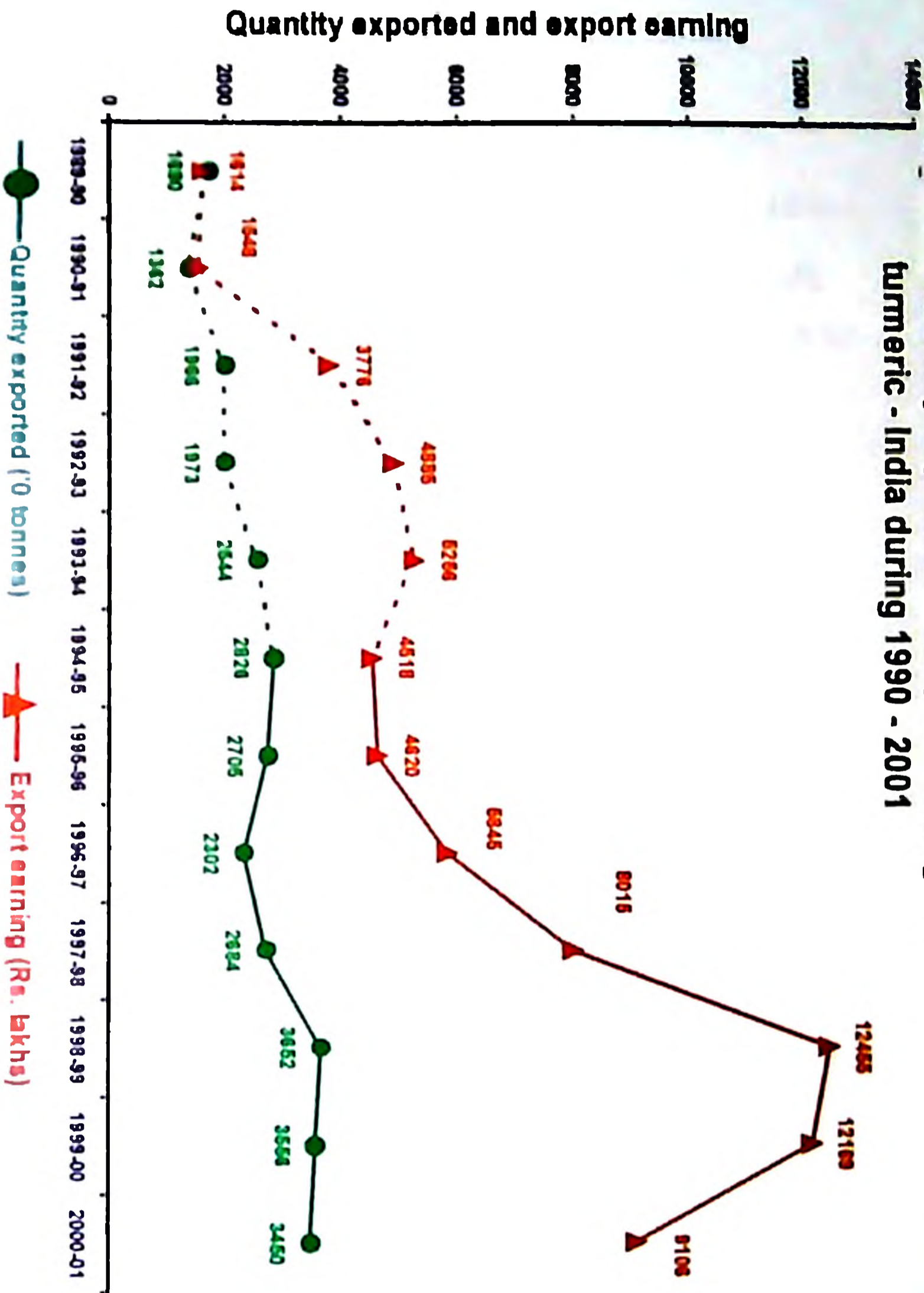
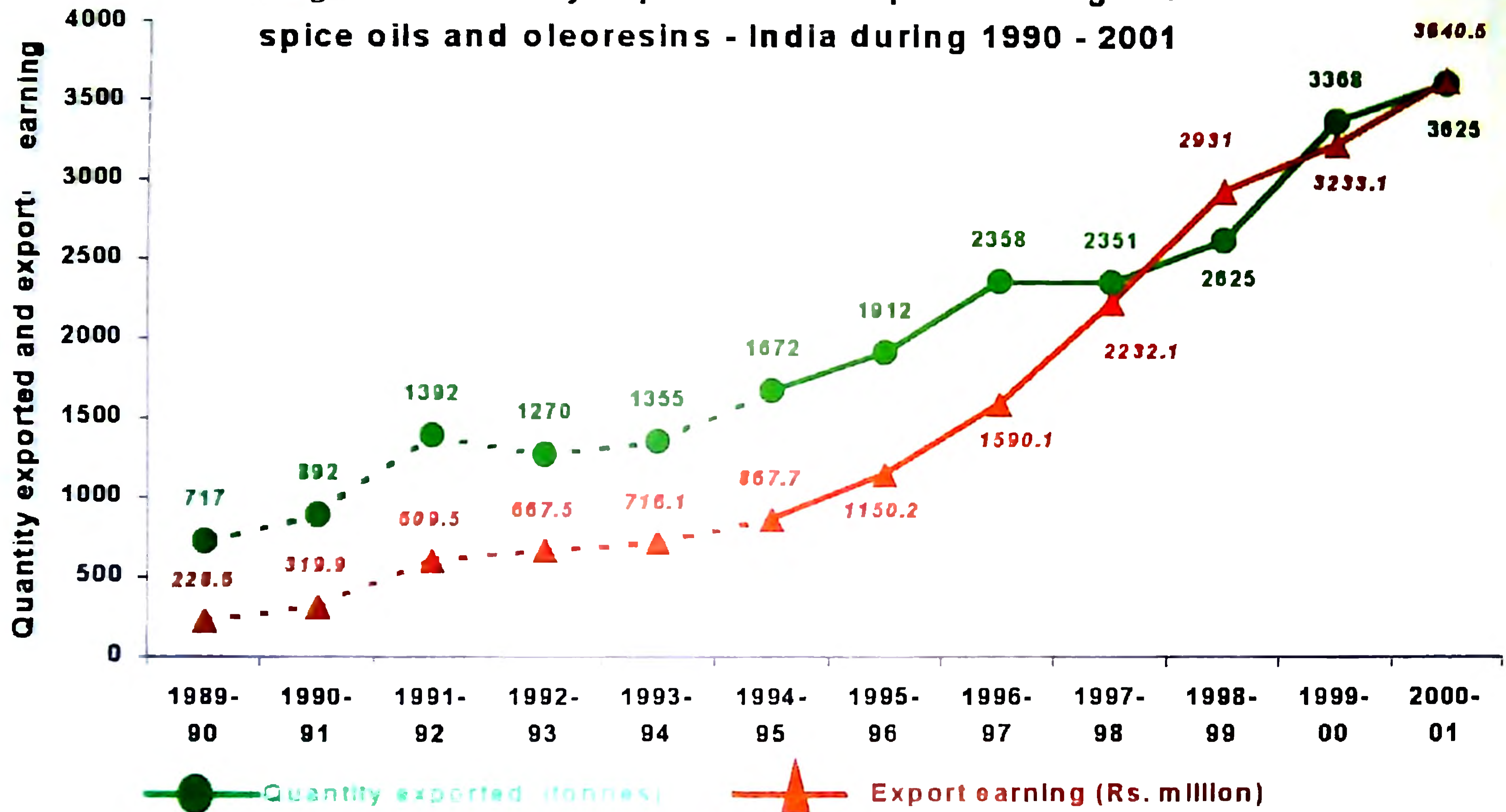


Figure 13. Quantity exported and export earnings of spice oils and oleoresins - India during 1990 - 2001



Kerala have increased by 400% during 1980 to 1995, while there was 47% increase in Malaysia during the same period. Moreover black pepper is grown mostly a mixed crop in homesteads so per hectare yield is less.

Table 11. Quantity exported and export earnings of turmeric from India (1990-2001)

Year	Quantity exported (tonnes)	Export earning (Rs. lakhs)
1989-90	16900	1613.9
1990-91	13624	1548.48
1991-92	19661	3776.22
1992-93	19726	4885.43
1993-94	25436	5256
1994-95	28256	4517.96
Average	20600.5000	3599.6650
Co-efficient of variation (%)	26.2311	45.5152
CARG (%)	13.5458	29.5851
1995-96	27050	4620.33
1996-97	23019	5844.61
1997-98	26838	8015.01
1998-99	36522	12454.98
1999-00	35556	12168.69
2000-01	34500	9106
Average	30580.8333	8701.6033
Co-efficient of variation (%)	18.4440	36.9048
CARG (%)	8.4180	18.8125

CARG = Compound annual rate of growth

Source : Directorate of Arecanut and Spices Development, 2002, Arecanut and Spices Database, Calicut

Calculations are of the author.

Product diversification

Spice farmers are in the habit of selling the produce in primary form. 85-90% is exported as primary produce. There exist a good scope for value added products. Spices could form the biggest component of " nutraceuticals," the food products used in preventive health care systems.

CONCLUSION

From the above analysis it can be inferred that compound annual rate of growth in area, production and yield of pepper, cardamom and turmeric is lesser in post WTO period compared to pre WTO period. While area and production under ginger in Kerala showed a faster compound annual rate of growth in post WTO period than in pre WTO period.

Quantity exported and export earning of pepper, ginger, turmeric and spice oils and oleoresins showed a lesser compound annual rate of growth in post WTO period than in pre WTO period, while growth was faster in post WTO period than in

pre WTO period. But there is high variability in export earning and quantity exported, so predictability is less.

Table 12. Domestic price and international price of turmeric (1990-2001)

Year	Domestic price (Rs/quintal)	International price (Rs/kg)
1989-90	1009	-
1990-91	1547	-
1991-92	3235	-
1992-93	3292	43.7
1993-94	2092	43.02
1994-95	2189	46.5
Average	2227.3333	44.4067
CV (%)	40.7344	4.1536
CARG (%)	14.6838	3.1539
1995-96	2257	52.2
1996-97	2788	62.602
1997-98	4149	89.58
1998-99	5790	82.68
1999-00	4207	73.45
2000-01	4490	64.88
Average	3946.8333	70.8987
CV (%)	32.0473	19.4317
CARG (%)	15.3783	4.3388

Source : 1. Directorate of Arecanut and Spices Development, Government of India, 2002, Arecanut and Spices Database, Calicut
2. Various issues of Spice India

Both the domestic price and international grew faster in post WTO period than in pre WTO period in the case of pepper and turmeric, while it was slower than pre WTO period in the case of ginger. Compound annual rate of domestic price of cardamom grew at a faster rate in post WTO period than pre WTO period, while compound annual rate of international price is slower in the post WTO period.

Table 13. Quantity exported and export earnings of spice oils and oleoresins from India (1990-2001)

Year	Quantity exported (tonnes)	Export earning (Rs. lakhs)
1989-90	717	2286
1990-91	892	3199
1991-92	1392	6095
1992-93	1270	6675
1993-94	1355	7161
1994-95	1672	8677
Average	1216.3333	5682.1667
Co-efficient of variation (%)	28.8366	43.1171
CARG (%)	16.6692	29.9812
1995-96	1912	11502
1996-97	2358	15901
1997-98	2351	22321
1998-99	2625	29310
1999-00	3368	32331
2000-01	3625	36405
Average	2706.5000	24628.3333
Co-efficient of variation (%)	24.3237	39.5226
CARG (%)	13.3255	26.2643

CARG = Compound annual rate of growth

Source : Directorate of Arecanut and Spices Development, 2002, Arecanut and Spices Database, Calicut

Calculations are of the author.

Discussion

1. Is GATT and WTO same?

GATT is General Agreement on Tariffs and Trade and it was created after second world war. It was ad hoc and provisional and was never ratified in members' parliament and it contained no provisions for the creation of an organisation. GATT dealt with trade in goods only.

WTO was developed out of GATT in 1995 January 1. WTO and its rule are permanent. As an international organisation, the WTO has a sound legal basis because members have ratified the WTO agreements, and the agreements themselves describe how the WTO has members instead of contracting parties in GATT and it covers services and intellectual property other than trade. Rulings of WTO cannot be blocked.

2. How many years it will take to know the actual impact of WTO?

Prices have a tendency to rise for 4-5 years and then decline for the same number of years. In order to rule out the effect of trade cycle and complete implementation of rules and commitments under WTO it will take 10 years.

3. Is there any correlation between International price and production?

Yes, there exist a positive correlation between price and production. Price is the main motive for the farmers to produce more.

4. Should a country like India sign WTO agreement?

Yes, in WTO there are a set of rules and commitments that member countries should follow. Subsidies given by different to promote production and exports, and tariff level for import and export are fixed. So one country could not dominate the market by providing more protection or subsidies It will increase predictability and competitiveness and reduce protectionism. Member countries have the advantage of open market, predictable trade and reduced protectionism which a country like India prefer.

5. Why is per hectare yield of pepper in India low as compared to that of other Asian countries?

In India, black pepper is grown mostly as a mixed crop in homesteads by using live standards. Hence productivity per unit area is less in India though ecosystem is nurtured.

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FOOD SECURITY IN INDIA

1320

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(2001-16-01)
M.Sc Food science and Nutrition

SEMINAR REPORT

Submitted in the partial fulfillment of the course
HSc. 651 Seminar

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ABSTRACT

In India, 500 million people sleep hungry everyday and over 750-800 million people are either undernourished or malnourished. Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. The three major dimensions of food insecurity are food availability, food access and absorption of food.

Even after 50 years of independence, it has not been possible for the country to ensure access to productive livelihoods and food for all. Those dependent upon low income and casual employment do not hope to eat enough throughout the year. There are problems of discrimination by gender which is ingrained in society and which have a bearing upon access to food. Further, problems of absorption of food into the body occur due to imbalance in the diet and diseases. Lack of health care facilities, clean drinking water and sanitation worsen the situation. They inturn have an impact on human outcomes such as life expectancy, maternal mortality, child mortality, infant mortality and malnutrition.

INTRODUCTION

Food is the most basic need of a person. Each one needs enough food to stay active and healthy life.(MSSRF,2001).In India,500 million people sleep hungry everyday and over 750-800 million people are either undernourished or malnourished (Chaubey,2001)Even after fifty years of independence it has not been possible for the country to ensure access to productive livelihoods and food for all. Those dependent upon low wage incomes and casual employment do not hope to eat enough through out the year .In this context, the topic of food security is gaining overwhelming importance.

FAO (1983) had formulated that the basic concept of food security implied that "all people at all times have both physical and economic access to the basic food they need." FAO (1996) has modified to indicate that food security is "access by all people at all times to enough food for an active, healthy life. Its essential elements are the availability of food and the ability to acquire it."

A draft document of the subcommittee on Nutrition (United Nations, 1997) defines household food security as follows: "a household is food secure when it has access to the food needed for a healthy life for all its members (adequate in terms of quality, safety and culturally acceptable) and when it is not at undue risk of losing such access.

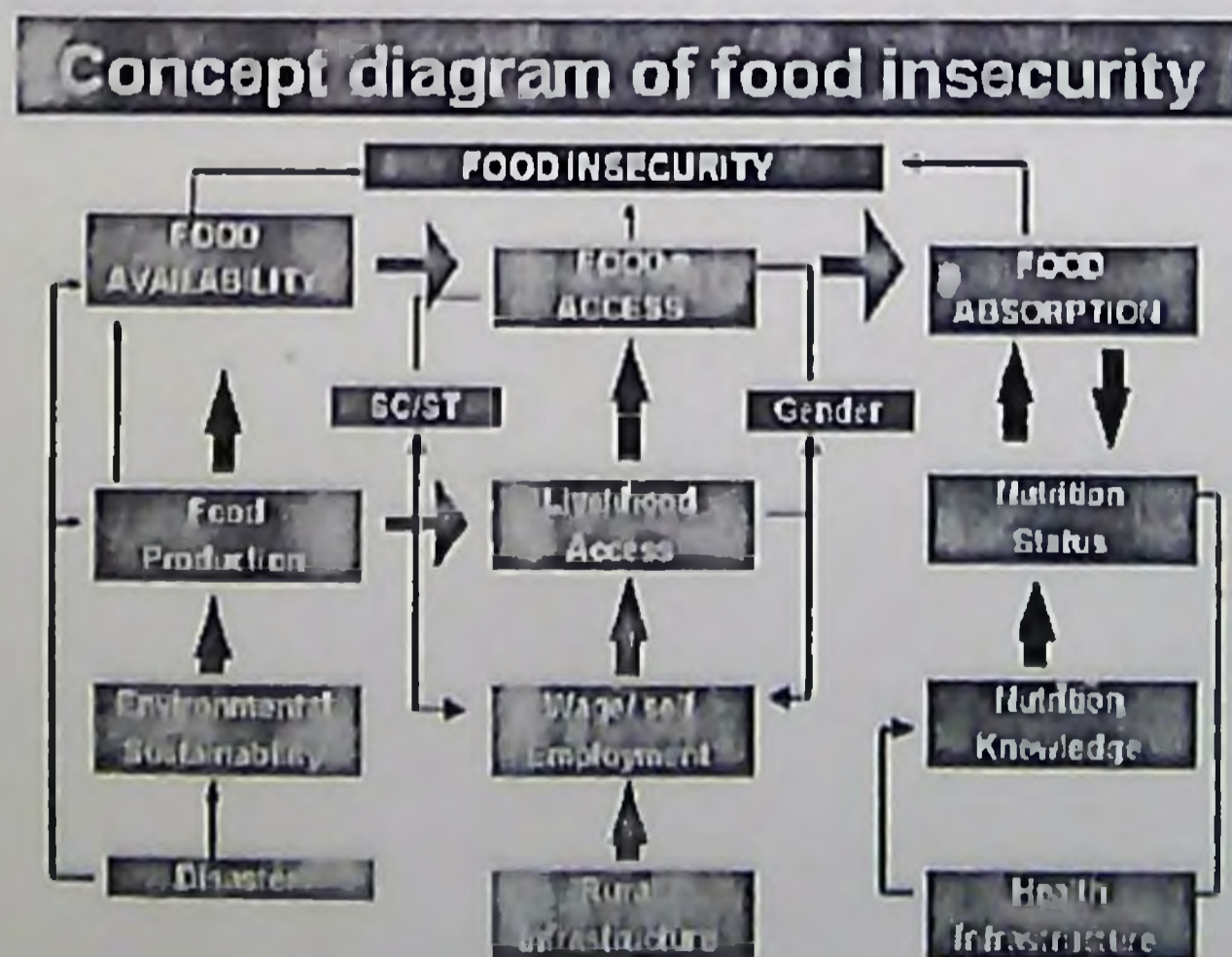
DIMENSIONS OF FOOD INSECURITY

Food insecurity may be present or potential. A state producing sufficient food at present may not be able to produce the same amount in the future, due to environmental factors such as land degradation or ground water depletion or due to economic factors e.g., lack of price incentives. If it over uses its natural resources and fails in making provision for preventing environmental degradation, it would become potentially food insecure.

Potential food insecurity is related not only to existing malnutrition of the people in a region but also to the lack of access to safe drinking water and poor sanitation and health conditions. It can occur either due to a potential lack of availability of food or due to a potential lack of livelihood or a potential threat of disease and lack of absorption.

Food insecurity may be chronic or transitory. Chronic food insecurity refers to a situation in which people consistently consume diets inadequate in calories and essential nutrients. This often happens due to inability to access food by production, purchase, gift or aid. Transitory food insecurity is a temporary shortfall in food availability and consumption. Factors are fall in income, increase in food prices, shortage of production, temporary short fall due to floods, droughts and other natural calamities etc. lead to temporary food insecurity.

Table I



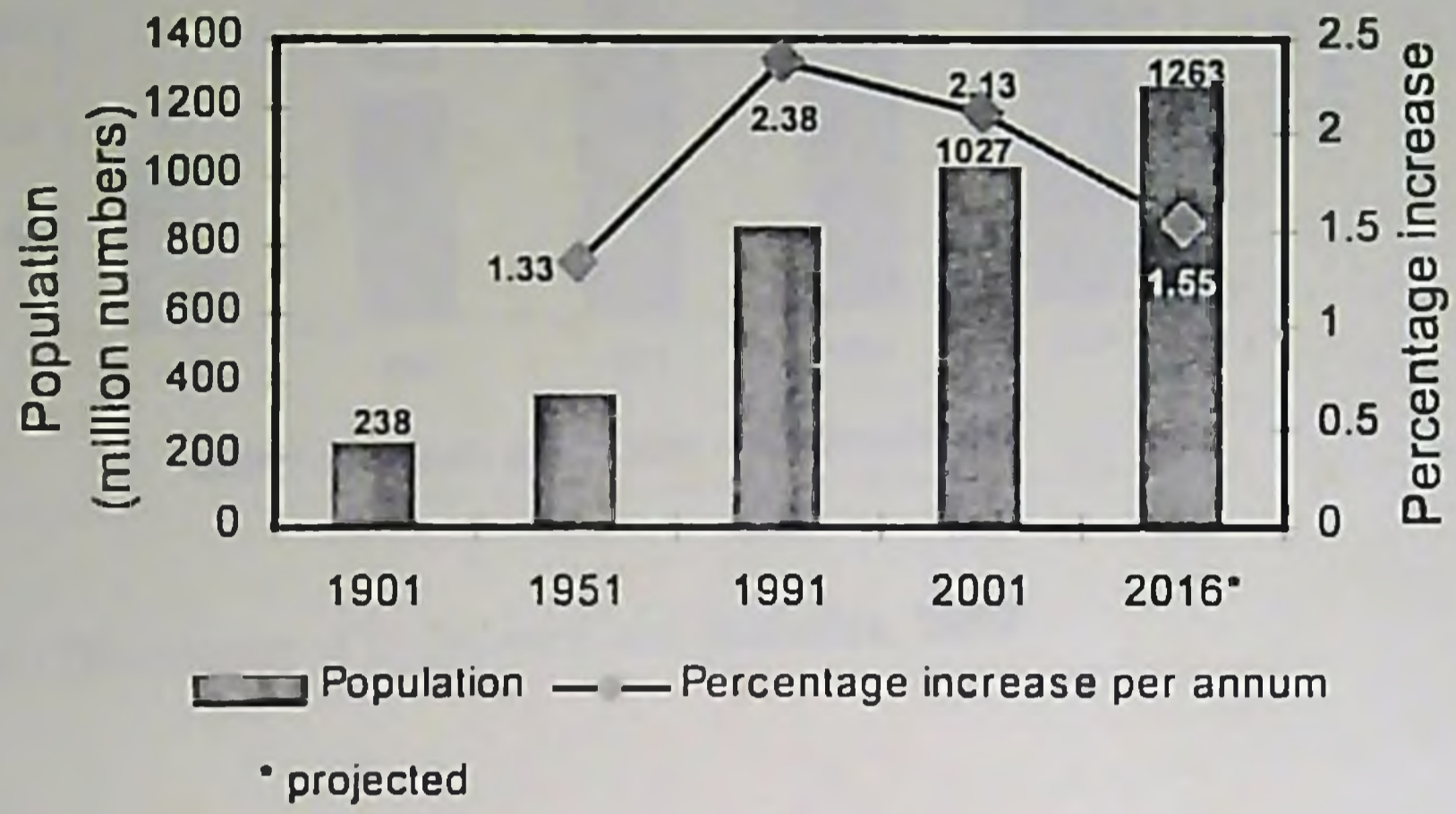
The three major dimensions of food insecurity are: 1) Availability of food, which is a function of production, 2) Access to food which is related to purchasing power, 3) Absorption of food in the body which is determined by the availability of safe drinking water, environmental hygiene, primary health care and primary education.

FOOD AVAILABILITY

Food has to be available in abundance if every body has to eat enough. Food availability may be hampered by low levels of production or inadequate inflow of food into the area. Low levels of production may be due to limitations such as markets, credits, technology and the natural resource base. It may also due to lack of price incentives to production.

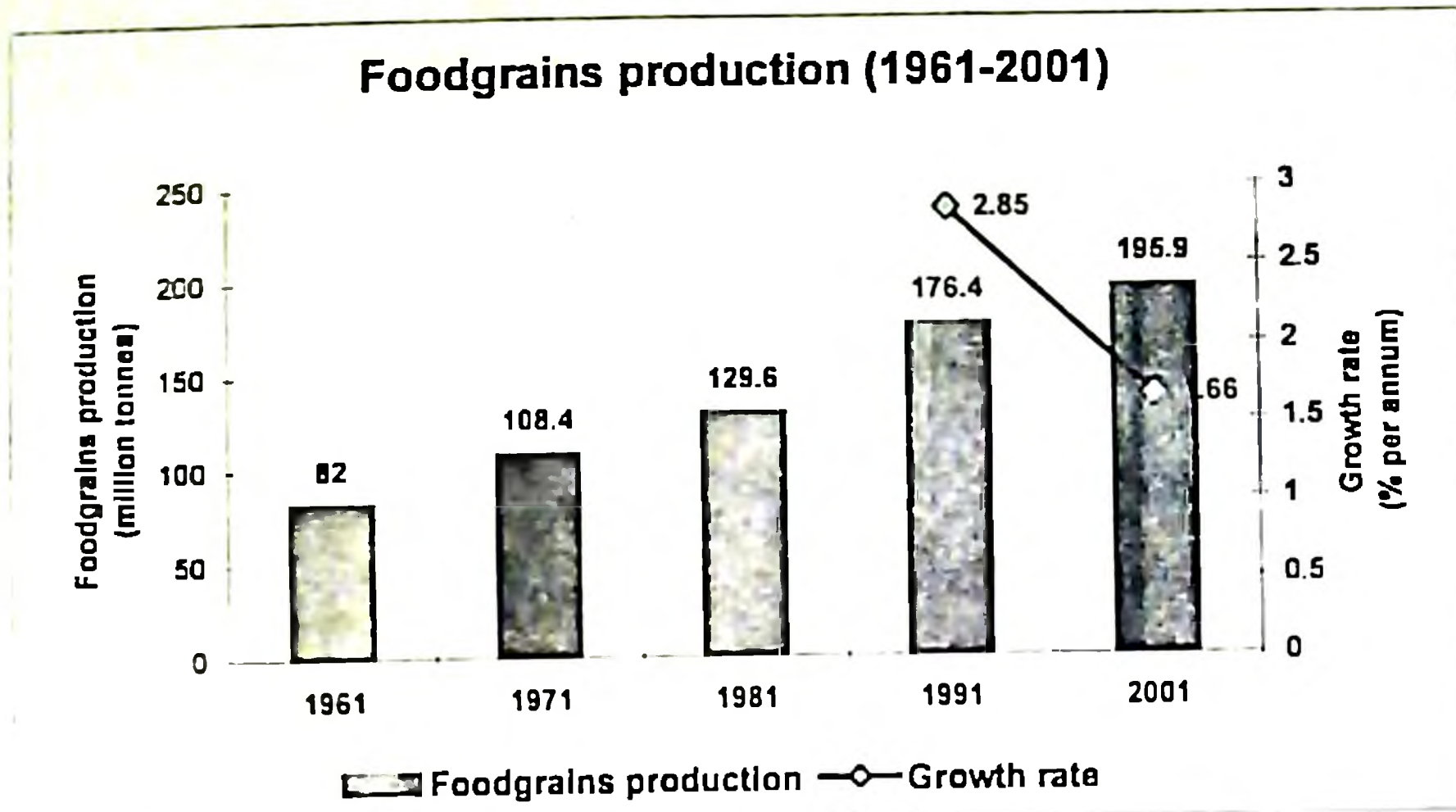
India's population is very large in size and is growing rapidly. During the last decade, the annual growth in population in percentage terms has dropped only marginally from 2.38 per cent to 2.13 per cent. (Agrawal, 1997) The growth of population is shown in the figure. Prior to independence, crop agriculture production was stagnant for over five decades. Since then until the Green Revolution arrived in the mid 1960s its production increased by 2.1 per cent per annum. In the post Green Revolution period (up to 1992-93) this increased annually by 2.58 per cent. Our food grain production which was just 50.8 million tones in 1950-51 has increased by four times to 208.9 million tones in 1999-2000, which is a spectacular achievement. (Directorate of Economics and Statistics, 2000) The food grain production (1961-2000) is shown in the figure.

Table 2.

Growth of population in India (1901-2016)

Source : Agrawal, A.N., 1997

Table 3.



Source : Directorate of Economics and Statistics, 2000

Table: 4

Per capita net production of vegetative food items (gms/day)

Sl. No.	States	Cereals	Tubers	Pulses	Fruits	Vegetables
	ICMR norms	420	75	40	50	125
1	Andhra Pradesh	363.35	6.87	22.68	106.33	66.41
2	Assam	16.10	58.01	5.84	49.83	196.33
3	Bihar	318.40	42.48	15.90	45.17	199.52
4	Gujarat	221.90	30.46	28.96	58.83	109.04
5	Haryana	1291.46	22.84	45.98	11.50	162.98
6	Himachal Pradesh	487.03	50.88	4.17	70.17	211.70
7	Karnataka	371.11	20.91	29.49	141.00	230.26
8	Kerala	65.92	197.09	1.42	78.67	209.09
9	Madhya Pradesh	454.43	22.21	100.22	20.17	85.55
10	Maharashtra	274.13	3.95	43.00	97.67	100.63
11	Orissa	389.27	28.20	21.20	55.33	354.33
12	Punjab	2132.58	85.37	7.67	48.00	166.75
13	Rajasthan	458.77	1.02	99.27	7.00	15.95
14	Tamil Nadu	270.31	123.47	9.26	84.83	158.00
15	Uttar Pradesh	545.68	116.76	33.62	38.17	160.95
16	West Bengal	413.24	210.85	4.73	21.17	438.77
	All India	430.33	65.73	31.94	58.83	179.22

Source: MSSRF, 2001.

Net production of food at the state level

Cereal production per capita is high in the states of Punjab and Haryana followed by Uttar Pradesh, Himachal Pradesh and Rajasthan. Tuber production per capita is highest in West Bengal, followed by Kerala, Tamil Nadu and Uttar Pradesh. Per capita availability of pulses is high in Madhya Pradesh and Rajasthan. Similarly per capita per day sugar production is high in Maharashtra at 140 gms. The production per capita of almost all foods except fruits and vegetables show a high coefficient of variation, exceeding 90-100 per cent. The per capita net production of vegetative food items in different states

Deficit of Production over requirement

Deficit or surplus in production per capita per day over the recommended daily allowance per capita only shows whether a state is producing enough food to meet its requirements or not. The rural poor in India derive approximately 80 per cent of their daily energy and protein requirement from cereals. In the food deficit areas, particularly when the staple food is not produced locally, low income families may face food insecurity.

Environment Sustainability

Sustainability is defined as the use of natural resources or the application of a practice or technology in a manner in which long term net impact on natural resources is not negative. Environmental degradation, soil degradation and climate change are longer threats to sustained productivity. Potential food insecurity may arise out of unsustainable livelihood. These lead to deforestation and degradation, soil erosion, desertification etc. Sustainability is not limited to food production but includes environmental sustainability, which is essential for long term viable crop and animal production.

Natural Disasters

A natural disaster is an event of 'nature', which causes disruption to crops, assets and lives. Natural calamities often result in transitory food insecurity of the people in the region. The length of the transient phase depends upon the severity of the disaster, the preparedness systems in place and the ability of the affected people to cope with the shock. The transitory food insecurity due to disasters is normally spread over one season or one agricultural year, before the people and the

region recover. Disasters may also lead to chronic food insecurity for people who lose their assets, homes and livelihoods.

FOOD ACCESS

Food availability by itself does not ensure adequate access to food, though adequate food availability is necessary for food access. If people have access to livelihood, they would in general have access to food and nutrition. Those who are unemployed, employed on a casual basis or under employed, would have limited economic and physical access to food. 80-90 per cent of the energy requirements of the lowest expenditure groups in various states come from cereals. Food prices also play an important part in the ability of the household to purchase an adequate diet. Rural infrastructure and agricultural and nonagricultural employment enhance livelihood opportunities and food access. Further, social and gender related factors might prevent access to livelihood as well as an individual's access to a balanced diet.

Access to Adequate Food

The ICMR has recommended 420 gms of cereal per capita per day as adequate cereal consumption is below this recommended level in the rural areas of Gujarat, Maharashtra, Tamil Nadu, Kerala and Punjab. In the state of Orissa, West Bengal and Rajasthan, the consumption is much above the level recommended by ICMR. Cereal substitutes, pulses, fats and oils, vegetables, fruits, eggs and meat are not consumed in adequate quantities in any of the states. Fish is consumed in adequate quantities only in Kerala. Gujarat is the only state in which consumption of oils and fats are close to the ICMR norms. Sugar is consumed in adequate quantities only in Punjab, Haryana, Rajasthan, Gujarat, Maharashtra and Himachal Pradesh. Only 6 states consume milk in adequate quantities.

Table .5.

Per capita consumption of various food items (gms/day)

Sl. No.	States	Cereals	Pulses	Vegetables	Fruits	Milk	Eggs	Meat	Fish
	ICMR norm	420	40	125	50	150	45	25	25
1	Andhra Pradesh	442.33	23.33	66.00	22.36	78.60	6.00	7.33	3.67
2	Assam	439.00	17.00	47.33	32.15	36.30	4.67	5.00	14.33
3	Bihar	477.00	24.00	63.00	17.52	71.70	0.58	2.33	4.00
4	Gujarat	355.33	12.33	74.67	17.72	152.10	0.71	1.67	0.67
5	Haryana	430.67	20.67	64.67	30.18	414.60	0.33	2.00	0.00
6	Himachal Pradesh	445.67	36.00	51.33	12.88	225.60	0.92	3.00	0.00
7	Karnataka	438.33	26.33	62.67	31.93	86.40	3.71	4.33	4.67
8	Kerala	337.00	14.33	35.67	43.41	78.30	8.33	8.00	45.00
9	Madhya Pradesh	473.33	32.33	56.33	10.27	82.80	0.63	2.00	2.00
10	Maharashtra	379.67	31.00	61.67	20.57	75.00	2.54	4.00	3.67
11	Orissa	531.00	14.00	58.67	13.50	23.10	1.21	2.00	9.67
12	Punjab	359.33	29.67	77.33	21.50	429.90	1.96	2.00	0.00
13	Rajasthan	495.00	21.33	47.33	14.91	312.30	0.29	1.67	0.00
14	Tamil Nadu	390.67	22.67	67.33	35.38	63.60	4.42	5.67	5.67
15	Uttar Pradesh	463.67	32.67	56.33	18.08	163.20	0.88	3.67	1.33
16	West Bengal	498.67	14.00	63.67	19.20	46.20	7.04	4.33	18.00
	Average	434.79	23.29	59.63	22.60	146.23	2.76	3.69	7.04

Source:MSSRF,2001.

Maharashtra is a surplus producer of sugar and pulses. People in these states consume more of these items than those in other states. In the state of Kerala, the consumption of large quantities of tubers, fish, fruits and nuts compensates for low consumption of cereals to some extent. Kerala also accounts for higher than average consumption of meat. Tamil Nadu by contrast, consumes less than that recommended level of cereals, but this is not compensated by above average consumption of any other foods. Hence, the average caloric consumption of Tamil Nadu is the lowest. Expensive protective foods are out of the reach of a majority of the rural population. The per capita consumption of various food items in different states is shown in the table 5.

Access to adequate Energy

The FAO has estimated that India has 207 million people consuming diets inadequate in calories. The government of India has set its own norms at 2400 kcal per consumer unit per day for rural India and 2100 kcal per consumer unit per day for urban India.

Haryana recorded the highest level of energy intake per consumer unit per day at 3109 kcal, followed by Rajasthan at 3090 kcal and Punjab at 3007 kcal in rural areas. Tamil Nadu with 2347 kcal, Assam with 2406 kcal, Maharashtra with 2427 kcal, Kerala with 2451 kcal and Gujarat with 2470 kcal. Cereals contribute the most to calorie intake compared to other foods. A higher level of cereal consumption is associated with higher levels of caloric intake in most states except Punjab. The states of Kerala, TamilNadu, Maharashtra, Assam, Karnataka and Gujarat show moderate levels of average caloric consumption but are below the national average.

Number of Meals

The persons reporting zero meals are spread across all expenditure groups, though their concentration is higher among the lower expenditure groups. For all classes put together there is only 1.6 per cent reporting zero meals in rural India. Persons reporting zero meals in the lower monthly per capita expenditure groups below Rs.190 are only 2 per cent for the country as a whole.

Table 6.

**Per Thousand distribution of Households by Availability of Two Square Meals
a Day**

Sl. No.	State	Members of households getting two square meals a day.			
		1	2	3	4
		Throughout the year	Only some months of the year	Not getting throughout the year	Not getting meals Col. 2+3
1	Andhra Pradesh	966.00	17.00	12.00	29.00
2	Assam	901.00	61.00	30.00	91.00
3	Bihar	928.00	51.00	15.00	66.00
4	Gujarat	976.00	9.00	4.00	13.00
5	Haryana	992.00	8.00	0.00	8.00
6	Karnataka	960.00	27.00	8.00	35.00
7	Kerala	910.00	74.00	4.00	78.00
8	Madhya Pradesh	970.00	25.00	3.00	28.00
9	Maharashtra	954.00	41.00	4.00	45.00
10	Orissa	844.00	149.00	5.00	154.00
11	Punjab	999.00	1.00	0.00	1.00
12	Rajasthan	985.00	6.00	0.00	6.00
13	Tamil Nadu	969.00	15.00	9.00	24.00
14	Uttar Pradesh	963.00	29.00	5.00	34.00
15	West Bengal	856.00	111.00	30.00	141.00
	All India	945.00	42.00	9.00	51.00

Source: MSSRF, 2001.

In Orissa 14.9 per cent of the population reported having 2 square meals a day only on some months of the year. Another 0.5 per cent reported not having two square meals a day throughout the year or for a part of the year. Next to Orissa, West Bengal with a per cent of 14.1 reported the highest number of people not having 2 full meals throughout the year. The states reporting highest levels of seasonal food inadequacy appear to be the states in which the reported caloric adequacy is not very high. It is probably our indication that seasonal and transitory

problems of food inadequacy can be different from permanent food adequacy. Orissa is a state in which there is a high tribal population who lives in remote areas and may be more vulnerable to transitory food inadequacy in summer and monsoon months.

Food prices

Food access depends upon the affordability of adequate food. Food access depends upon the income of the people and the prices prevailing in the market. If income rises at a slower rate than food prices, the purchasing power is under mined. The decline in cereal consumption and calorie consumption noticed at the average level is due to the per capita incomes and the diversification of the food basket away from cereals.

Deficient calorie consumption at least among the poor would be due to the mismatch of incomes and prices. The price and the seasonal variations in prices further lead to transitory food insecurity of people not being able to eat well throughout the year. Shortage of food during droughts and the increase in food prices could be seasonal.

The PDS that provides food at affordable prices and the poverty alleviating programmes that put more income in the hands of the people are of crucial importance. They help to correct the mismatch of the rate of growth of incomes and prices to some extent.

Discrimination by Gender

Food access and livelihood access opportunities are not available equally to everybody. In our country women constitute the biggest source of potential workers in rural areas. Most of the women workers are depending on agriculture as their livelihood source and 50 million of them and 20 million agricultural labourers constitute the total rural female work force. 70 per cent of the poorest of the poor are women in the world.

The bias against females is a result of 'the intangible variable of culture and custom'. Such cultural practices may have had their origins in economic factors, as men, being the livelihood earners, should be fed first. It results in preference for male members in food and health care allocation within a household children come next, being dependent and in need of care. The needs of the women herself are considered only in the end. Intrahousehold disparity in food distribution among children and women was reported in India by Barah and Asha (1994). The factors

that determine food access of women in a household are economic, social and cultural.

According to Swaminathan(2001)in the households which is not a homogeneous unit women and girl children tend to suffer more from endemic hunger.Swamy et al (2000)in a study conducted among the farm women labourers of UAS Bangalore observed poor nutritional status and deficit in the intake of all food groups.Women and girl children are the worst sufferers of the decline in secondary source of food, which is compounded by the anti-female bias prevalent in many rural households. (Jodha,1995) Over hurdening of women means that they require high energy foods that many of them do not get.

The lowest female work participation rates are seen in Assam at 12 per cent, Haryana at 26 per cent, West Bengal and Bihar at 30 per cent. The highest female work participation rates are found in Himachal Pradesh at 74.6 per cent, followed by Maharashtra at 59.4 per cent and Andhra Pradesh at 56 per cent. Unless work participation or employment along wjth adequate incomes, increases their food access, it will not remove gender discrimination. Wages of women are less than that of men.

Female literacy

Female literacy is the first step towards empowerment. It gives self-confidence and reduces dependency on others. Often it helps in getting better deals in the purchase of food and selling of produce or their own labour. It helps women to get better paid semiskilled jobs, as against manual work. Female literacy improves knowledge of nutrition and medical facilities, enabling them to look after their children better. A fall in child mortality rates is inversely related to female literacy. Finally, the process of education can help a girl child to escape the drudgery of child labour both at home and outside.

The states with the lowest female literacy in rural India are Rajasthan and Bihar at 11.6 and 17.9 per cent respectively. Kerala is way ahead in female literacy at 85 per cent. The states of Himachal Pradesh, Punjab, Maharashtra and Tamil Nadu have achieved literacy levels of 41-49 per cent. Female literacy levels are low in Andhra Pradesh at about 24 per cent.

Discrimination by Caste

Certain sections of the population are deprived of food access and livelihood access due to their disadvantaged position as a Scheduled Caste or

Scheduled Tribe. Among the rural population, the concentration of SC and ST is the highest in Madhya Pradesh (44%) and Orissa (41%). Kerala has the lowest per cent (12%).

The major occupation of the SC population is labour. Although some of them belong to the category of small and marginal cultivators, their economic conditions are as bad as that of the landless groups.

Some micro studies conducted in Gujarat, Andhra Pradesh and Madhya Pradesh for ST, show that the consumption level of tribal populations is very low and is below the recommended level of intake. Staple foods such as cereals are also not consumed in adequate quantities. Their present occupation is mostly wage labour and nearly 50 per cent of the tribal population is engaged in the cultivation of land.

SC and ST are relatively disadvantaged, in terms of assets, education, incomes, land ownership and operation, when compared to other castes. One third of the labour households in the country belong to SC. The ST population faces hardships, particularly in the poorest states.

Poverty

Food access depends upon purchasing power linked to livelihood access. Livelihood access means assured access to income over long periods. Poverty is the bigger problem than unemployment. Economic growth is often necessary to reduce poverty and eliminate food insecurity (Sabri, 2000). As per the 55th round survey of the National sample survey organisation (NSSO), 26.1 per cent of India's population lies below poverty line in the year 2000 (Economic Division, 2002). 1.2 billion people live on less than a dollar a day, 2.8 billion live on less than 2 dollars a day (Pingali, 2000). The number of people below the poverty line represents those without access to productive livelihoods.

Bihar comes out as the poorest state in the country followed by Orissa, Assam, Uttar Pradesh, West Bengal and Madhya Pradesh. In all these states, more than 40 per cent of the rural population was poor in 1993-94. Bihar has the largest number of poor at 58 per cent, followed by Orissa at 50 per cent.

A study conducted by Prema (2001) on problems of food security among households below poverty line in Kerala found that household belonging to various underprivileged sections of the community were with average caloric deficiency dipped below 70 per cent of the requirements of their members. Households

identified as at risk were also observed to be labourers, small-scale entrepreneurs in informal sector urban poor and those residing in low potential areas.

Rural Infrastructure

Infrastructure consists of both hard infrastructure and soft infrastructure. Hard infrastructure refers to physical assets such as roads, transport system, water supply, electricity supply, irrigation facilities, storage facilities, market places for output as well as inputs to agriculture etc. It is not possible to improve livelihood opportunities without these communities.

Bihar is the state with the worst infrastructure facilities, followed by West Bengal, Uttar Pradesh, Assam and Orissa. The best states for infrastructure are Himachal Pradesh, Gujarat, Tamil Nadu and Maharashtra. Food access and livelihood access are problems in the 4 states where infrastructure is not good.

FOOD ABSORPTION

Food absorption relates to food assimilation. Absorption in turn depends upon the state of health of the individual. Food consumption depends upon habits, preferences, perceptions and knowledge of basic nutrition. Low levels of nutrient intake may occur if people do not consume balanced diets. This may happen due to a lack of knowledge of nutrition. Female literacy is known to enhance nutrition knowledge and child health. There are certain preconditions for the adequate of each type of essential nutrients. For example for protein adequacy, calorie adequacy is necessary. Similarly, for the absorption of iron, small amounts of vitamin C are important.

A person who is not healthy cannot assimilate food even if she or he consumes a balanced diet. One's state of health depends upon sanitation, hygiene of the surroundings. It also depends upon the timely availability of medical facilities to recover from disease. These in turn depends upon the health infrastructure. Lupien and Menza (1999) indicated that in addition to the problem of food supply, access to basic services like education, health facilities, sanitation, clean water, safe housing and jobs affect the health, nutritional status and food security. The outcome of problems connected with absorption is an unhealthy population with growth

disorders high levels of morbidity, high levels of mortality of infants, children, mothers, women and men.

MALNUTRITION

Malnutrition has several dimensions including protein energy malnutrition and deficiencies of one or more nutrients.

Protein is an essential nutrient for body building. When a person consumes a diet deficient in calories but sufficient in protein, the protein is utilized for generating energy and cannot perform the function of a protective food. One has to consume enough calories to achieve protein adequacy.

As per the Indian Nutrition profile, protein consumption is below the norm of 60 gms in many states except Punjab, Haryana, Rajasthan, Himachal Pradesh, Bihar, Gujarat and Andhra Pradesh. The percentage of population with and /or calorie deficiency in different states is shown in the table 7. Protein calorie inadequacy is as high as 41.40 per cent in Tamil Nadu, 24.10 per cent in Orissa, 27.90 per cent in Assam, 19.90 per cent in Kerala and 19.70 per cent in Madhya Pradesh and Maharashtra. The smaller percentage of protein deficient could be due to diets rich in milk, pulses and other non cereal items.

Table 7. Protein Calorie Inadequacy (Percentage of population with protein and/or calorie deficiency)

Sl. No.	State	P-C-
1	Andhra Pradesh	10.4
2	Assam	27.9
3	Bihar	12.3
4	Gujarat	2.5
5	Haryana	4.6
6	Himachal Pradesh	6.7
7	Karnataka	14.9
8	Kerala	19.9
9	Madhya Pradesh	19.7
10	Maharashtra	19.7
11	Orissa	24.1
12	Punjab	3.0
13	Rajasthan	15.0
14	Tamil Nadu	41.4
15	Uttar Pradesh	NA

P :protein c :calorie + :Adequate - :Inadequate

Source :MSSRF,2001.

A prolonged intake of inadequate calories and protein would, however, lead to certain nutritional deficiency diseases such as marasmus and kwashiorkor. The incidence of these diseases is very low. The occurrence of marasmus in rural areas is as low as 0.04 per cent and that of kwashiorkor is as low as 0.07 per cent.

Vitamin and Mineral deficiencies

Iron, vitamin A, iodine and calcium are among the important nutrients needed by the body. These are vital for the growth and development of a person, viz. normal learning, cognitive functions, immunity, work capacity and reproductive health.

IRON

Iron deficiency reduces work capacity and has adverse effects on productivity. Maternal anaemia results in intra uterine growth retardation, low birth

weight, increased prenatal mortality, high maternal mortality and also premature deliveries. It diminishes one's ability to fight infection and thus increases vulnerability to transmittable diseases.

In India anaemia affects an estimated 50 per cent of the population. The average recommended daily intake of iron is 28 mg/day. Assam consumes the lowest amount of 12 mg/day. The lowest prevalence of anaemia in women (23%) and children (44%) is seen in Kerala. Anaemia is particularly pronounced in the Eastern region and in many states in the Northeastern region.

Table 8
Micro nutrient deficiency

Sl. No.	State	Calcium (mg)	Iron (mg)	Thiamine (mg)	Riboflavin (mg)	Niacin (mg)	Vit.C (mg)	Vit.A (mg)
1	Andhra Pradesh	518.00	26.20	0.87	0.77	13.60	34.00	352.00
2	Assam	364.00	12.00	0.70	0.60	12.00	47.00	235.00
3	Bihar	432.80	22.01	1.89	0.90	20.39	59.86	262.84
4	Gujarat	536.00	26.60	1.70	1.15	15.90	25.40	263.00
5	Haryana	886.00	25.70	2.40	1.10	20.00	38.50	415.00
6	Himachal Pradesh	640.00	23.00	2.10	0.90	16.00	55.00	481.00
7	Karnataka	839.00	30.60	1.54	0.89	12.20	32.70	286.00
8	Kerala	696.00	22.80	0.70	0.77	12.60	50.30	214.00
9	Madhya Pradesh	354.00	27.00	1.13	0.83	15.80	44.50	343.00
10	Maharashtra	404.00	28.60	1.82	0.90	16.30	18.50	222.00
11	Orissa	381.00	27.00	0.80	0.60	12.00	40.00	436.00
12	Punjab	966.00	27.70	2.50	1.20	21.20	38.10	448.00
13	Rajasthan	733.90	30.52	2.58	1.23	21.07	45.98	399.79
14	Tamil Nadu	455.00	20.20	0.77	0.63	9.70	29.90	184.00
	RDA	400.00	28.00	1.20	1.40	16.00	40.00	600.00

Source: MSSRF, 2001.

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Vitamin A

The consequences of vitamin A deficiency range from mild deficiency signs such as night blindness to Bitot's spot that may lead to a total loss of vision if not treated early. None of the states meet the minimum intake requirement of 600 µg/day of retinal among adults. Tamil Nadu has the highest percentage (3.11%) of population and with vitamin A deficiency. Himachal Pradesh shows better per capita intake and hence only a small per cent (0.01%) of the population is affected.

Vitamin B

As far as thiamine is concerned studies show that the status of Andhra Pradesh, Assam, Kerala, Madhya Pradesh, Orissa and Tamil Nadu consume less than the required level of 1.20 mg/day. Thiamine intake is the highest in Rajasthan, at 2.58 mg per capita per day. The average intake of niacin is the lowest in the state of Tamil Nadu at 9.70 mg as against the minimum requirement of 16 mg/day. None of the states in the study meet the minimum requirement of riboflavin of 1.40 mg/day.

Vitamin C

Bihar ranks first with a consumption of 59.86 mg as against the daily requirement of 40 mg per capita per day. The lowest intake of 18.50 mg is found in the state of Maharashtra.

Iodine

About 200 million people in India are exposed to the risk of iodine deficiency and 70 million suffer from goitre and other iodine deficiencies. 1/5th of pregnant women are considered at risk of giving birth to children who will not reach their optimum physical and mental potential because of maternal iodine deficiency.

Calcium

The minimum calcium requirement is 400 mg/day which is met in almost all the states except Assam, Orissa and Madhya Pradesh. Punjab and Haryana report the highest intake of Calcium.

The major strategies or direct nutritional interventions to deliver vitamins and minerals are dietary diversification through behaviour modification, fortification of foods with nutrients and other foods, supplementation with nutrients in capsule, tablet or liquid form.

Life expectancy

The long-term outcome of food security is ultimately reflected in an improvement in the life expectancy of the population. It depends upon a large number of other factors such as level of literacy, knowledge of nutrition and health care of the past generations. Assam has the lowest life expectancy at age one (60.6 years). Madhya Pradesh comes next with a life expectancy at age one of 61.2 years, followed by Uttar Pradesh at 62.2 years and Orissa at 62.6 years. The best state is Kerala with 73.2 years.

Table 9. Life expectancy at the age one.

Sl. No.	State	Life Expectancy at the age one (1992-96)
1	Andhra Pradesh	65.2
2	Assam	60.6
3	Bihar	63.2
4	Gujarat	65.1
5	Haryana	67.6
6	Himachal Pradesh	68.1
7	Karnataka	66.6
8	Kerala	73.2
9	Madhya Pradesh	61.2
10	Maharashtra	68.1
11	Orissa	62.6
12	Punjab	70.5
13	Rajasthan	64.6
14	Tamil Nadu	66.1
15	Uttar Pradesh	62.2
16	West Bengal	65.8

Source: MSSRF, 2001.

Chronic Energy Deficiency

CED in adults is a result of long term undernutrition and malnutrition. CED is usually indicated by a BMI of less than 18.5.

Table 10. Adult health indicators

Sl. No.	State	Maternal Mortality Rate	Percentage of population with CED
1	Andhra Pradesh	443.00	49.40
2	Assam	204.00	17.10
3	Bihar	482.00	51.30
4	Gujarat	129.00	53.10
5	Haryana	381.00	25.90
6	Himachal Pradesh	456.00	38.90
7	Karnataka	172.00	53.80
8	Kerala	179.00	33.20
9	Madhya Pradesh	567.00	53.30
10	Maharashtra	266.00	51.00
11	Orissa	679.00	57.30
12	Punjab	187.00	23.00
13	Rajasthan	335.00	36.20
14	Tamil Nadu	218.00	37.30
15	Uttar Pradesh	649.00	44.00
16	West Bengal	389.00	50.00

Source: MSSRF, 2001.

Orissa is found to occupy the worst position in this respect with 57 per cent of the population. West Bengal, Karnataka, Madhya Pradesh and Gujarat come next with 56%, 54% and 53% respectively.

Maternal mortality: gives the number of maternal deaths per one 1000 live births. It is highest in Orissa at 67.9 it is lowest in Gujarat.

Severe stunting in children

Child nutrition is extremely important as better health of infants and children below 5 will influence their future growth, health, immunity to diseases and mental facilities.

Table 11.

Child Health Indicators

Sl. No.	State	Percentage of severity stunted Children under five	Infant Mortality Rate (1997)
1	Andhra Pradesh	27.00	70.00
2	Assam	32.60	79.00
3	Bihar	44.00	73.00
4	Gujarat	54.20	69.00
5	Haryana	34.70	70.00
6	Himachal Pradesh	38.90	64.00
7	Karnataka	37.70	63.00
8	Kerala	37.30	11.00
9	Madhya Pradesh	40.00	99.00
10	Maharashtra	43.30	56.00
11	Orissa	26.50	100.00
12	Punjab	38.20	54.00
13	Rajasthan	37.20	89.00
14	Tamil Nadu	21.50	58.00
15	Uttar Pradesh	40.50	89.00
16	West Bengal	37.60	58.00

Source: MSSRF, 2001.

Gujarat is in the worst position with 54 per cent followed by Bihar with 44 per cent, Maharashtra with 43 per cent and Madhya Pradesh with 40 per cent.

Infant mortality rate: indicates the number of infants dying before the age of one, per thousand live births. The problems of nutrition starts with the malnutrition of pregnant women and is manifested in LBW babies and infant deaths. This also results from a lack of immunization, medical help, and safe drinking water. Kerala is in the best position with only its infant deaths. Punjab, Maharashtra and West Bengal show infant mortality rates ranging between 54 and 58 deaths.

Rural Health Infrastructure

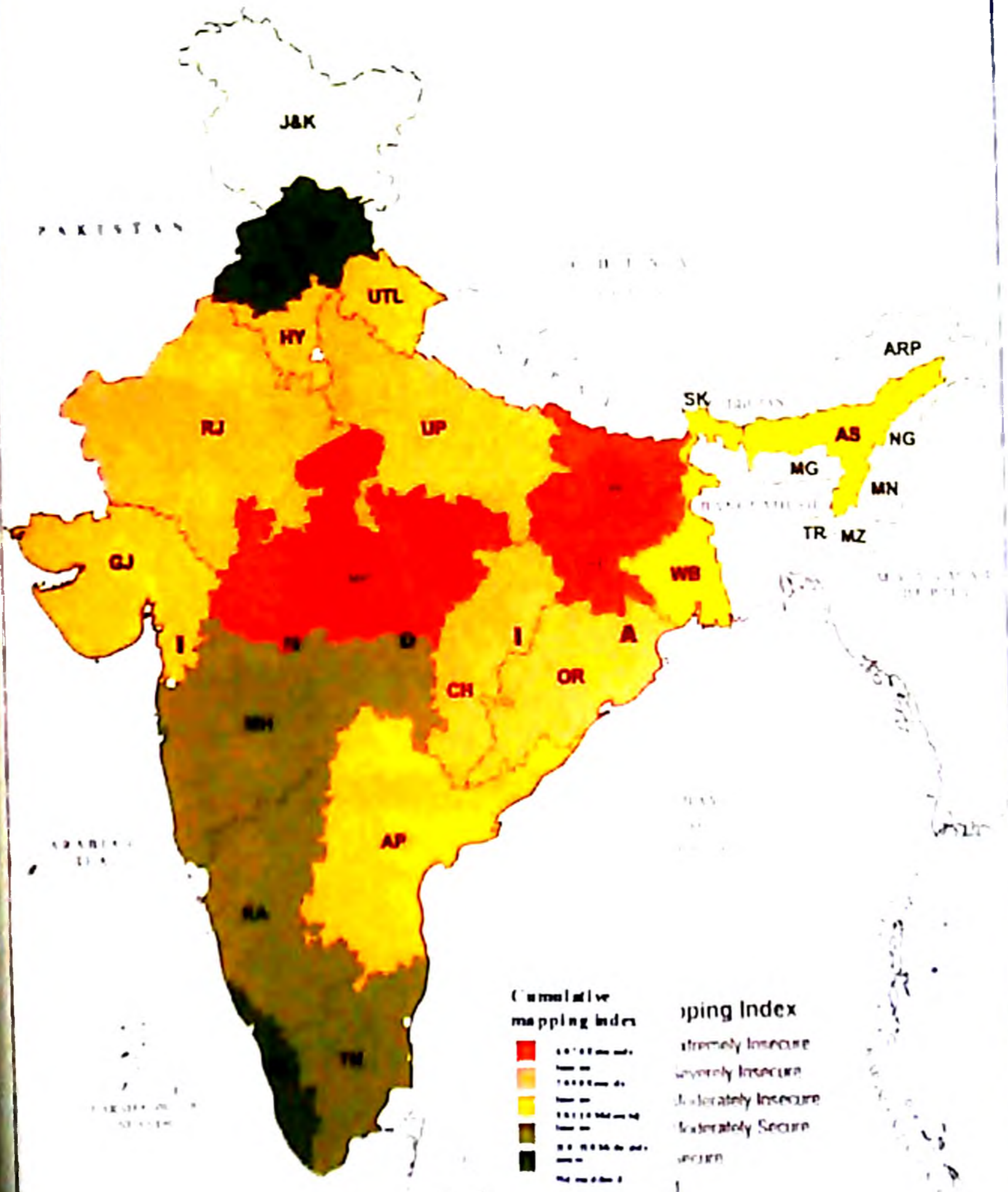
Good rural health infrastructure is important to keep the population free from disease. The existence of hospital beds, doctors and primary health centres by itself does not mean availability of health facilities. The quality of services provided by the hospitals is also important.

According to the health infrastructure index, Bihar and Uttar Pradesh occupy the worst positions. Himachal Pradesh has by far the best facilities compared to any other state in the country. Punjab and Tamil Nadu have good health infrastructure.

FOOD INSECURITY MAP OF RURAL INDIA

The food insecurity map of rural India gives an overall picture of the food insecurity situation at the state level. From the map we can observe that Bihar, Jharkhand and Madhya Pradesh are the most food insecure states while Punjab, Himachal Pradesh and Kerala are the most food secure states.

Food insecurity in rural India



Map No. 5.2

CONCLUSION

Food security is not just a problem of increasing production. It is a problem of improving access, it is a problem of equitable distribution, it is also a problem of enhancing effective demand of the poorest of the poor for food. Ten point Agenda for Action adopted that the closing session of the consultation on 'Towards Hunger Free India' on April 26, 2001(MSSRF,2001)

1. Identification of the vulnerable individuals
2. Information empowerment
3. Eliminating protein calories malnutrition and energy deprivation
4. Eliminating hidden hunger caused by micronutrient deficiencies
5. Safe drinking water and environmental hygiene
6. Enhancing purchasing power through sustainable livelihoods
7. Special attention to women and children
8. Strengthening food based safety nets
9. Linking disaster mitigation with development
10. Greater market access to farm products.

DISCUSSION

1. How we can strengthen food based safety nets?

Ans. Food assistance plays an important role in ensuring minimum nutritional intake for the most undernourished people. ICDS and the mid day meal programme are very relevant examples. With respect to natural resource management and disaster mitigation, Food for work can be used to promote sustainable livelihoods for the food insecure.

2. Kerala's production and consumption of food is very low. But it comes under food secure states. Substantiate the statement

Ans. Kerala have better health facilities, infrastructure, lower infant mortality rates and relatively higher female literacy. Public safety nets provided by the state governments have made a difference. The public distribution system and public health facilities are freely available to the poor.

3. How we can eliminate hidden hunger caused by micronutrient deficiencies?

Ans. A multiprolonged strategy consisting of direct interventions like the fortification of food, the administration of oral doses of vitamin A, iron and iodine fortified salt, as well as the promotion of the cultivation of vegetables and trees like amla in the small areas surrounding homes can be introduced in every village.

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CHANGING CONCEPTS OF FOOD SECURITY- AN INDIAN PERSPECTIVE

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SEMINAR REPORT

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ABSTRACT

The FAO (Food and Agricultural Organisation) estimates that one out of every eight people suffers from chronic malnutrition and that 800 million people suffer from severe food deficiency (FAO, 1992). The occurrence of a series of famines in the late seventies led to the evolution of the concept of food security as an aspect of overwhelming importance. As it touched a myriad of issues, the concept has undergone many changes and as of now is being universally accepted "as the physical and economic access of all people to food at all times" (FAO, 1983). In order to operationalise the concept of food security, which embraces multiple dimensions, it was also defined at various levels viz individual, household, national, regional and global food security (Pinstrup- Anderson and Pandya-Lorch, 1995).

Ensuring adequacy of food supplies, maintaining supply stability and access to food supplies to all consumers are the three major elements of national food security (FAO, 1994). The deceleration in food production coupled with higher population growth indicates the threats faced by the country in the sphere of national food security. Though food grain production is characterised by more stability and more physical access, the composition of the food basket is indicating certain grey areas. Though the economic access has improved during the eighties and the nineties (Acharya, 1997), accompanied by the reduction in people below poverty line, the continuation of government assisted program vis-à-vis national food security is a challenging task ahead.

Access to adequate food is one of the foremost and the basic need of every life and should be the birth right of every single human on this earth, yet widespread poverty resulting in chronic and persistent hunger is the single biggest scourge of the developing world today. It is alarming to note that about 20 per cent of the developing worlds population wake up - and likely to go to bed – hungry, day after day. Millions more experience prolonged hunger during part of the year... or they suffer birth defects, growth retardation, mental deficiency, lethargy, blindness or even death because they do not have the diversity of food required to meet their total needs (including an estimated 200 million children under age 5 suffering protein or energy deficiencies). (Rogers, 2002). The situation in India is still more pathetic with the third of the world's hungry and marginalised living in India. India in the recent past had to witness a glaring and shame full "Paradox of plenty " with more than 60 million tones of food grains. Stacked, bulk of it in open, while some 320 million go to bed hungry every night. (Sharma, 2001)

The late realization of this concept way back in 1972, made the FAO (Food and Agricultural Organization) to wake up to the issues relating to eradication of world hunger, especially after the world food crisis in 1972. The FAO sponsored World Food Conference held in Rome In 1974, as an after math of the World food crisis of 1972 declared that *" Every men, women and children has the inalienable right to be free from hunger and malnutrition in order to develop fully and maintain their physical and mental faculties"*. Later the FAO declaration was endorsed by the general assembly of the United Nations in December 1974. The world food conference was have been a regular event in the myriad issues surrounding food security and its many dimension became an international concern. The most popular slogan of the FAO sponsored world Food Summit is '**FOOD FOR ALL**' (November 13 -17, 1996).

The changing concepts of food security

The concept of food security has been undergoing evolutionary changes during the last 50 years. The very genesis of this concept took place in the 1974 Food world Conference, after which it has been refined a number of times over the years .The early system of food security inevitably consisted of '**a system of food stocks**' (Hannah, 1977). Although food security received prominent treatment during the World food conference

(1974) as **'freedom from hunger and malnutrition'**, the emphasis was essentially on food production in the food deficit countries and in creating co-ordinated system of national and international grain reserves. This concept of food security was criticised by Lewis (1977) as **'Food self-sufficiency syndrome'** because it mainly aimed at the attaining self-sufficiency by the concerned countries rather than ensuring food security to the people. To overcome this problem, of the concept Valdes (1981) came with an alternative approach whereby food security was defined as **'the ability of the food deficit countries, or regions within those countries, to meet target consumption levels on a year-to-year basis'**. However, this definition suffered from ambiguity on what constituted the target consumption levels and the reference group(s) whose ability to maintain consumption were in question.

The report of the committee on the World Food security (eighth session) by the FAO redefined food security as the **'access by all people at all times to enough food for an active, healthy life'**. The emphasis in this concept was shifted from the food self-sufficiency to "food access" or "entitlement". It was based on the logic that although availability of food is necessary condition, but is not sufficient condition to ensure food security. People should have entitlements or ability to command food through legal means.

However, it was widely felt that the above definition of food security grossly underplayed the necessary condition. Therefore, FAO in 1994 redefined food security **'as the physical and economic access of all people to food at all times'** (FAO, 1994). This has since remained the universal definition of food security.

Alternatively, the terms food security and food insecurity are both widely used by the scientists and the policy makers. Food insecurity is defined as the lack of access to enough food. (Reutlinger and Pellekaan, 1986). There is a further temporal dimension to the concept food insecurity concept *viz* **'chronic food insecurity'** and **'acute food insecurity'**. Chronic food insecurity is characterised by a persistent inability to attain food access over the long term. Acute food insecurity is characterised by the abrupt declines in food security status over a relatively short period of time. (Chung *et. al* 1997).

Another term that is confused with the term **'food security'** is **'Hunger'** and **'malnutrition'**. Hunger or "under nutrition" means intake below 80 per cent of

recommended daily calories (2200 – 2300 as recommended by the FAO). While malnutrition on the other hand, means a pathological state due to the absolute or relative deficiency of essential nutrient (s).

Different levels of food security

The food security concept operates at different levels and the distinction is crucial because, without sharp, sustained focus on the particular level, the world may be indifferent to the plight of the poor and lose any sense of urgency. Therefore, to alleviate this and to bring a greater sense of importance at a particular level food security has been divided into *individual, household, national, regional and global* (Pinstrup- Anderson and Pandya-Lorch, 1995).

Global food security

Global food security means the world's ability to produce enough food for the planet's population. Analysis and debates are usually best done at macro levels, focusing on the global issues and national issues – which can encourage complacency (when, as now, there is enough food) and distract proper attention from those who go hungry each day. An alternative to the above global food security is the universal food security and is about the children, women and men who spend each hungry and malnourished, unable to lead productive and active lives. Achieving it would mean every human being, in developed or developing countries, having access to the food needed for a healthy life, regardless of climate, harvests, social status or income. (Rogers, 2002)

Regional food security

The main theme of this concept is that, if at any time the world thinks that it is quite difficult to eradicate hunger all over the world, it can make the process simple by focusing on the poorest countries and regions. The 88 low-income deficit countries deserve immediate attention (42 in sub-Saharan Africa, 19 in Asia / Pacific, 9 Latin America / Caribbean, 6 in Near East / North Africa and 12 in Europe / CIS). (Rogers, 2002). With

National food security – An Indian perspective

The national Governments have to play a very active role in maintaining national food security. Firstly, it has to protect its population from national and international threats so that food production is not disrupted. Secondly, a fair and stable legislative and judicial framework is required to ensure that individual players in the market play by the same set of rules. Thirdly, food security on a sustainable basis requires governments to take appropriate policy options to correct past distortions and to provide for stimulating the domestic food supplies by way of incentives.

The main components of national food security programmes are

1. Ensuring adequacy of food supplies
2. Maintaining supply stability
3. Access to food supplies to all consumers. (FAO,1994)

(a) ENSURING ADEQUACY OF FOOD SUPPLIES

At every moment of time we have to keep in mind that India has feed additional 17 million people per year. (Satyasundaram, 2000). To keep up the supplies of food grain production in align with the burgeoning population is really Herculean task. Indian agriculture quite necessarily deserves kudos for the production and yield improvements that it has achieved.

For assessing the trend in the food supplies over the decades we here by take area, production and yield of food grains in the country, over three decades namely, the 1970's when the Green Revolution started having its effect, the mid 1980's when the green revolution had its peaks and the current scenario in the 1990's.

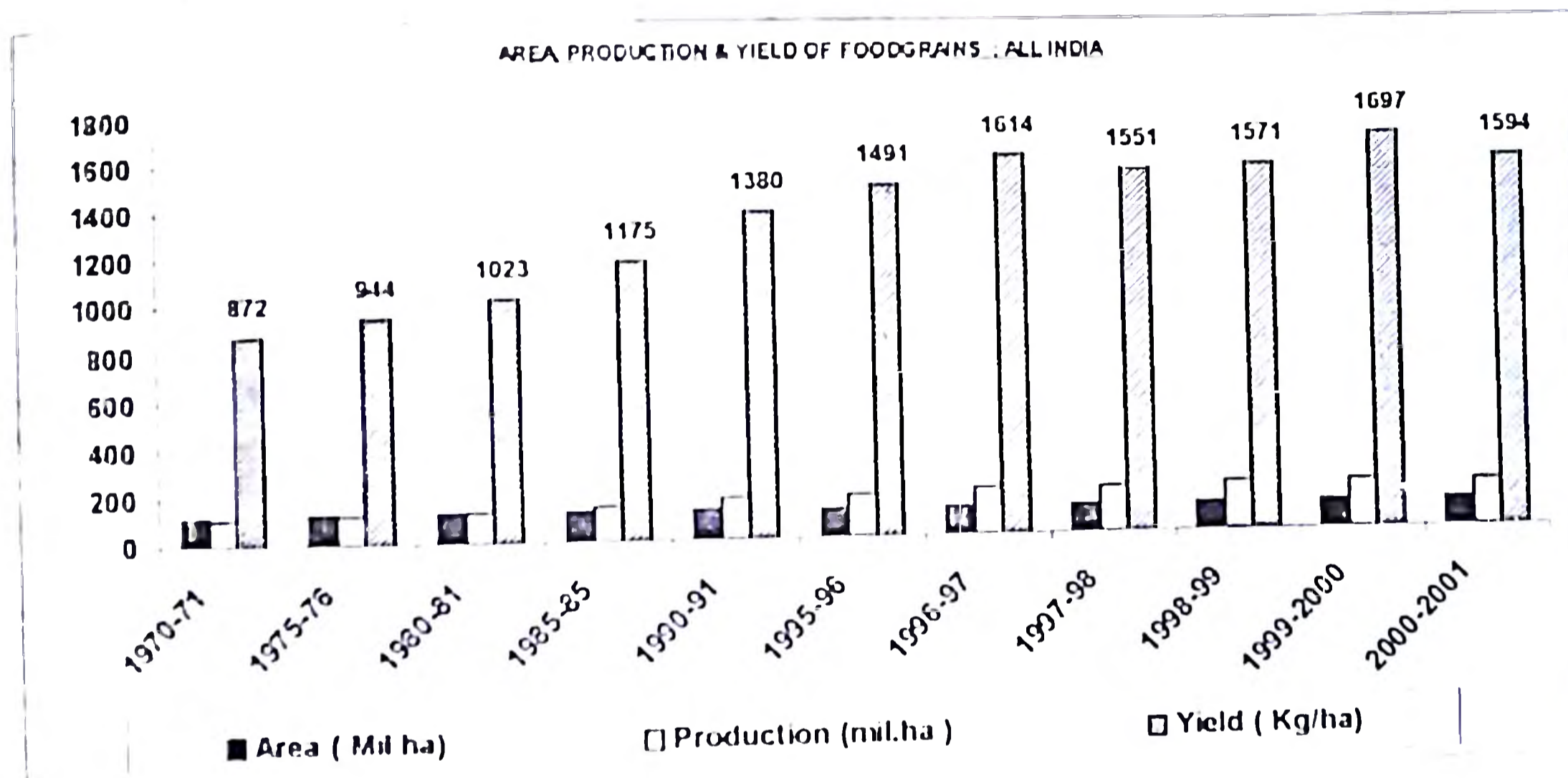
Table 1 Area, production and yield of food grains crops in India

YEAR	AREA (Million ha)	PRODUCTION (Million tonnes)	YIELD Kg/ha
1970-71	124.32	108.42	872
1975-76	128.18	121.03	944

1980-81	126.61	129.59	1023
1985-86	128.02	150.44	1175
1990-91	127.84	176.39	1380
1995-96	121.01	180.42	1491
1996-97	123.58	199.44	1614
1997-98	124.07	192.43	1551
1998-99	123.6	203.6	1571
1999-2000	123.1	208.8	1697
2000-2001*	123.4	196.7	1594

- Provisional estimate (Source: Economic Survey (various issues))

Figure 1. Area production and yield of food grain crops: All India



The above table indicates that the cultivated area in India was highest in the year 1985-86, but after that it was stagnating around 123 million ha in the subsequent years. The food grain production before the launching of the Green Revolution was just 74.23 MT in the year 1966-67, and has crossed the hundred million tonnes mark during 1970-71. There has been a consistent increase in the food production there after, Thanks to the development of newer agricultural technology, the production crossed the 200 MT mark in the year 1998-99. However, the estimate for the current year shows that food grain production may go down to the level of 196.7 MT. The increase in the production has been mainly due to the increase in the productivity as the area under cultivation is almost the

same. The increase in the area has been less but the production has almost doubled (1.95 times), hence the increase has been mainly due to productivity increases.

A more clearer picture would be perceived if the growth rates are worked out for same absolute values in the table 1. but we restrict to the major food grain crops over three decades .

Table no: 2 CGR of area, production and yield of food grain crops
(% / annum)

CROP	1970-71 to 1979 - 80			1980-81 to 1989-90			1990-91 to 2000-01		
	Area	Production	Yield	Area	Production	Yield	Area	Production	Yield
Rice	0.88	1.90	1.01	0.41	3.62	3.19	0.66	1.86	1.20
Wheat	2.39	4.31	1.87	0.46	3.57	3.10	1.18	2.97	1.78
Maize	-0.13	-0.63	-0.50	-0.18	1.91	2.10	1.09	3.33	2.21
Jowar	-0.34	5.67	6.04	-1.00	0.27	1.29	-3.26	-3.31	-0.06
Bajra	-1.85	-3.18	-1.35	-1.05	-1.37	-0.32	-1.19	0.59	1.80
Pulses	0.59	-0.39	-0.10	-0.09	1.52	1.61	-1.02	-0.58	0.27
Food Grains	0.47	2.07	-2.30	-0.23	2.85	2.74	-0.20	1.66	1.34

(Estimated based on Table 1)

In this table rice and wheat, which are the staple food of majority of people and Maize, Jowar, and Bajra, which are staple food in the states of Maharashtra, parts of Madhya Pradesh and Rajasthan, and pulses are taken in to consideration. The growth rate in production in 1970-71 with respect to rice has been increasing from 1.90 to 3.60 in 1980-81, but decelerated drastically to 1.86 in the current decade. The same has been the trend in the case of wheat, but maize has shown a increasing trend in the growth rate from 0.63 in 1970's to 1.91 in 1980's to 3.33 in 1990's. While the case of pulses, though it showed an increase in production from -0.31 in 1970's to 1.52 in 1980's, it reduced drastically in the 1990's. In nutshell, the food grain production too shows the same trend, with increase in the 1980's to deceleration in the 1990's. This shall be a matter of concern to all. Literature indicates that there are "fatigues" in the Green Revolution in all the major GR states of Punjab, Haryana, and Western UP on the one hand and degradation of soil and water resource on the other hand. This has resulted in the declining total factor production in the major GR belt states (Kumar & Rosegrant, 1994, Kumar, 1996)

All the developments achieved in the agriculture sector are trampled probably by the mammoth like burgeoning populace that never seems to pace down. India needs support 16 % of the world population with 2.4 % of the world's land area (Economic Survey 2001-2002) With a population equivalent to Australia's population added each year

Hence it is pertinent to compare the growth rate in the food grain production and the population growth over the three decades.

Table: 3. CGR of population and food grain production in three decades: all India

YEAR (DECADE WISE)	POPULATION (% / Annum)	FOODGRAIN PRODUCTION (% / Annum)
SEVENTIES	2.22	2.07
EIGHTIES	2.14	2.85
NINETIES	1.93	1.66

(Economic survey 2001-2002)

Figure 2 . CGR of population and food grain production in three decades: all India

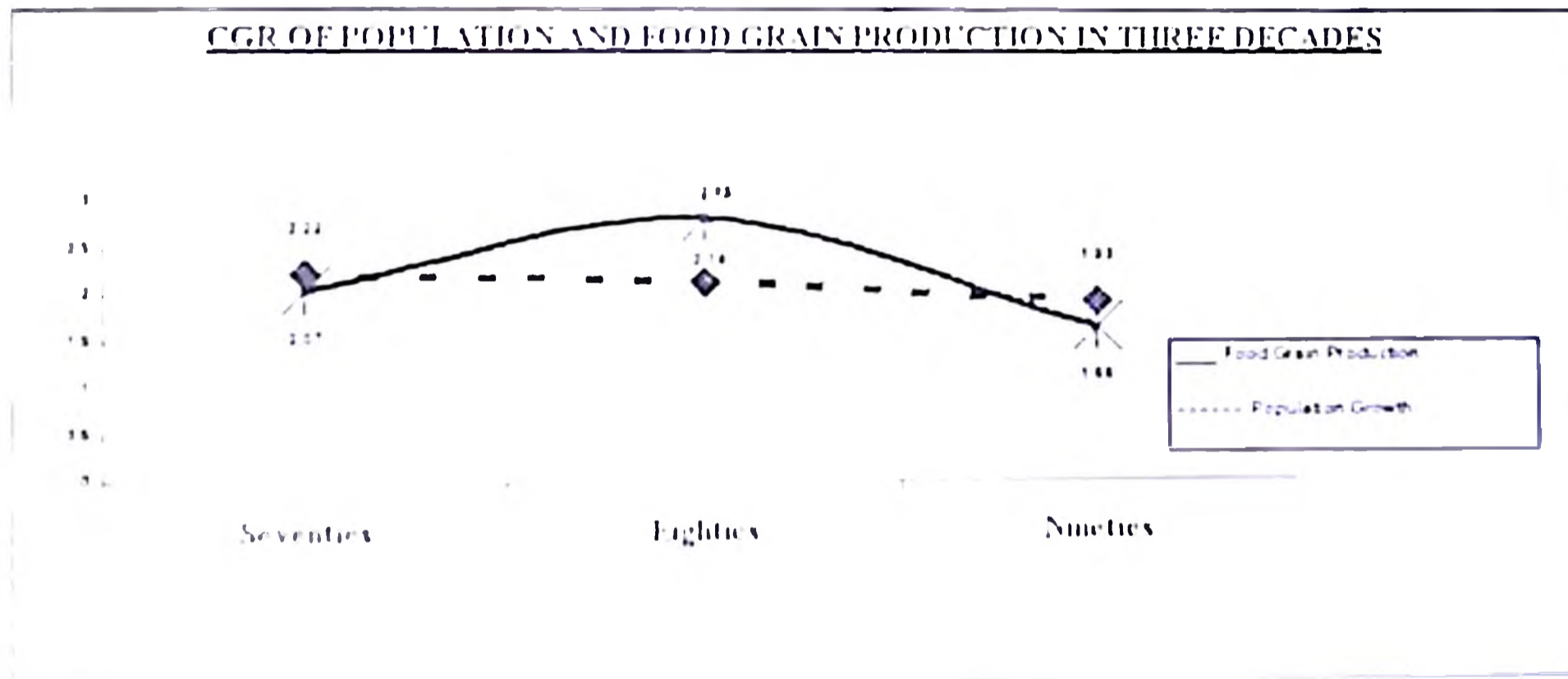


Table 3 shows the growth rate in the population representing the demand side and the growth rate in rate in food grain production representing the supply side in the three decades viz 1970's, 1980's and 1990's. The table shows the growth rate in the production during the 1970's was only 2.07, which was inadequate to the population growth during that period. But during the 1980's the food grain production increased and was much higher to the growth in the population, which were only 2.14. In the 1990's, the food grain production growth rate decelerated to 1.66 and it was not sufficient to meet the growth in population, which was 1.93. Hence, we can see that

currently the increase in the food grain production is inadequate to meet the growth in the population.

To meet the demands for the increasing population, Indian food grain production must be increased from 200 Mt. in 2000 to about 300 Mt. by the year 2020 (Bhalla et.al, 1999). To achieve these targets food grain production must increase at the rate of 5 Mt. per year over the two decades (Swaminathan, 2001).

Table no: 4

Required yield (kg/ha), Crop wise target at the end of the ninth plan

ITEMS	ACHIEVED (YE 1994-95)	REQUIRED LEVEL BY 2001-2002
Rice	1990	2229
Wheat	275	2885
Coarse cereals	1001	1062
Jowar	852	989
Bajra	639	712
Maize	1785	1863
Pulses	630	839
Oilseeds	856	1104
Vegetables	17727	17915
Fruits	10281	16781

(Source: Kumar, 1998)

Table 4 shows the required yield and the targeted yield at the end of the ninth plan. It is vivid that only in the case of coarse cereals the achieved yield is near to the targeted yield. The per capita land area is declining rapidly and meeting all the basic necessities from per capita land area of 0.08 ha is bound to be major challenge for scientists, policy makers and farmers (Swaminathan, 2001).

If food requirement of the people are to be met, the alarming trend in the stagnation and marginal decline in area under crops will have to be reversed particularly, the significant decline in the current decades must viewed with greater importance and concern.

(b) MAINTAINING SUPPLY STABILITY

The second component of the national food security is maintaining the supply stability. This is of much greater importance, because any fluctuation in the supply of food grains can in turn increase the acute food security, making the country more food insecure. To calculate the instability in the production of food grain crops, we, calculate the

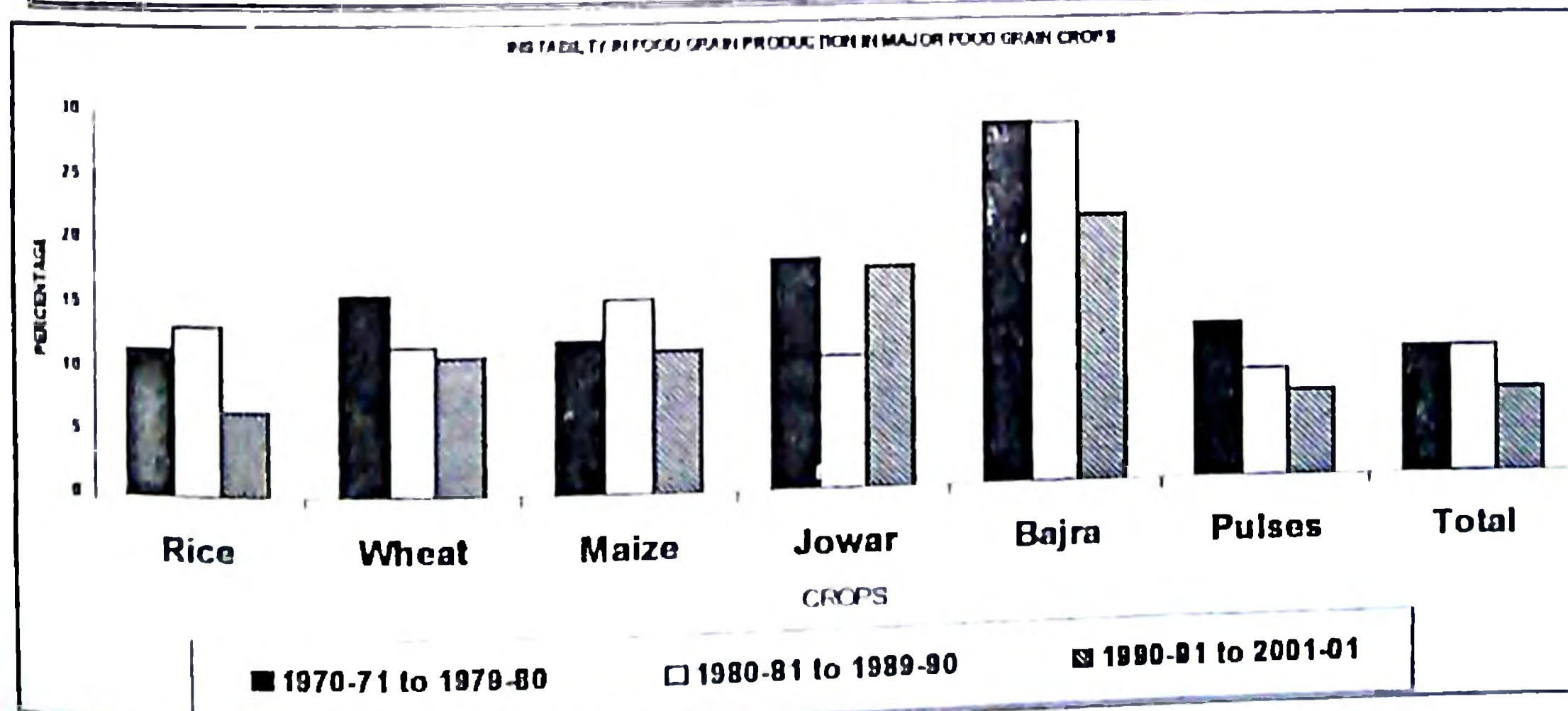
coefficient of variation for the different food grain crops. Coefficient of variation (CV) in percentage shows the degree of instability. Higher the CV values, lesser the stability

Table: 5. Instability in production in major food grain crops

(%)

CROPS	1970-71 to 1979-80	1980-81 to 1989-90	1990-91 to 2000-01
Rice	11.55	13.35	6.70
Wheat	15.68	11.75	10.93
Maize	12.12	15.26	11.24
Jowar	18.05	10.39	17.36
Bajra	28.34	28.26	21.00
Pulses	12.25	8.61	6.83
Total	10.24	10.17	6.84

Source: (Agricultural Statistics at a glance, 2001)



The above table and graph shows CV and lesser the CV value, better the stability. The instability of production in the case of wheat has been continuously decreasing in the case of wheat and same is the trend in the case bajra and pulses. As far as rice is considered the instability in the production increased during 80's but came down to 6.70 in 1990's. Same trend has been seen in the case of maize also. As far as total food grain production is considered the fluctuation has been declining continuously. The stability in food production in the country where one third of the food production is still under rain fed condition is an encouraging sign.

(c): ACCESS TO FOOD SUPPLIES TO ALL CONSUMERS

Food security arguably is a function not only of the availability of food, but also of the purchasing power available with each individual in every household. There may be abundance of food but it is of no help to the poor if he has no access to it. "There is no assurance of deliverance from hunger unless those charged with the tasks of governing him (the poor) take conscious & deliberate steps to channel that abundance in his direction so that he can absorb the little he needs". (Venugopal, 1993).

The virtual meaning of the phrase "India achieved self sufficiency in food grain production" is that India no longer requires to import, but in reality it is quite specifically skips off the accessibility part of the food security concept.

This lack of access or lack of purchasing power has been forcefully brought by Amartya sen, when he describes it as deprivation due to non-entitlement or "the mobility of certain people to command food through the legal means available in the society, including the use of production possibilities, trade opportunities. The access food shall be analyzed from two angles viz the physical access and the economic access.

(c.1.) PHYSICAL ACCESS:

The physical access brings about the actual physical quantity available for consumption.

Table 6 brings about the per capita availability of cereals, pulses and total food grains over the years from 1970-71 to 2000-2001. The data is compared with the Recommended daily intake (RDI) given by the Indian Council of Medical Research (ICMR).

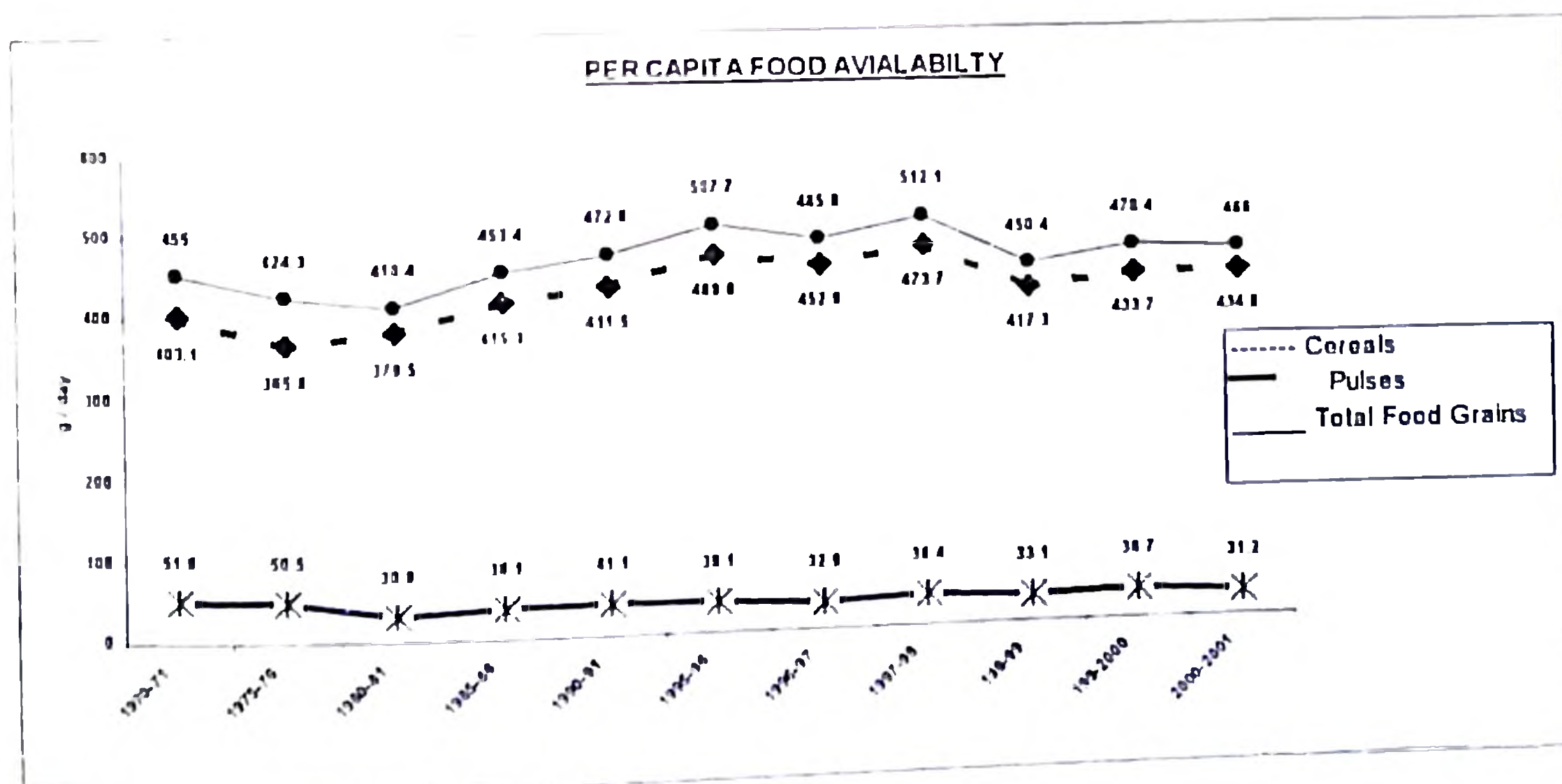
Table .6 Per capita food availability

(g / day)

YEAR	CEREALS	PULSES	TOTAL
1970-71	403.1	51.9	455.0
1975-76	365.8	50.5	424.3
1980-81	379.5	30.9	410.4
1985-86	415.3	38.1	453.4
1990-91	431.5	41.1	472.6
1995-96	469.6	38.1	507.7
1996-97	452.9	32.9	485.8
1997-98	473.7	38.4	512.1
1998-99	417.3	33.1	450.4
1999-2000	433.7	36.7	470.4
2000-01*	434.8	31.2	466.0

* Provisional Estimate (Source: Economic Survey (Various Issues))

Figure no: 4 Per capita food availability.



The food grain production availability increased till 1997-98, then gradually decreased there after to 466 g/day. It indicates a better physical access to food during the corresponding period. This indicates that there is increase in the quantity of consumption

Yet, due to decrease in the pulses consumption shows that there is decrease in the quality of consumption.

The ICMR recommended RDI for rice is 460 grams /ca/day, for pulses it is 47 g/ca/day and for the total food grains in total is 507 g/ca/day. (Swaminathan, 1999) From the table No: 6 its vivid that only during the year 1995-96 & 1997-98, the per capita cereal availability has been surpassed the RDI and with regard to total food grains, per capita availability has matched with the RDI only in two years namely 1995-96 & 1997-98

The fact that food availability itself being less than the RDI is indeed an eye opener. It surpasses all views that we have been boasting about viz the excess food grain production and the brimming buffer stocks.

(c.2.) ECONOMIC ACCESS:

Widespread poverty resulting in chronic and persistent hunger is the single biggest scourge of the developing world today. The physical expression of this continuously re-enacted tragedy is the condition of under-nutrition, which manifests itself among large section of the poor, particularly among the women and children

Poverty and precisely the lack of economic access to food is / has been matter of concern for most of the developing countries. Food security in these countries is almost entirely based on the purchasing power of the people.

A low per capita income of 3.7 per cent (as the latest study the International Food Policy Research Institute Washington) shows (Prabhakarnair, 2000). This point out the fact that economic access to food should be given greater importance is future policy regulations. Hence measurement of the economic access to food becomes crucial in this juncture.

According to Acharya (1997), the economic access to food can be measured by the difference between the rate of increase in per capita income at current prices and that in the prices of staple food.

ECONOMIC ACCESS

Table no: 7 CGR of per capita income and price of wheat & rice

PARTICULARS	1970-71 to 1979-80	1980-81 to 1989-90	1990-91 to 2000-01
Per capita income	9.00	11.17	13.36
Wheat- Nominal	5.52	4.51	10.98
Rice – Nominal	6.57	5.47	9.65
Difference w.r.t wheat price	3.48	6.66	2.38
Difference w.r.t Rice price	2.43	5.7	3.71

Table no: 7 shows the compound growth of per capita income and the prices of wheat and rice in three decades viz, 1970's 1980's and the 1990's. The table argues that with the changes in the per capita income from 9.00 in 1970's to 11.17 in 1980's, prices of wheat and rice also increased along with it. But in the 1990's, when the per capita income reduced prices of wheat and rice also reduced considerably, indicating better economic access even with the reduced per capita income.

POLICY RECOMMENDATIONS & SUGGESTIONS

a) Need for an evergreen revolution:

The term "Green Revolution" coined by William Gaud in 1968 need to reform in to an "Ever green revolution" which Swaminathan (2001) defines it as sustainable advances in crop productivity per units of land water and time, without associated ecological harm. The necessity for such a arise due to the reports of then fatigues of Green revolution in the traditional green revolution areas.

The green revolution in future needs to have higher diversification. Diversification both in the area and crops covered. By diversification we mean that

Figure no:5 Rice allocation and off take under PDS

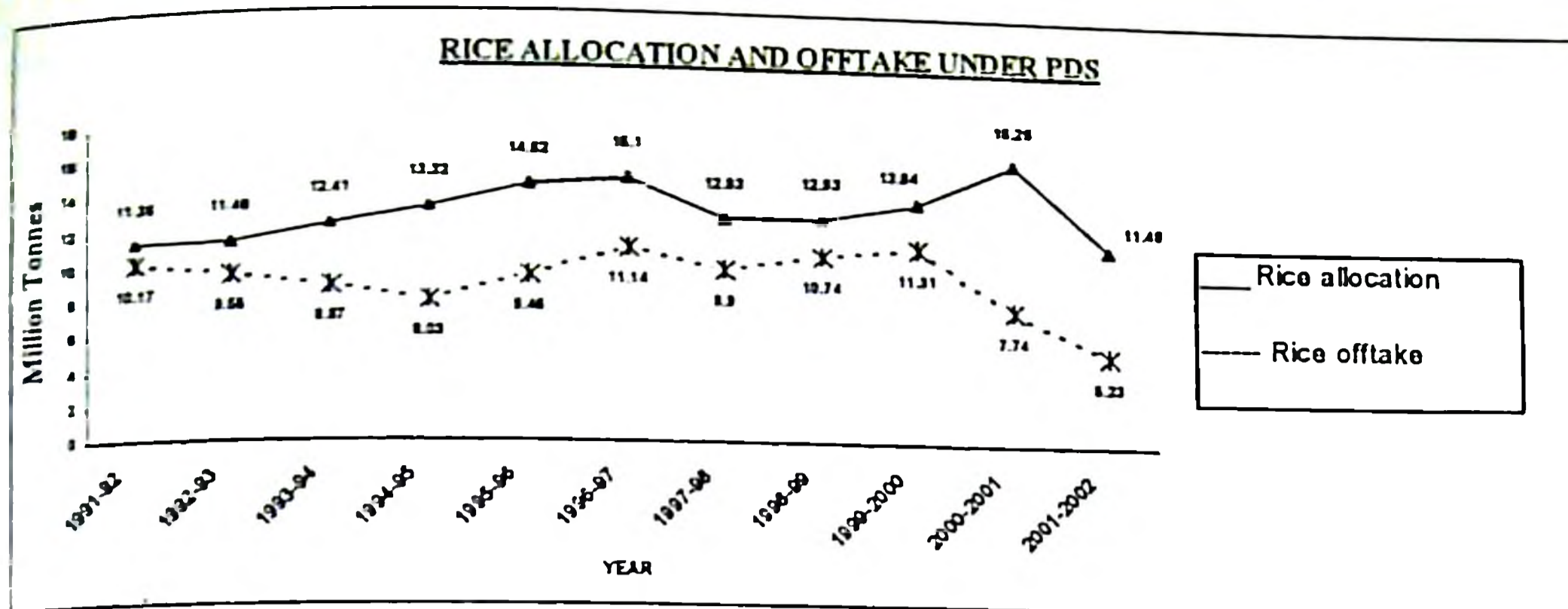
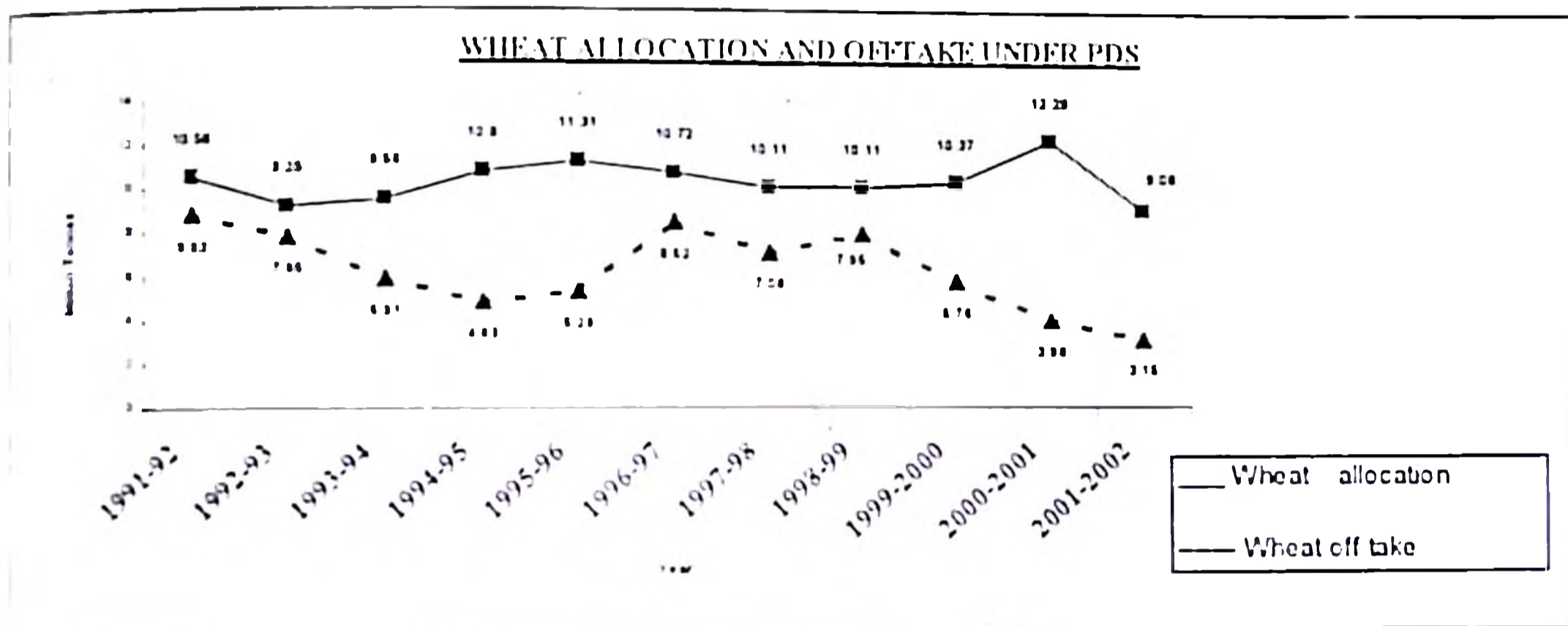


Figure no: 6 Wheat allocation and off take under PDS



The magnitudes of increasing difference between rice off take and allocation is indicative of two factors, namely quality standards of the food grains supplied through the PDS, which adversely affects the living conditions of the poor (Balakrishnana and Ramaswami, 1997) Which supposedly was created for creation of better food security condition in the country. In 1991-92, the off take was 86 % of the quantity allotted for PDS, while in the case of rice, off take was about 90 % of the allotted quantity. However, in 200-01 off take of wheat fell to 32 %, while for rice it fell to 48% (Economic Survey, 2002). The reason for the same being the introduction of Targeted Public Distribution System (TPDS), which made a distinction between Above Poverty Line (APL) and Below Poverty Line (BPL) categories. Also the APL categories have been made to bear 70 % of the economic cost

d) Investment in Agriculture decreasing

The declining investment in agriculture has been a cause of concern as it is crucial for the development of infrastructure like irrigation, electricity, and agricultural research, roads etc. The investment in agriculture declined over the years.

Table No: 9 Declining investment in Agriculture

Year	Investment in Agrl.as % of GDP	Per cent share	
		Public investment	Private investment
1993-94	1.6	33.0	67.0
1994-95	1.6	33.0	67.0
1995-96	1.6	30.9	69.1
1996-97	1.5	28.9	71.1
1997-98	1.4	25.0	75.0
1998-99	1.3	26.0	74.6
1999-2000	1.3	24.8	75.2
2000-2001	1.3	24.2	75.8

(Economic Survey 2001-2002)

Investment in agriculture as percentage of GDP has been declining. (Table: 9) It was about 1.6 % from 1993-94 to 1995-96, after which it declined. The Current investment in agriculture as per centage of GDP is only 1.3 %. The most vivid reason for this is the declining public investment in agriculture. The table reveals that investment in agriculture stands at least to this point only because of continuous higher investment in agriculture by the private sector. Government ignoring a sector that is the base for almost all the industries is not a positive sign. It is to worthy to add that, this was precisely the sector, that got maximum allocation in the first five year plan, which stands now ignored.

e) Better marketing facilities

Due to poorer marketing facilities, the poor farmer is usually forced to "distress sale" of his products. Hence regulations in marketing of agrl produce

have to be brought in. It is also noted that there is a greater disparity in the number of regulated market in different states of the country, like for example Punjab has more than 500 regulated markets in the state, while Kerala has nothing to its credit.

(f) Terms of trade unfavourable.

Terms of trade cannot the relationship of prices of one country or sector with another. In international trade, it's rate at which a country exchanges exports for imports. But within a country, this term is used for inter-sectoral exchanges reflected through relative prices. The farmer's terms of trade cannot the ratio of the indices of prices received and prices paid by the farmers. This ratio indicates whether farmers as a group are gainers or losers in the price situation prevailing in the country. (Acharya and Agrawal, 1994)

Below is a table (table no:10) showing the terms of trade for agricultural sector, over the years, from 1965-66 to 1997-98. If the value of the terms of trade is found to be above 100, then it is said to be favourable to the framers.

Table no : 10 Index of prices received, prices paid and the terms of trade in the agricultural sector

(1972-73 = 100)

Year	Prices received	Prices paid	Terms of trade
1965-66	77.7	75.5	102.9
1966-67	93.7	83	112.89
1967-68	100.2	86.7	115.57
1970-71	100.5	100.5	100.0
1975-76	142.4	168.3	84.61
1980-81	213.6	244.8	87.25
1985-86	278.6	337.4	82.39
1990-91*	112.3	110.2	101.9
1991-92	130.8	123.8	105.6
1992-93	138.7	133.5	103.9
1993-94	151.4	146.1	103.6
1994-95	171.1	160.5	103.6
1995-96	182.9	173.7	105.3
1996-97	190.6	184.8	103.1
1997-98	205.6	194.9	105.6
1998-99	220.8	209.9	105.2
1999-2000	223.1	214.0	104.2

* Revised from 1990-91 (Economic Survey,2002)

The table shows that in the initial four years, that is when the Green revolution was introduced and started having its effects, terms of trade were above 100, indicating that it was favourable to farmers. But after that, it got disturbed, which was

a cause of worry to the Government. After 1990-91, the table reveals that, terms of trade were above 100. A probable reason for this sudden jump from 82.39 in 1985-86 to 101.9 in 1990-91 could be the change in the base period in 1990-91.

(g) Population below poverty line (BPL)

It is astonishing to note that, even after 50 years of independence, more than a quarter of the population (26.10 %) lives below poverty line (Table no: 11) The Government and policy makers should give greater importance to this fact, because if a nation has to make progress, all sections of the nation should march together in unison. In turn, the decrease in the percentage of people below poverty line over the years from 54.9 % in 1973-74 to the current rate of 26.10 % is certainly laudable. Poverty alleviation programs have to be concentrated in this part of the population.

Table no: 11 Percentage of population below poverty line

YEAR	% OF PEOPLE BPL
1973-74	54.9
1977-78	51.3
1983-84	44.5
1987-88	38.9
1990-91	46.6
1992-93	51.1
1993-94	35.77
1999-2000	26.10

(Economic Survey, 2002)

Discussion

Q.1. You have discussed in detail the term "Food Security", can you tell me what is Nutritional Security?

A. Nutritional Security is all together different concept, covering different aspects. More Precisely Nutritional Security is defined as the condition when every person has a diet, nutritionally adequate in quantity and quality and the food consumed is biologically utilized for a healthy life. Nutritional Security is influenced by factors other than food –health, sanitation, clean water and child care.

Q.2. What is the targeted food production for this year and have we achieved it?

A In fact current year provisional estimate of food production is only 197.6 Million tonnes and the expected food grain production is 211 Million tonnes

Q.3. What reasons can you attribute for the reduced production this year?

A There are many probable of reasons for the reduced production in the current year. Some of the reasons could be

Last year we had drought in four major states and the overall rainfall was deficit by 8 % It could be due to the fatigues of green revolution that I have discussed earlier The Rabi Crop food grain out put was 93 Million tonnes but the target was 103 38 million tonnes Rice area in Western Bengal, about one million hectare shrunk because of moisture stress.

Q.4. What is the poverty line?

A. Poverty line is the line demarcating the minimum required, consumption, expenditure level of items such as food clothing, shelter, transport and health care, which meets per capita calories requirement of 2400 calories in Rural areas and 2100 calories in Urban areas, along with minimum non-food expenditure.

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**MOTIVATION
FOR
WORK, EMPOWERMENT AND
DEVELOPMENT**

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SEMINAR REPORT

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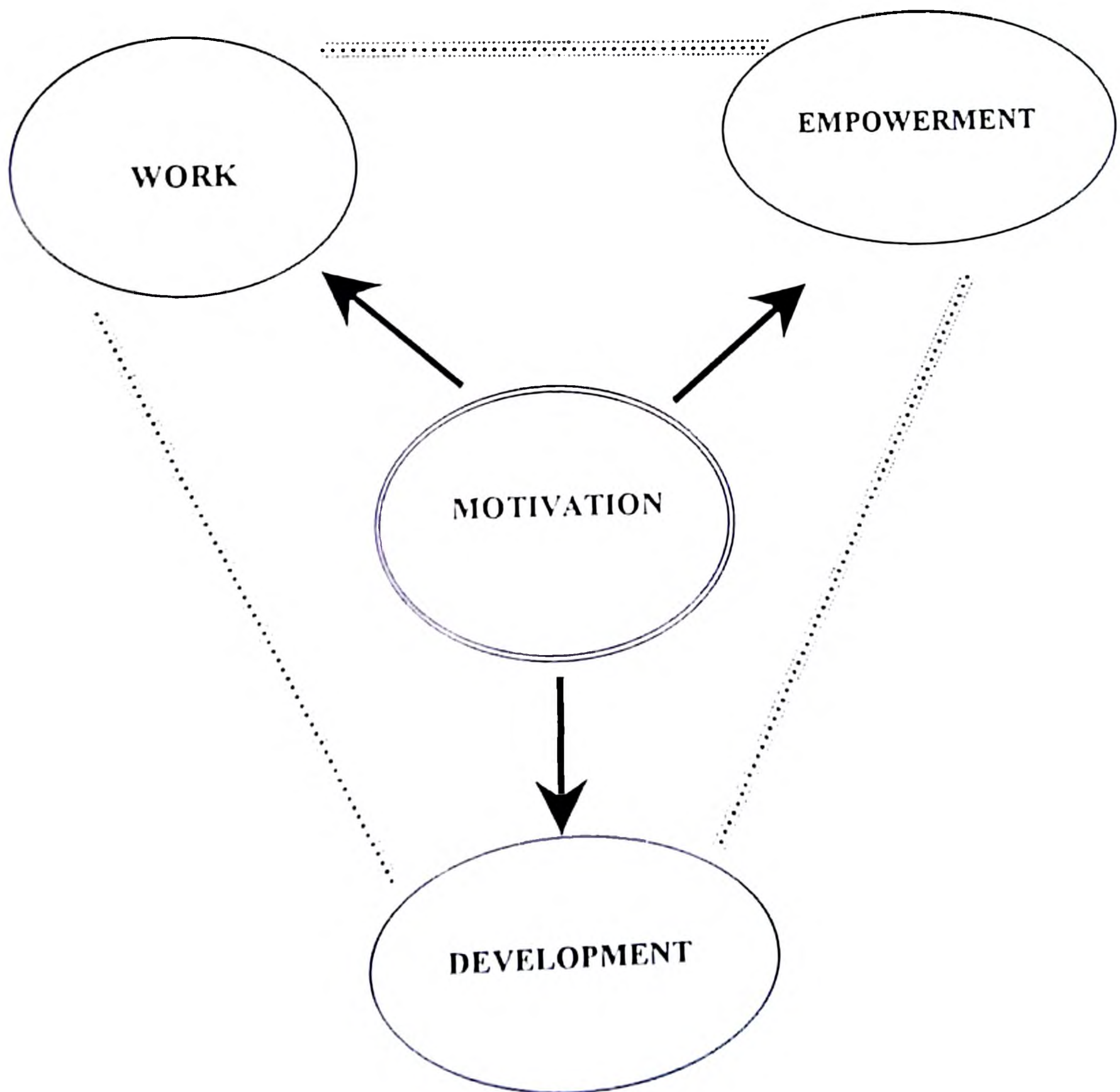
ABSTRACT

Nearly all conscious behaviour is motivated. Motivation is the psychological process that gives purpose and direction to behaviour. If we understand what motivates people we have the most powerful tool at our command to deal with them. For the survival and sustenance of an organization motivated employees are indispensable, so it has to create and maintain an environment in which individuals work together in groups towards the achievement of targeted objectives.

Today, in the dynamic and competitive environment, maintaining a highly motivated workforce is the most challenging task. Thus, the techniques of motivation are the powerful tools in the hands of leaders to persuade, convince and propel people for action. The five major motivation approaches viz. need theory, expectancy theory, equity theory, reinforcement theory and goal setting theory (*Robbins, 1999*) blended judiciously to design appropriate management techniques would provide the cutting edge in dealing with people and driving them to meaningful action aimed at effective work, empowerment and development (*Greenberg, 1999*).

In a recent study, it was found that majority of the teachers of KAU (70.67 %) perceived the work climate as good and it has positive and significant relationship with work motivation (*George, A 1996*). Knowing what motivates employees and incorporating that knowledge into the reward system will help extension to identify, recruit, employ, train, and retain a productive work force. Therefore, we have to motivate ourselves to motivate others (*Denny, 1993*).

MOTIVATION
FOR
WORK, EMPOWERMENT AND DEVELOPMENT



INTRODUCTION:

Nearly all conscious behaviour of human beings is motivated. The internal needs and drives lead to tensions, which in turn result in actions.

A manager requires to create and maintain an environment in which individuals work together in groups towards the accomplishment of common objectives. A manager cannot do a job without knowing what motivates people. The building of motivating factors into organizational roles, the staffing of these roles and the entire process of leading people must be built on the sound knowledge of motivation. It is necessary to remember that level of motivation varies both between individuals and within group at different times. Today, in the increasingly competitive environment maintaining a highly motivated workforce is the most challenging task. The art of motivation starts by learning how to influence the behavior of the individual. This understanding helps to achieve both the individual as well as organizational objectives. Motivation is a powerful tool in the hands of leaders. It can persuade, convince and propel people to act. If you understand what motivates people, you have at your command the most powerful tool for dealing with them.

WHAT IS MOTIVATION?

It is a general tendency to believe that motivation is a personal trait of every individual. Some people have it and the others don't. In practice, some are labelled to be lazy because they do not display an outward sign of motivation. However, individuals differ in their basic motivational drives. It also depends upon their areas of interest. The concept of motivation is situational and its level varies between different individuals at different times.

DEFINING MOTIVATION:

The term motivation was derived from a Latin word "*MOVERE*", It means 'to move'.

Motivation is to inspire people to work, individually or in groups such as to produce the best of results. It is the will to act by exerting high level of efforts towards achieving organizational goals, conditioned by the effort's ability to satisfy some individual needs.

Motivation is getting others to do something because they want to do it. It was once assumed that motivation had to be injected from outside, but it is now understood that everyone is motivated by several differing forces.

Motivation is a general term applied to the entire class of drives, desires, needs, wishes and similar forces. To say that managers motivate their subordinates is to say that they act in such a manner to satisfy drives and desires and induce the subordinates to act in a desired manner.

To motivate others, is the most important of management tasks. It comprises the abilities to communicate, to set an example, to challenge, to encourage, obtaining feedback, to involve, delegating, to develop and train, to inform, to brief and to provide a just reward.

NATURE OF MOTIVATION:

Motivation explains how behaviour gets started, is energized, is sustained, is directed, is stopped, and what kind of subjective reaction is present in the organism, while all this is going on.

Two major facets of motivation are arousal (activation of behaviour) and direction (movement in a particular direction). - (Benson, 1995)

Motivation answers the following questions,

- What energizes human behaviour?
- What directs or channels such behaviour?
- How this behaviour is maintained or sustained?

MOTIVATION AND RELATED CONCEPTS:

Motivation refers to the drives and efforts to satisfy a want or goal, whereas satisfaction refers to the contentment experienced when a want is satisfied. In contrast, inspiration is bringing about a change in the thinking pattern. While, manipulation is getting things done from others in a premeditated manner.

Hence, manipulation or external stimulus as well as inspiration or internal stimulus act as carriers of either de-motivation or motivation which in turn either results into dissatisfaction or satisfaction depending upon the existing situation

Motivation: (Drive to satisfy a want or goal)

- It is getting somebody to do something because they want to do it.

Manipulation:

- It is getting others to do something because you want them to do it.

Inspiration:

- It is bringing about a change in the thinking pattern.

Satisfaction:

- It refers to the contentment experience when a want is satisfied.

- (Rao and Narayana, 1986)

GENERALISED MODEL OF MOTIVATION

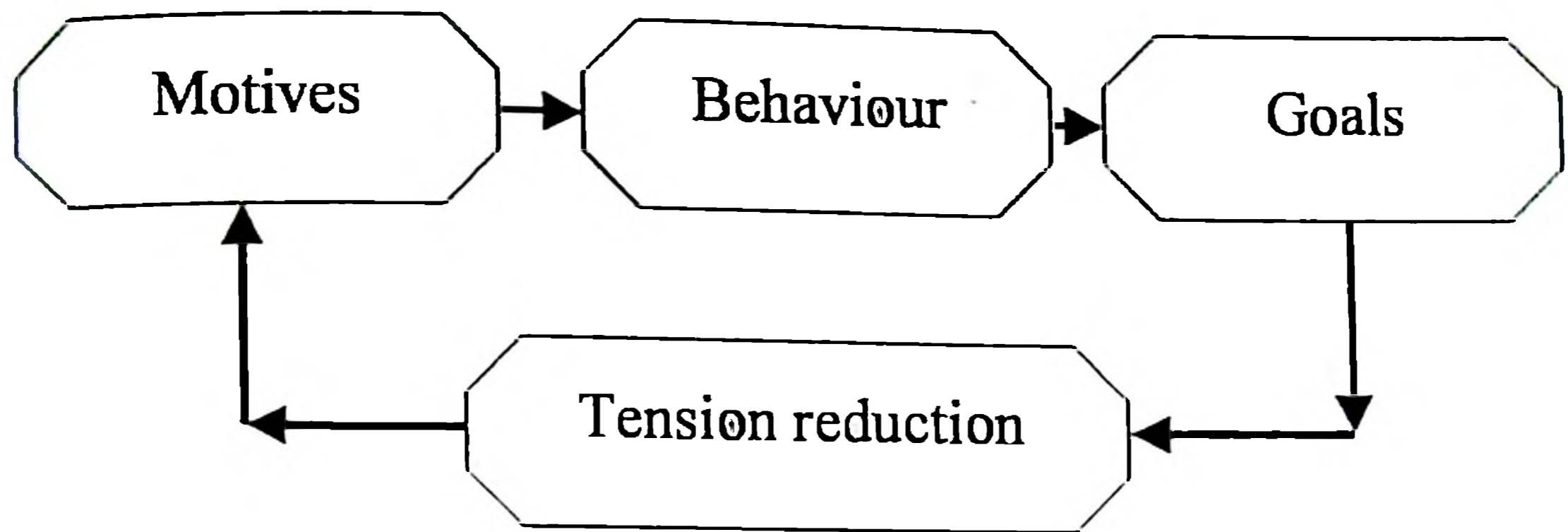
The basic building blocks of this generalised model of motivation are,

1. Behaviour
2. Motives
3. Goals, and
4. Some form of feedback as shown in the figure

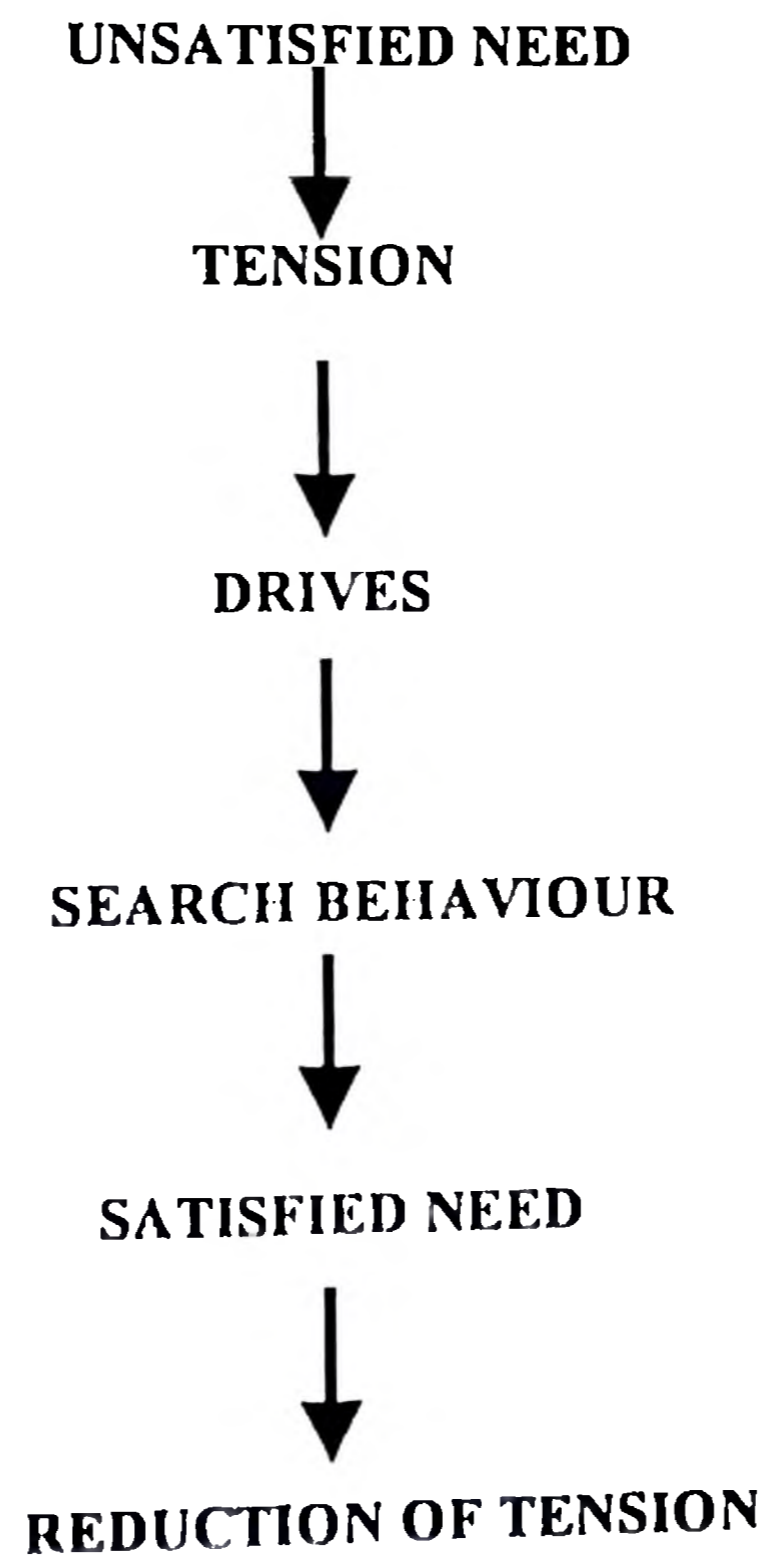
Behaviour. All behaviour is series of activities, behaviour is generally motivated by a desire to achieve a goal. In order to predict and control behaviour managers must understand the motives of people.

Motives: Motives prompt people to action. They are the primary energizers of behaviour; the "Whys" of behaviour. mainsprings of action. They arise continuously and determine the general direction of an individual's behaviour.

Goals: Motives are directed towards goals, generally creates a state of disequilibrium, physiological or psychological imbalance within the individuals. Goals are the ends which provide satisfaction of human wants. The internal tension will be reduced after the satisfaction of needs.



MOTIVATION PROCESS



In the initial stage, a person starts feeling the lack of something. There is an arousal of need so urgent, that the bearer has to venture in its search to satisfy it. This leads to creation of tension, which makes the person to forget everything else and start work in order to satisfy the same. This tension also creates attitudes, drives, and regarding the type of satisfaction that is desired. Then it leads a person to venture in search of information. Eventually leading to evaluation of alternatives where the best alternative

is chosen. After choosing the alternative, necessary action is taken. Because of the performance of the activity, satisfaction is achieved which then relieves our tensions.

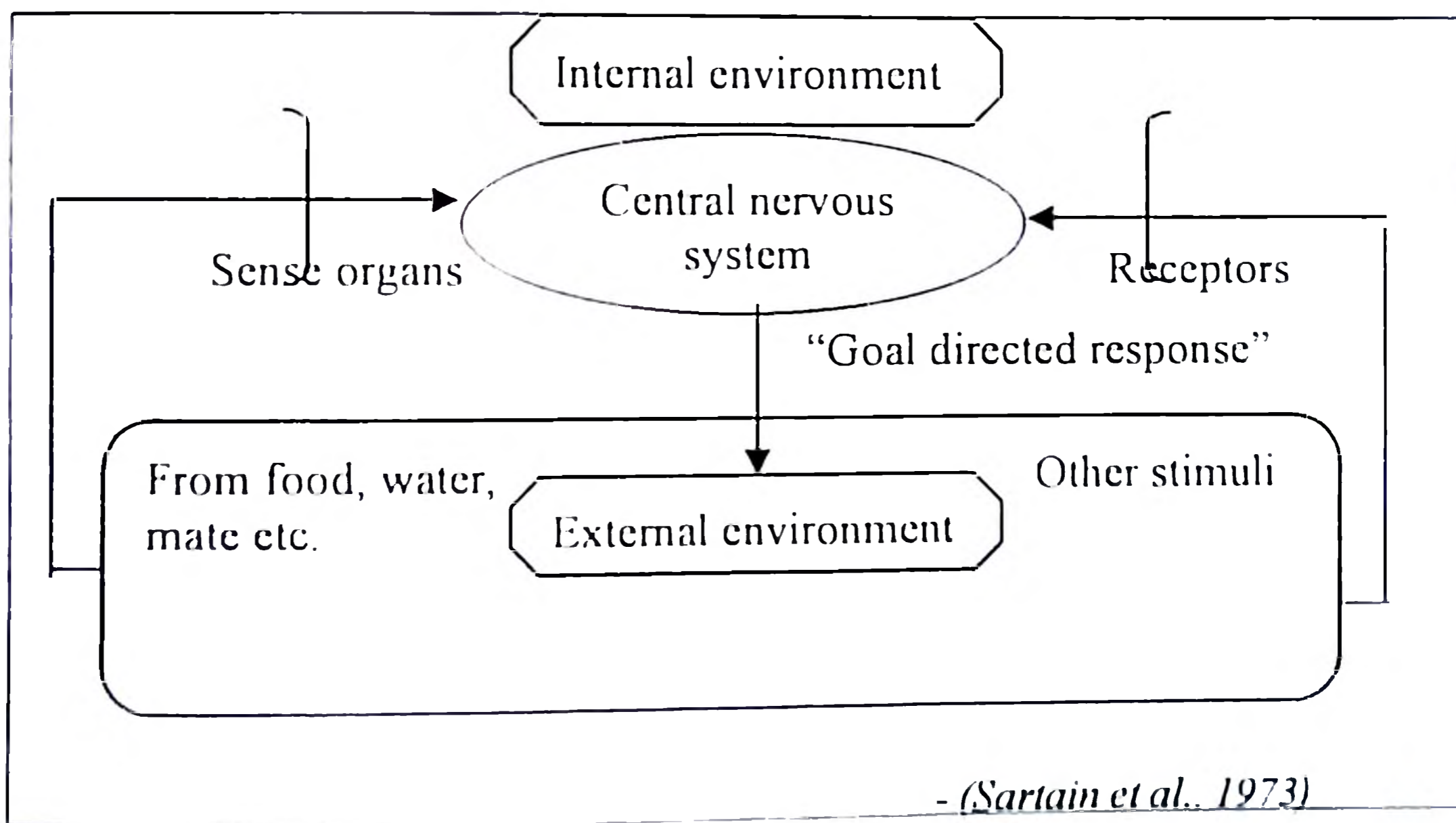
Therefore, we can say that motivated employees are in a state of tension. To relieve this tension, they exert effort. The greater the tension, the higher the effort level. If this effort successfully leads to the satisfaction of need, tension is reduced.

PSYCHOLOGY OF MOTIVATION

“Field concerned with factors leading to arousal, direction and persistence of behavior”

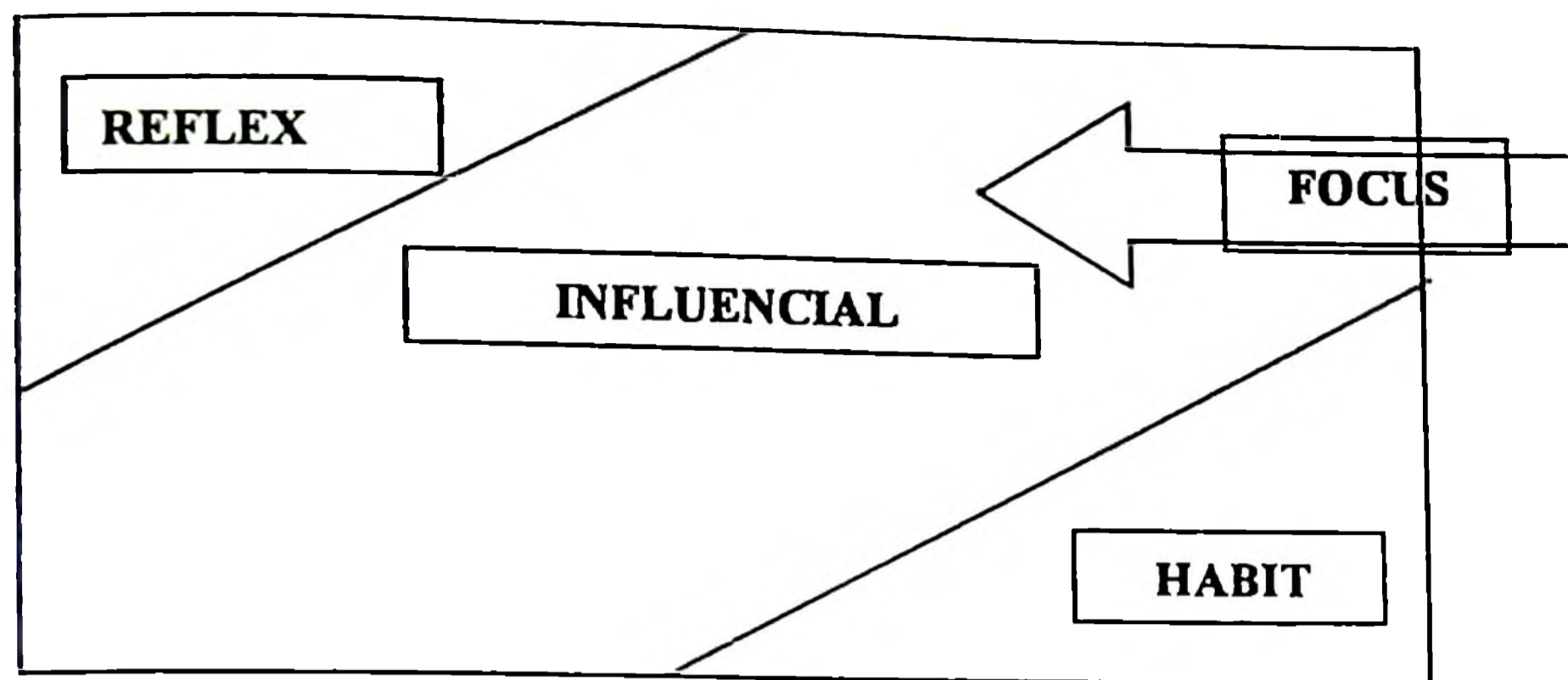
Motivation is a psychological process influenced by both internal and external factors. It is the goal directed behaviour arises within the organism as a response to the stimulus from the external environment. The “Stimulus – Organism – Response” relationship is diagrammatically illustrated below.

INTERNAL AND EXTERNAL FACTORS IN MOTIVATION



HUMAN BEHAVIOUR

Human behaviour is highly dynamic, same person may act differently in different situation. Completely human behaviour can be divided as in the figure shown below. It ranges from two extremes that are reflex and habit. The immediate reflex and habitualised behaviour are difficult to influence. Most of the motivational theories are focusing the influential area between two extremes.



HUMAN NATURE

Individuals are different; People can be broadly classified into following major categories. - (Schneider, 1977)

- People are interested in their own survival
- People are interested in gaining pleasure and avoiding pain
- People resolve competing forces in the same way that bodies move in a physical field
- People are interested in making sense of and controlling their environment

Each of these models can be referred in terms of a metaphor.

- Person as animal
- Person as profit seeker
- Person as physical field
- Person as scientist

TYPES OF TEAMS

(Based on *Peter Drucker's* Categorizations)

Teams vary in composition and manner of functioning. For example, teams within companies can be characterized with the following analogies:

1. Baseball Team:

Players play on the team not as a team. They have fixed positions that they never leave. They pass work from one team member to the next, e.g. Henry Ford's assembly line.

2. Football Team:

Players have fixed positions but they play as a team. They work in parallel rather than in sequence, e.g. Clusters or groups of people drawn from different disciplines who work together on a semi-permanent basis).

3. Tennis Doubles Team:

Players have primary rather than fixed positions. They cover their teammates, adjusting to their strengths and weaknesses and the changing rules of the game, e.g. self-regulated, multi-skilled work teams.

Understanding, what sort of person he/she is? Moreover, which type of group it is? would help the leaders to design appropriate motivational strategies

THEORIES OF MOTIVATION

Theories of motivation try to provided a general set of principles to guide our understanding of the urges, wants, needs, desires, strivings and goals that come under the heading of motivation.

- (Morgan et al., 1993)

DRIVE THEORY

This might be described as “push theories of Motivation”; behaviour is pushed towards goals by driving states with in the person or animal .In general, it says the following when a internal driving state is aroused, the individual is pushed to engaged in behaviour which will lead to a goal that reduces the intensity of the driving state.

- (Bolles, 1975)

Thus, Motivation is said to consist of,

1. A driving state
2. The goal directed behaviour initiated by the driving state
3. The attainment of an appropriate goal
4. The reduction of the driving state and subjective satisfaction and relief when the goal is reached

After a time, the driving state builds up again to push behaviour towards the appropriate goal .The sequence of events mentioned are called 'Motivational cycle'.

Drive theory differ in the source of the driving state, which impels people and animal to action. Some theorist proposed an elaborate set of in born driving mechanisms, others emphasised the role of learning (Learned drives) in the origin of the driving states.

INCENTIVE THEORIES

The drive theories of Motivation perhaps apply best to some of the biological motives.

The stimulus characteristics of the goal can some times start a train of motivated behaviour. This is the basic idea behind theories of incentive Motivation.

Thus, in contrast with the push of drive theories incentive theories are known as "Pull theories of Motivation". Because of certain characteristic, they have the goal objects pull behaviour towards them. The goal objects that motivate behaviour are known as incentives. An important part of any incentive theories is that individuals expect pleasure from the attainment of what are called positive incentives and from the avoidance of what are known as negative incentives.

OPPONENT PROCESS THEORY

Hedonistic views of motivation say that we are motivated to seek goals that give us good emotional feelings and to avoid those resulting in displeasure.

The opponent process theory takes a hedonistic view of motivation, because what it says about pleasure and displeasure, this theory might also be classed as a theory of emotion.

Basic to this theory is the observation that many emotional motivating states are followed by opposing are opposite state. This theory gives us a way of thinking about the basis of some learned motives .For example, the heroin addict acquires a need for the drug in order to prevent the unpleasant consequences of withdrawal; some people acquire a need to seek thrills in order to experience after the danger is over.

OPTIMAL- LEVEL THEORY

These are hedonistic theories, which say that there is a certain optimal or best level of arousal that is pleasurable. Optimal-level theories might be called "just-right theories" .The individual is motivated to behave in such a way as to maintain the optimal level of arousal. For instance, if the arousal is too low person will seek

situations or stimulus to increase arousal, if arousal is too high behaviour will be directed towards decreasing it.

BIOLOGICAL MOTIVATION

The biological motives are rooted in the physiological state of the body. There are many such motives including hunger, thirst, desire for sex, temperature regulation, sleep, pain avoidance and a need for oxygen.

Many biological motives are triggered, in part by departures from balanced physiological conditions of the body. The body tends to maintain a state of equilibrium called "Homeostasis" in many of its internal physiological processes; this balance is crucial for life.

Thus these basic motivational theories give an inside about how behaviour gets start, energised, directed, sustained and stopped.

MOTIVATION: FROM CONCEPTS TO APPLICATIONS

- (Robbins, 1999 & Greenberg and Baron, 1999)

NEED THEORIES

Need is a craving or deficit of physiological (such as hunger) or psychological (such as acceptance) nature. - (Luthans, 1981)

Development of need: - (Williams, 1997)

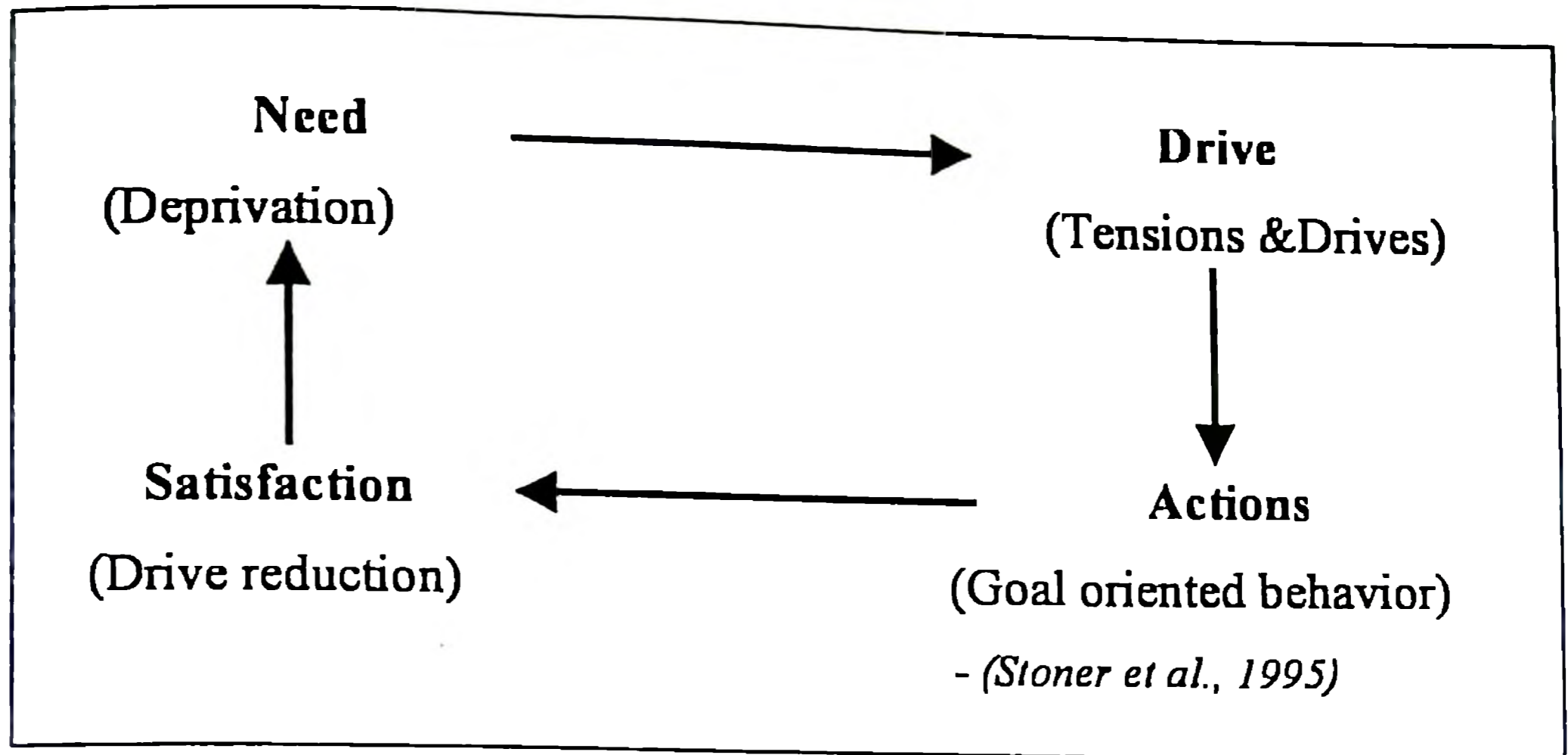
- I don't need to change
- I am dissatisfied
- My dissatisfaction is increasing
- I need to do something about it

The development of the awareness of value: - (Williams, 1997)

- I ought to do something about it
- I can see the value it does
- The value outweighs the cost
- I will do something about it

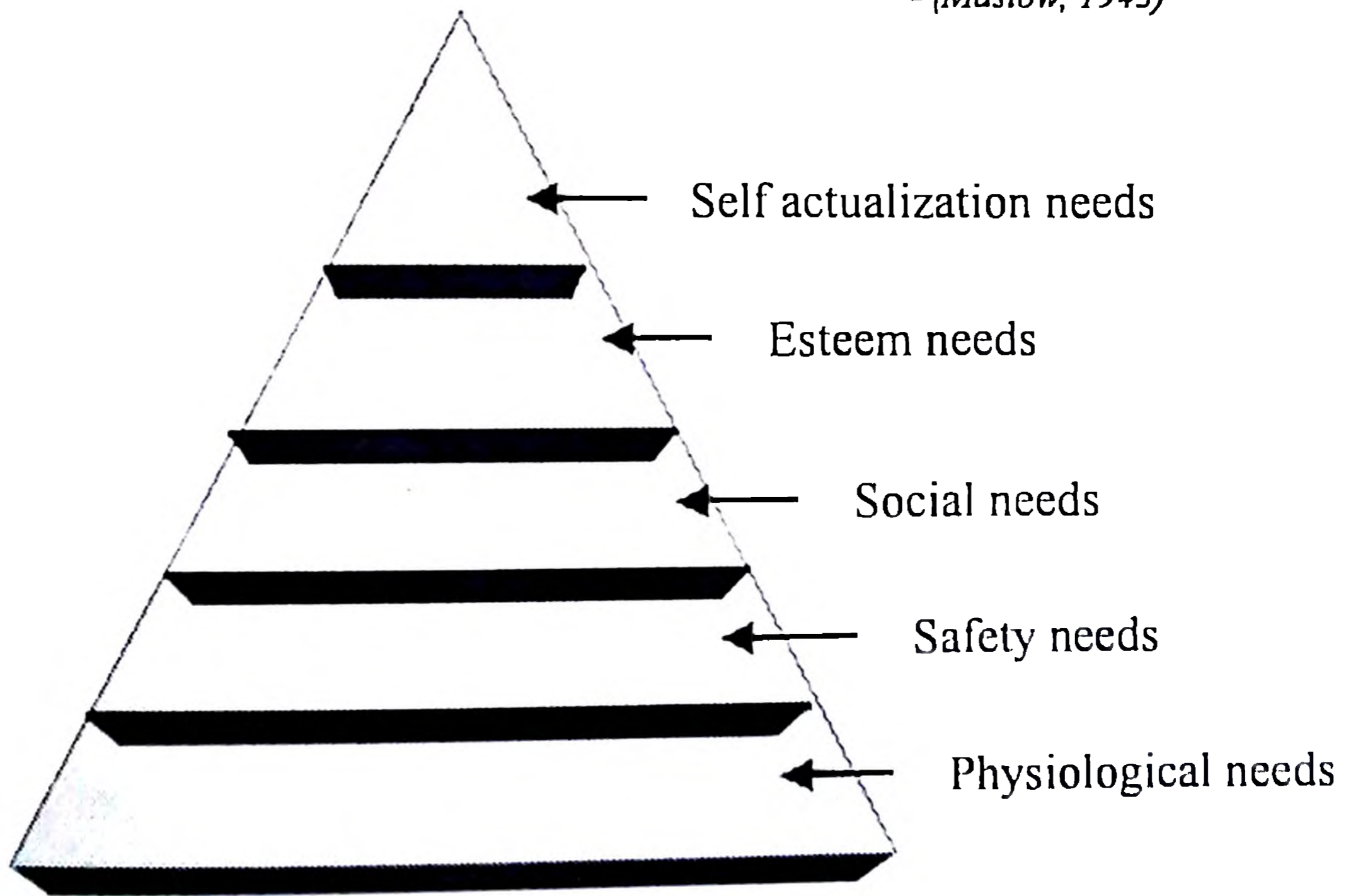
NEED CYCLE

A need means some internal state that makes certain outcomes appear attractive. An unsatisfied need creates tension that stimulus later derives within the individual. These drives generates search behaviour to find particular goals. That, if attained will satisfy the need and leads to reduction of tension.



NEED HIERARCHY THEORY

- (Maslow, 1943)



One of the most widely mentioned theories of motivation is the hierarchy of needs theory put forth by psychologist Abraham Maslow. Maslow saw human needs in the form of a hierarchy, ascending from the lowest to the highest, and he concluded that when one set of needs is satisfied, these kind of needs ceases to motivate.

As per his theory needs are:

Physiological needs: These are important needs for sustaining human life. Food, water, warmth, shelter and sleep are the basic physiological needs, which fall in the primary list of need hierarchy. Maslow was of an opinion that until these needs were satisfied to a degree to maintain life, no other motivating factors could work.

“Even god can not speak to a hungry man except in terms of bread” - M.K. Gandhi

Security or Safety needs:

These are the needs to be free from the physical dangers such as the fear of losing a job, property, food or shelter. It also includes protection against any emotional harm.

Social needs:

Since people are social beings, they demand for societal acceptance. People try to satisfy their needs for affection, acceptance and friendship.

Esteem needs:

According to Maslow, once people begin to satisfy their social needs, they want to be held in esteem both by themselves and by others. This kind of need produces such satisfaction such as power, prestige, status and self-confidence. It includes both internal esteem factors like self-respect, autonomy, achievements and external esteem factors such as status, recognition and attention.

- (Gunsch, 1991)

Need for self-actualization:

Maslow regards this as the highest need in his hierarchy. It is the drive to become what one is capable of becoming: it includes growth, achieving one's potential and self-fulfillment. It is to maximise one's potential and to achieve something.

Maslow separated the five needs into higher and lower orders; physiological, safety needs were described as lower-order needs and social, esteem, and self-actualization as higher-order needs. The differentiation was on the premise that

higher order needs are predominantly satisfied internally, whereas lower order needs are satisfied externally.

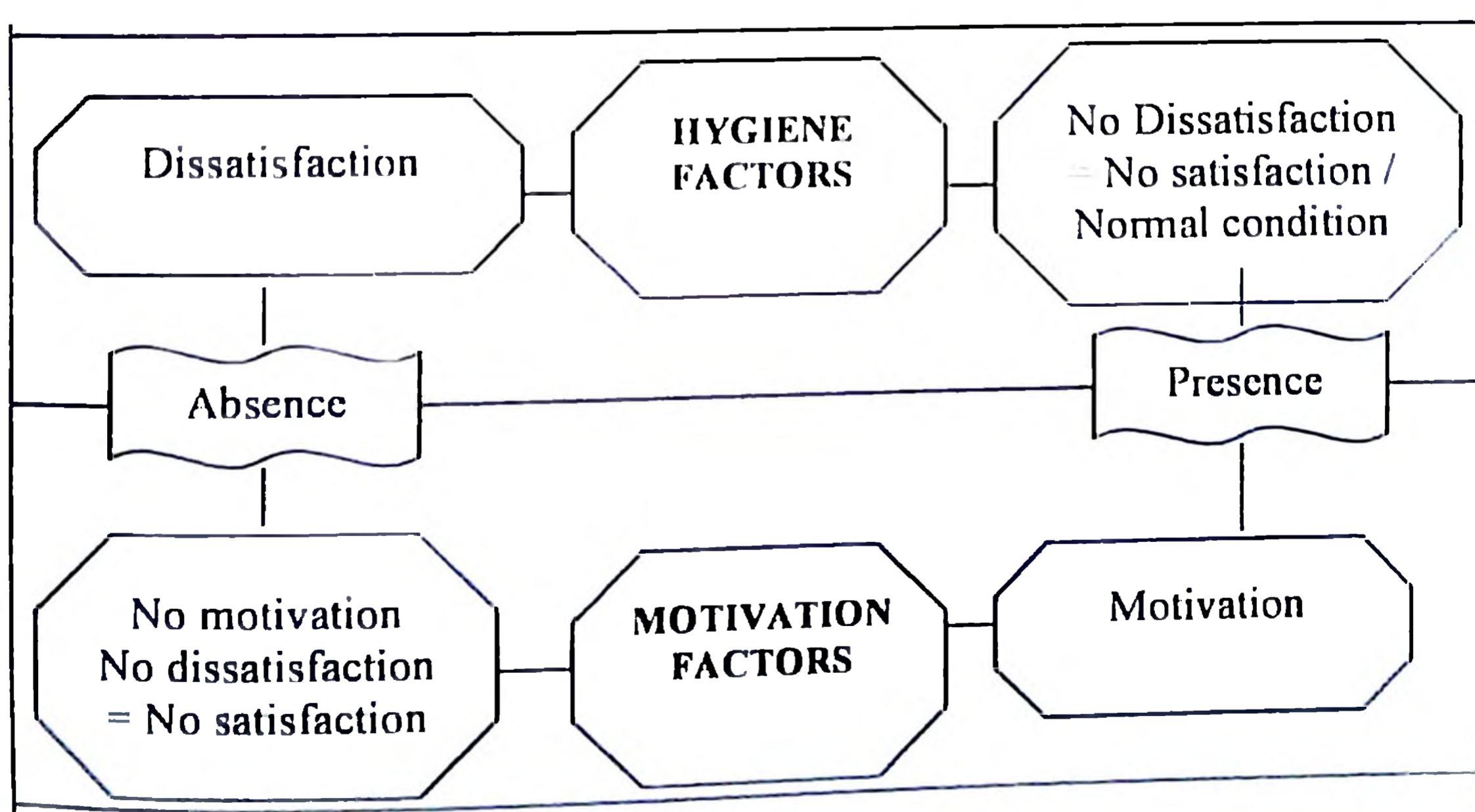
As each of these needs is substantially satisfied, the next need becomes dominant. From the standpoint of motivation, the theory would say that although no need is ever fully gratified, a substantially satisfied need no longer motivates. Therefore, if you want to motivate someone, you need to understand what level of the hierarchy that person is on and focus on satisfying those needs or needs above that level.

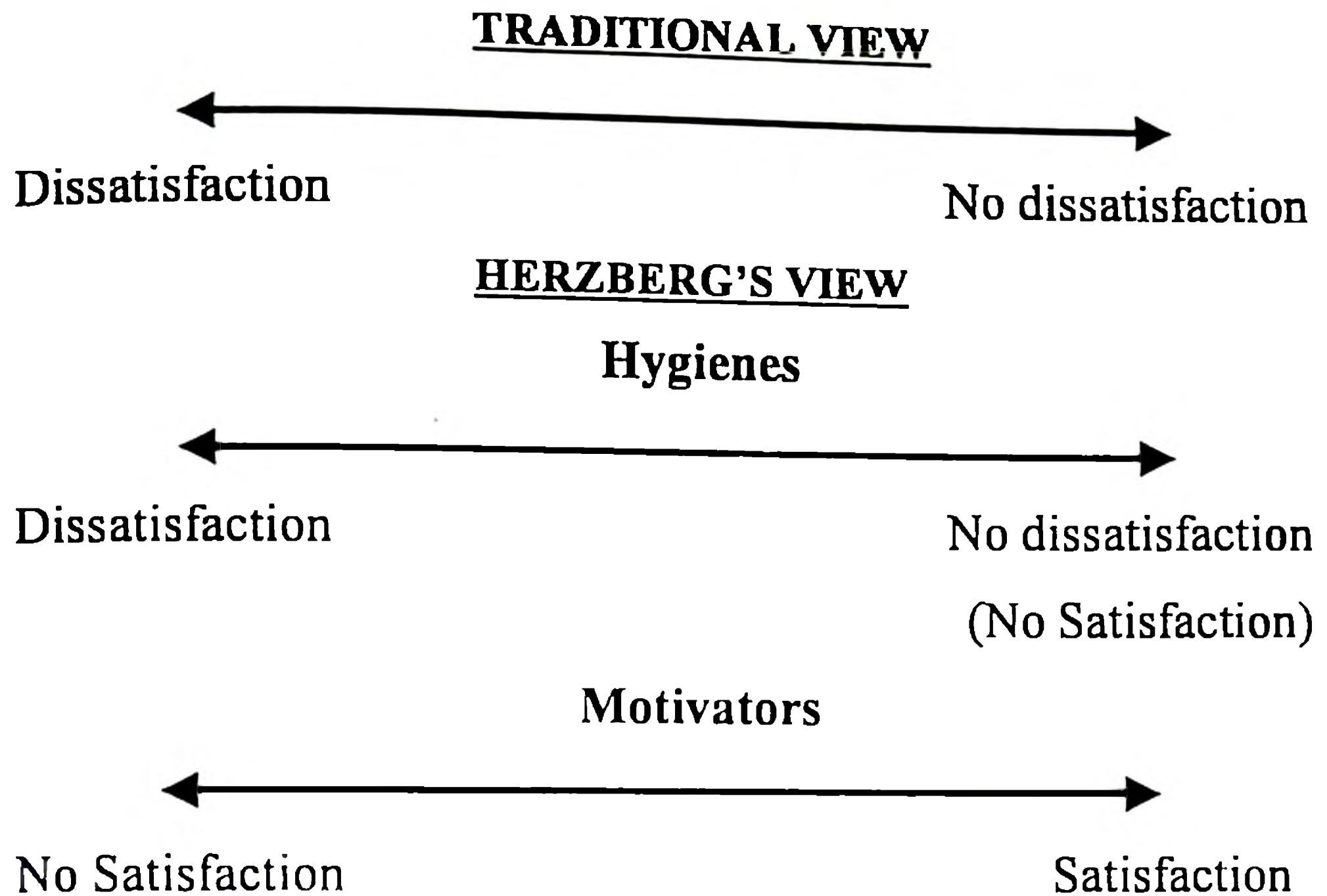
Maslow's need theory has received wide recognition, particularly among practicing managers. This can be attributed to the theory's intuitive logic and ease of understanding. However, research does not validate these theories.

Maslow provided no empirical evidence and other several studies that sought to validate the theory found no support for it.

MOTIVATION-HYGIENE THEORY

- (Herzberg, 1966)





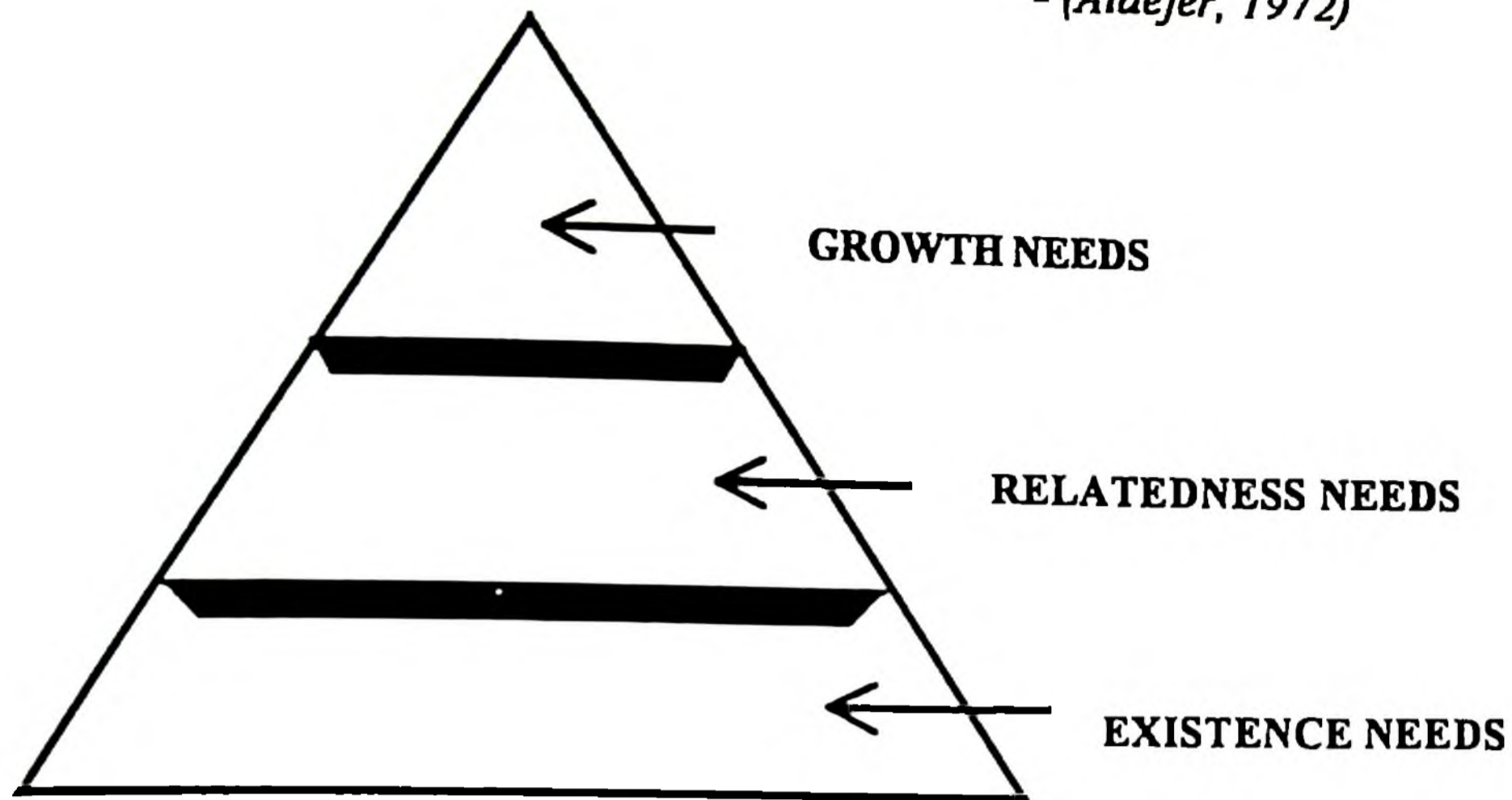
Herzberg has tried to modify Maslow's need hierarchy theory. His theory is also known as "Two-factor theory or Hygiene theory". He stated that there are certain satisfiers and dissatisfiers for employees at work. Intrinsic factors are related to job satisfaction, while extrinsic factors are associated with dissatisfaction. He devised his theory on the question: "What do people want from their jobs?" He asked people to describe in detail, such situations when they felt exceptionally good or exceptionally bad. From the responses that he received, he concluded that opposite of satisfaction is not dissatisfaction. Removing dissatisfying characteristics from a job does not necessarily make the job satisfying. He states that presence of certain factors (Hygiene factors) in the organization is natural and the presence of the same does not lead to motivation. However, their non-presence leads to de-motivation. In similar manner, there are certain factors (Motivational factors), the absence of which causes no dissatisfaction, but their presence has motivational impact.

Examples of Hygiene factors are: Security, status, relationship with subordinates, personal life, salary, work conditions, relationship with supervisor, company policy and administration.

Examples of Motivational factors are: Growth, prospective, job advancement, responsibility, challenges, recognition and achievements.

ERG -THEORY

- (Alderfer, 1972)



Alderfer has tried to rebuild the hierarchy of needs of Maslow into another model named ERG i.e. "Existence – Relatedness – Growth". According to him, there are three groups of core needs as mentioned above. The existence group is concerned mainly with providing basic material existence. The second group is the individuals need to maintain interpersonal relationship with other members in the group. The final group is the intrinsic desire to grow and develop personally.

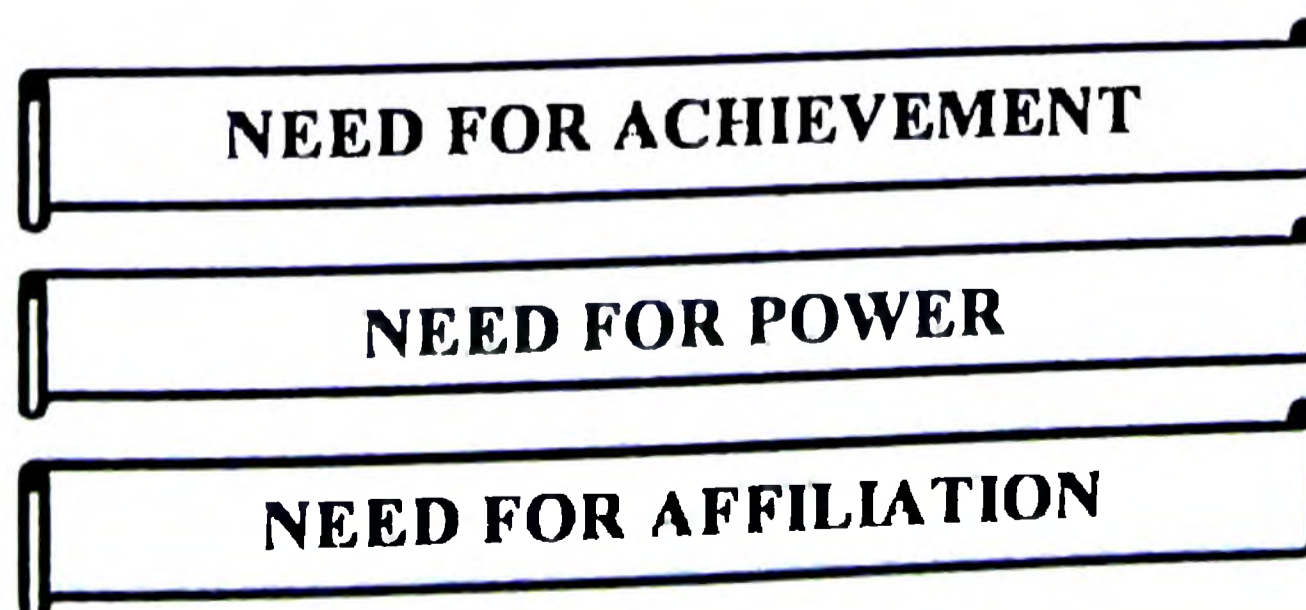
The major conclusions of this theory are:

In an individual, more than one need may be operative at the same time. It also contains frustration-regression dimension. Frustration in attempting to satisfy a higher level need can result in regression to a lower level need i.e. If a higher need goes unsatisfied then the desire to satisfy a lower need intensifies.

THREE NEEDS THEORY

- *David McClelland*

David McClelland has developed a theory on three types of motivating needs:



➤ **Need for Achievement**

(The drive to excel, to achieve in relation to a set of standards, strive to succeed)

➤ **Need for Power**

(The need to make others behave in a way that they would not have behaved otherwise)

➤ **Need for Affiliation**

(The desire for friendly and close interpersonal relationship)

Achievement motivated people are driven by the challenge of success and the fear of failure. Their need for achievement is moderate and they set for themselves moderately difficult tasks. They are analytical in nature and take calculated risks. Such people are motivated to perform when they see at least some chances of success.

Basically people in high need of power are inclined towards influence and control. They like to be at the center and are good orators. They are demanding in nature, forceful in manners and ambitious in life. They can be motivated to perform if they are given key positions or power positions.

In the third category are the people who are social in nature; they try to affiliate themselves with individuals and groups. They are driven by love and faith. They like to build a friendly environment around themselves. Social recognition and affiliation with others provides them motivation.

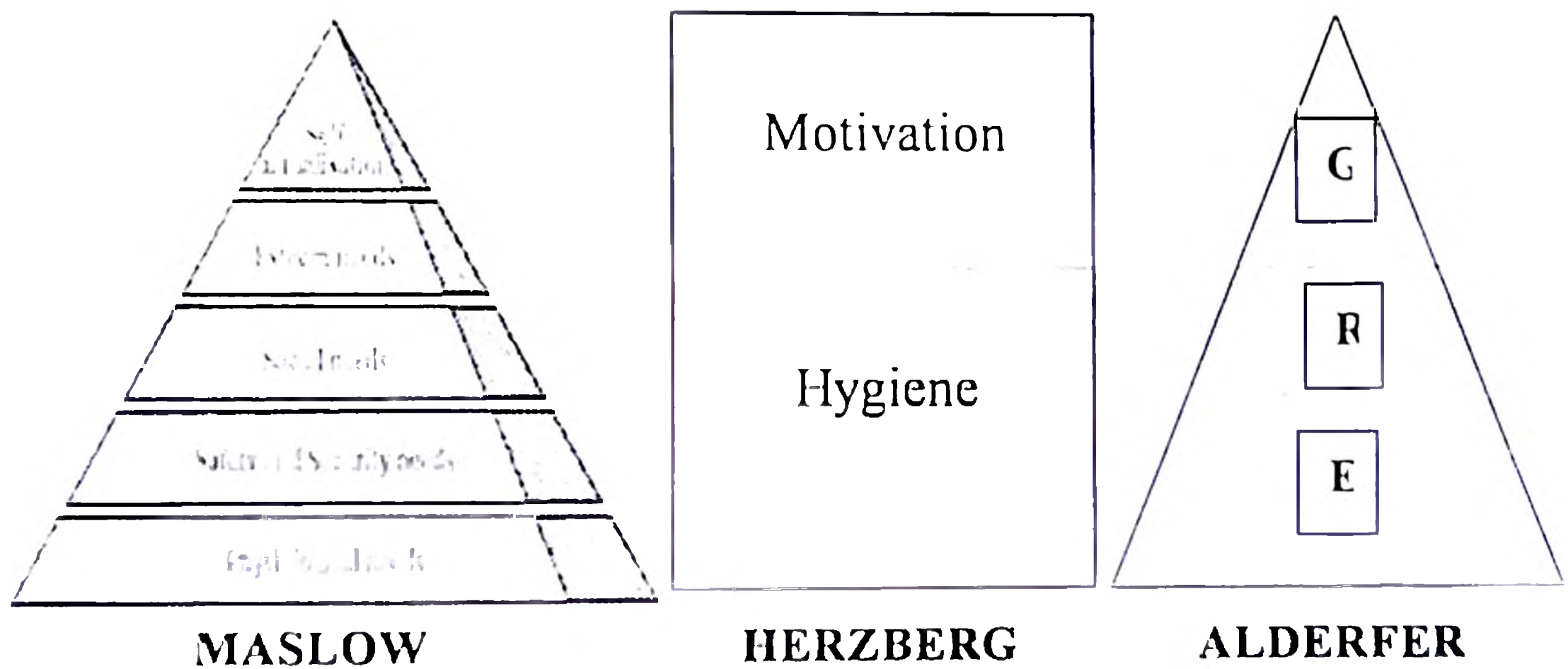
McClelland observed that with the advancement in hierarchy the need for power and achievement increased rather than affiliation. He also observed that people who were at the top, later ceased to be motivated by these drives.

NEED THEORIES: A COMPARISON

One of the main reasons for the popularity of the two-factor theory is that it is compatible with Maslow's need hierarchy. Herzberg attempted to refine and hedge on the need hierarchy and cast a new light on the content of work motivation. Herzberg recommended the use of hygiene factors to help people to attain their lower level needs. Motivators are recommended to meet upper level needs. However, Maslow construction implies a hierarchical arrangement with greater force from unfulfilled needs and movement through the hierarchy.

Maslow's need hierarchy follows a rigid step like progression. ERG theory does not assume that there exists a rigid hierarchy where lower need must be substantially gratified before one can move on i.e. More than one need may be operative at the same time. ERG also contains a frustration-regression dimension. Maslow argued that an individual will stay at a certain need level until that need was satisfied. ERG theory counters, when higher need level is frustrated the individual's desire to increase a lower level need takes place

NEED THEORIES: A COMPARISON



MANAGERIAL APPLICATIONS OF NEED THEORIES

Probably the greatest value of need theories lies in the practical implications they have for management. In particular, the theories are important insofar as they suggest specific things that managers can do to help their subordinates become self-actualized. Being self-actualized, employees are likely to work at their maximum creative potential; it makes sense to help people attain this state by helping them meet their needs. With this in mind, it is worthwhile to consider what organization may do to help their employees to satisfy their needs.

Some companies are encouraging their employees to satisfy physiological needs, by providing incentives to keep them healthy. To the extent that these incentives encourage employees to adopt healthier life styles, the likelihood of satisfying their

physiological needs is increased. Financial security is an important type of safety need. In this regard, some companies are going beyond the more traditional forms of payroll saving and profit sharing plans.

Financial security is a key aspect of job security, particularly in troubled economic times, when layoffs are inevitable.

To help satisfy employees social needs some companies have incorporated social activities deep into the fabric of its culture. Recognizing employees accomplishments is an important way to satisfy their esteem needs.

To control, need theories represent a potentially useful approach to understand motivation in organizations. These theories reflect the major ways in which human needs are involved in explaining motivation in work organizations.

GOAL SETTING THEORY

o (Lock, 1968)



Instead of giving vague tasks to people, specific and pronounced objectives will help them to achieve faster. As the clarity is high, goal orientation also avoids any misunderstandings in the work of the employees. The goal setting theory states that when the goals to be achieved are set at a higher standard, and then in that case employees are motivated to perform better and put in maximum effort. It revolves around the concept of "Self-efficacy" i.e. individual's belief that he or she is capable of performing a hard task. - (Locke and Latham. 1990)

MANAGER'S GUIDELINES TO SET EFFECTIVE PERFORMANCE GOALS

- (Greenberg, 1999)

As researchers have been actively involved in studying the goal-setting process for many years, it is possible to summarize their findings in the form of principles.

□ **Assign specific goals:**

Probably the best established findings of research on goal-setting is that people perform at higher levels when asked to meet a specific high performance goals than when simply asked to "do your best" or when no goal at all is assigned. People tend to find specific goals quite challenging and are motivated to try in meeting the goals - not only fulfill management's expectations but also to convince themselves that they have performed well. Other research has found that specific goals are also helpful in getting to bring out other desirable organizational goals such as reducing absenteeism and industrial accidents. Naturally to reap such beneficial efforts, goals must not only be highly specific, but challenging as well.

□ **Assign difficult, but acceptable, performance goals:**

Obviously, a goal that is too easy to attain will not bring about the desired increments in performance. The key point is that to raise performance a goal must be difficult as well as specific. At the same time, however people will work hard to reach challenging goals as long as these are within the limits of their capability. As goals become too difficult, performance suffers because people reject the goals as unrealistic and unattainable. In short, specific goals are most effective if they are set neither too low nor too high.

One obvious way of enhancing goal acceptance is to involve employees in the goal setting process. Research on workers participation in goal setting has demonstrated that people better accept goals that they have involved in setting than goals that have been assigned by their superiors. In addition, people are likely to be committed to attaining such goals, in large part because they must psychologically rationalized their decisions to set these goals.

□ **Provide feedback concerning goal attainment:**

The final principle of goal setting appears to be glaringly obvious; feedback helps people attain their performance goals. Findings show that the combination of goal setting and feedback helps raise the effectiveness of group performance.

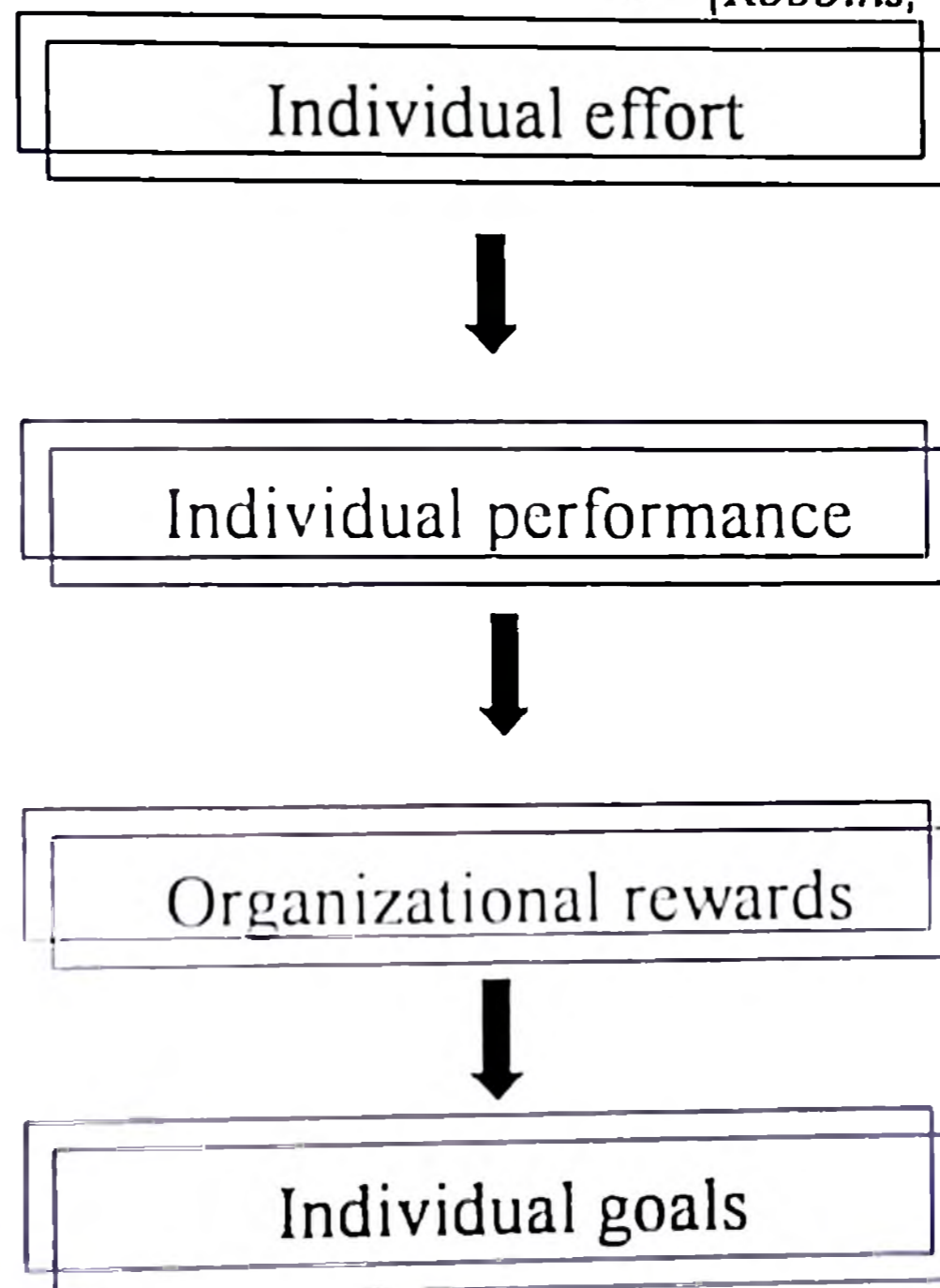
To conclude, goal setting is a very effective tool managers can use to motivate people. Setting a specific, acceptable difficult goal and providing feedback about progress towards that goal greatly enhances job performance.

EXPECTANCY THEORY

SIMPLIFIED EXPECTANCY THEORY

Expectancy theory argues that the strength of a tendency to act in a certain way depends on the strength of an expectation that the act will be followed by a given outcome and on the attractiveness of that outcome to the individual.

- (Robbins, 1999)



This theory focuses on three relationships:

- ✓ **Expectation – Performance relationship:** The probability perceived by the individual that exerting a given amount of effort would lead to performance.
- ✓ **Performance –Reward relationship:** The degree to which the individual believes that performing at a particular level will lead to the attainment of a desired outcome.
- ✓ **Reward –Personal goals relationship:** The degree to which organizational rewards satisfy an individual's personal goals or needs and the attractiveness of these potential rewards for the individual.

EXPECTANCY THEORY

Motivation = Expectancy x

Instrumentality x Valence

Expectancy x Instrumentality x Valence



Motivation = Expectancy x

Instrumentality x Valence



Ability, Technical tools, Group support



Performance

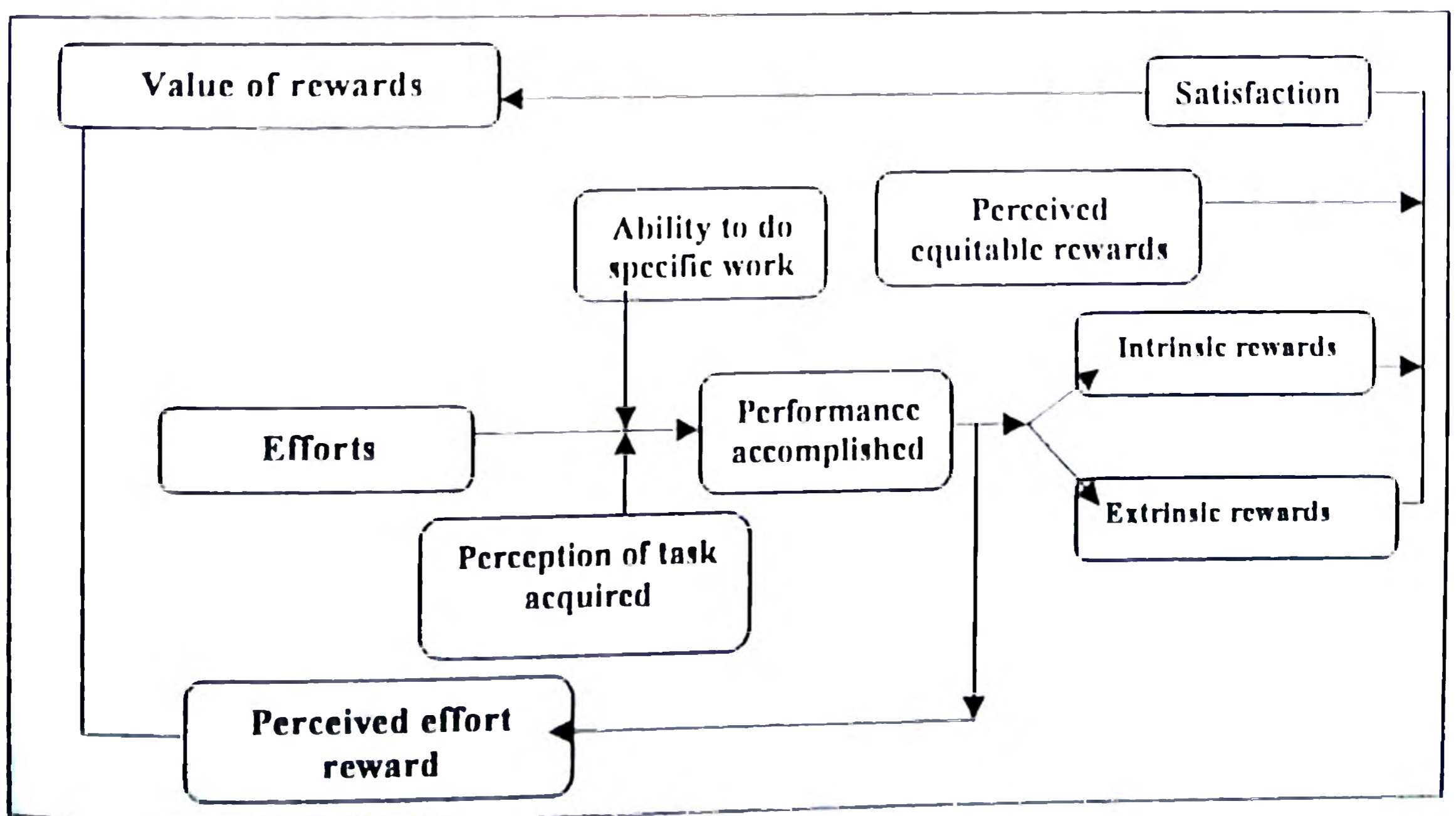
EXPECTANCY THEORY

- (Vroom, 1964)

The most widely accepted explanation of motivation has been propounded by Victor Vroom. His theory is commonly known as Expectancy theory. The theory argues that the strength of a tendency to act in a specific way depends on the strength of an expectation that the act will be followed by a given outcome and on the attractiveness of that outcome to the individual. To make this simple, expectancy theory states that an employee can be motivated to perform better, when there is a belief that better performance will lead to good performance appraisal and this shall result into realisation of personal goal in form of some reward.

This theory assumes that people are decision makers who choose among alternatives by selecting the one that appears to have the biggest personal payoff at the time. Expectancy theory has three major components: Expectancy - the ability to perform, Instrumentality - the hunch that performance will lead to reward and Valence - the value attached to the reward. Motivation is calculated by multiplying numerical values of all three

PORTER AND LAWLER MODEL



Lyman W. Porter and Edward E. Lawler developed a more comprehensive version of motivation depending upon expectancy theory. Actual performance in a job is primarily determined by the effort spent. However, it is also affected by the person's ability to do the job and by individuals perception of what the required task is. Therefore, performance is the responsible factor that leads to intrinsic as well as extrinsic rewards. These rewards, along with the equity of individual lead to satisfaction. Hence, satisfaction of the individual depends upon the fairness of the reward. It is illustrated in the following figure.

MANAGERIAL APPLICATIONS OF EXPECTANCY THEORY

Expectancy theory strongly suggests that it is essential to clarify people's expectancies that effort will lead to performance. Motivation may be enhanced by training employees to do their jobs no efficiently, there by achieving higher-levels of performance from their efforts. It may be also possible to enhance an effort - performance expectancies by following employee's suggestions about ways to change their jobs. To the extent that employees are aware of problems in their jobs that interfere with their performance, attempting to alleviate these problems may help them perform more effectively. In essence, what we are saying is; make the desired performance attainable. Good supervisors not only make it clear to people what is expected out of them, but they also help them attained that level of performance.

A second suggestion from expectancy theory is to clearly link valued rewards and performance. In other wards, manager's should enhance their subordinate's beliefs about instrumentality by specifying exactly what job behaviours will lead to what rewards. Of course the rewards need not be monetary in nature, even verbal recognitions for a job 'well done' can be very effective.

Finally, one of the most obvious practical suggestion from the expectancy theory is to administer rewards that are positively valence to employees. In other wards the carrot at the end of the stick must be tasty to have potential as a motivator. With this in mind, many companies have introduced 'cafeteria-style benefit plans': Incentive systems allowing employees to select to their fringe benefits from a manure of available alternatives.

EQUITY THEORY

- (Adam, 1979)

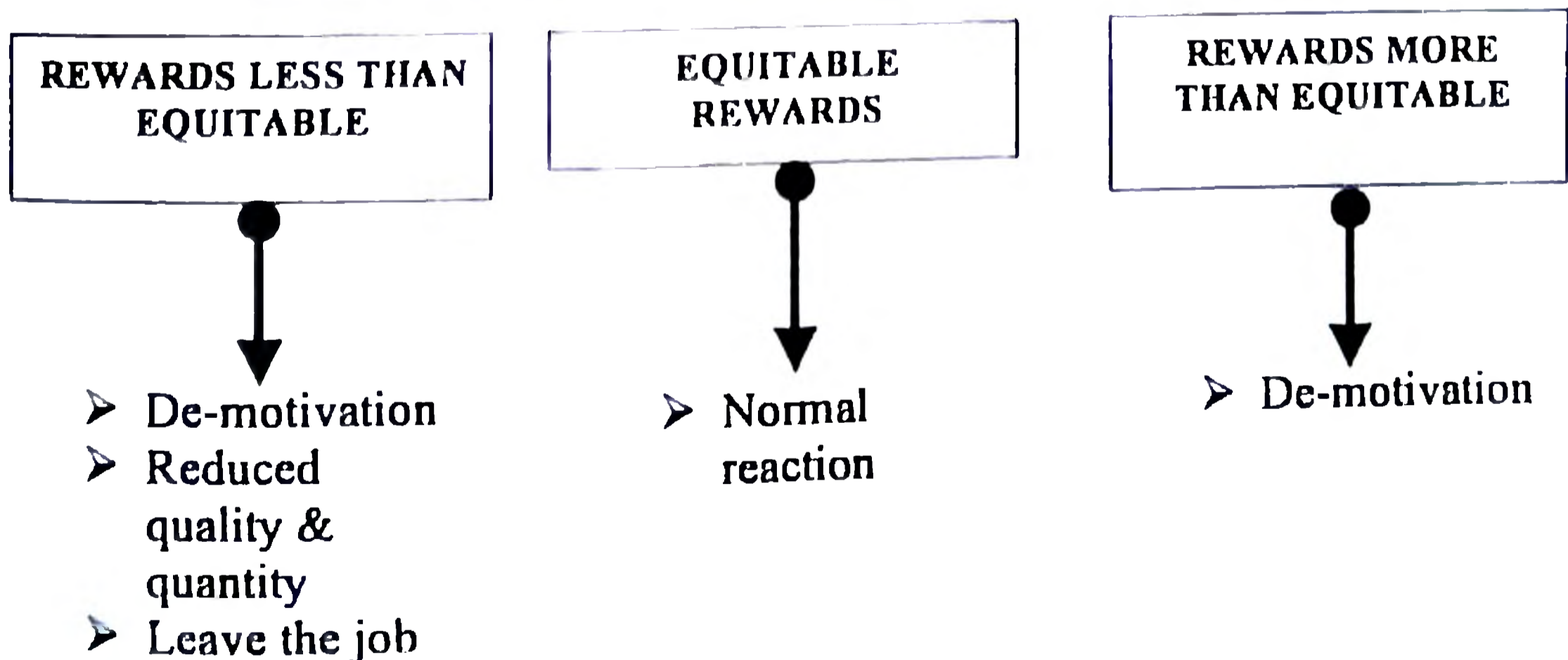
The theories we have describe so far are based on the operation of completely individual processes-the activation of need and the responses for goals. The next approach *i.e.* Equity theory also an individual based theory but one that adds the social component. Specifically, equity theory views motivation from the perspective of the social comparisons people made; that is what they see when they compare themselves to others.

It proposes that individuals are motivated to maintain fair or equitable relationships among themselves and to avoid those relationships that are unfair or inequitable. - (Greenberg, 1990)

As per the equity theory of J. Stacey Adams, people are motivated by their beliefs about the reward structure as being fair or unfair, relative to the inputs. People have a tendency to use subjective judgment to balance the outcomes and inputs in the relationship for comparisons between different individuals. Accordingly:

Persons outcomes	>	Others outcomes
_____	=	_____
Persons inputs	<	Others inputs

EQUILIBRIUM OR DISEQUILIBRIUM IN THE MIND



Outcomes by a person = Outcomes by another person
 Inputs by a Person = Input by another person

If people feel that they are not equally rewarded they either reduce the quantity or quality of work or migrate to some other organization. However, if people perceive that they are rewarded higher, they may be motivated to work harder.

APPLYING EQUITY THEORY: SOME MOTIVATIONAL TIPS

Equity theory has some important implications for ways of motivating people. First, it suggests that underpayment should be avoided. In recent years, a particular unsettling form of institutionalising under payment has materialised in the form of 'Two-tier wage structures'; in which newer employees are paid less than those hired to do the same work at the earlier point in the time. Not surprisingly, such systems are considered highly unfair, particularly by those in the lower tier.

Although, we have been talking about under payment, we also advise that overpayment should be avoided. You must think that because over paid employees work hard to deserve their pay, it would be a useful motivational technique to pay people more than they merit. When the majority of the employees feel under paid, they will lower their performance, resulting in a net decrease in productivity and widespread dissatisfaction. Hence, the conclusion is that a manager should strive to treat all employees equitably.

REINFORCEMENT THEORY

"Behaviour is the function of its consequences"

- (Skinner, 1971)

B.F. Skinner, who propounded the reinforcement theory, holds that individuals can be motivated by designing the environment properly. Instead of considering internal factors like impressions, feelings, attitudes and other cognitive behavior, individuals are directed by what happens in the environment external to them. Skinner states that work environment should be made suitable to the individuals and that punishment actually leads to frustration and de-motivation. Hence, the only way to motivate is to keep on making positive changes in the external environment of the organization.

“It is difficult to maintain a complete, logical and consistent conceptualisation of motivation without scarfing a large amount of materials, which many people consider as important to the topic...”
 - (Beck, 1990)

JOB DESIGN: STRUCTURING TASKS FOR HIGH MOTIVATION

- (Greenberg, and Baron, 1999)

The final approach to motivation we will consider is the larger in scope because it is directed at improving the nature of work performed. The idea behind job design is that motivation can be enhanced by making jobs more appealing to people. However, treating people as machines often meant having them engaging repetitive movements, which they found highly routine and monotonous. Not surprisingly, people become bored. With such jobs and frequently quit. Fortunately, today's organizational scientists have found several ways of designing jobs that can not only be performed a very efficiently, but are also highly pleasant and enjoyable.

- (Griffin and McMahan, 1994)

✓ **Job enlargement and job enrichment:**

Designing jobs by increasing the number of tasks performed at the same level (Horizontal job loading) is referred to as job enlargement. As a result of such an action, employees have no more responsibility nor use any greater skills, but perform wider variety of different task at the same level. In contrast to job enlargement job enrichment gives employees not only more jobs to do, but also more tasks to perform at a higher level of skills and responsibilities. Job enrichment gives employees the opportunity to take greater control over how to do their jobs. Because people performing enriched jobs have increased opportunities to work at a higher level, the job enrichment process is said to increase a job's 'vertical job loading'.

✓ **The job characteristic model:**

The job characteristic approach assumes that jobs can be designed so as to help people to get enjoyment out of their jobs, and care about the work they do. The jobs characteristics model identifies how jobs can be design to help people feel that they are doing meaningful and valuable work.

The five critical job dimensions are skill variety, task identity, task significance, autonomy and feedback.

- **Skill variety:** It is the extend to which the job requires the number of different activities using several of the employee's skills and talents
- **Task identity:** It is the extend to which a job requires completing a whole piece of work from beginning to end.
- **Task significance:** It is the degree of impact the job is believed to have on others.
- **Autonomy:** It refers to extend to which employees have the freedom and discretion to plan, schedule and carry out their jobs as desired.
- **Feedback:** It is the extend to which the job allows people to have information about the effectiveness of their performance

This model specifies that these job dimensions have important effects on various critical psychological states. For example, skill variety, task identity and task significance jointly contribute to task's experienced meaningfulness. A task is consider meaningful to the extend that it is experienced as been important, valuable and worthwhile. Jobs that provide a great deal of autonomy are said to make people feel personally responsible and accountable for their work. Finally, effective feedback is said to give employees knowledge of the results of their works.

To assess this, a questionnaire known as the 'Job Diagnostic Survey' (JDS) has been developed to measure the degree to which various job characteristics are present in a particular job. This is done by using a index known as the 'Motivating Potential Score' (MPS), computed as follows.

$$\text{MPS} = \left\{ \frac{\text{Skill variety} + \text{Task identity} + \text{Task significance}}{3} \right\} \times \text{Autonomy} \times \text{Feedback}$$

The MPS is the summary index of a job's potential for motivating people. Knowing a job's MPS helps one identify jobs that might benefit by being re designed

MANAGERIAL GUIDELINES FOR DESIGNING MOTIVATING JOBS

Enriching jobs: suggestions for the job characteristics model

The job characteristics model specify the several ways jobs can be designed to incorporate the core job dimension responsible for enhancing motivation and performance. A few are,

Principles of job design	Core job dimensions Incorporated
➤ Combine jobs: enabling workers to perform the entire job.	Skill variety Task identity
➤ Establish client relationships: allowing providers of a service to meet the recipients.	Skill variety Autonomy Feedback
➤ Load jobs vertically: allowing greater responsibility and control over work.	Autonomy
➤ Open feedback channels: giving workers knowledge of the results of their work.	Feedback

 **Combine tasks:**

Instead of having several workers each performing a separate part of whole job, it would be better to have each person perform the entire job. Doing so helps provide a greater skill variety and task identity.

 **Establish client relationships:**

The job characteristics model suggest that jobs should be set up so that the person performing a service comes into contact with the recipient of the service.

Jobs designed in this manner will not only help the employ by providing feedback but also provide skill variety and enhance autonomy.

 **Open feedback channels:**

Jobs should be designed to give employees as much feed back as possible. The more people know how well they are doing, the better equipped they are to take appropriate corrective actions.

 **Load jobs vertically:**

As we describe earlier, loading a job vertically involves giving people greater responsibility for their jobs.

MOTIVATIONAL LEADERSHIP

"Leadership is constantly changing, and survivors learn to change with it."

"Yesterday, natural resources defined power. Today, knowledge is power.

Yesterday, leaders commanded and controlled. Today, leaders empower and coach. Yesterday, leaders were warriors. Today, they are facilitators. Yesterday, managers directed. Today, managers delegate. Yesterday, supervisors flourished.

Today, supervisors vanish."

– *Dr. Denis Waitley*

Managers are learning to give up control and employees are learning how to be responsible for the actions and decisions

– *(Robbins, 1999)*

Therefore, we need to change our management style.

WHAT IS YOUR LEADERSHIP STYLE?

Decide now,

- ✓ Do it.
- ✓ Do it then tell me what you did.
- ✓ Tell me what you are going to do and do it.
- ✓ Tell me what you want to do and wait for a decision.
- ✓ Don't do anything without my approval.
- ✓ Don't do anything until I tell you.

POINTS TO PONDER:

Ask yourself

- ▶▶ What sort of manager would you like to be managed by?
- ▶▶ Are you that sort of manager?

These are two basic questions conducive to a healthy management style.

Do this:

- ▶▶ Reward performance
- ▶▶ Set an example by being a role model

- ▶▶ Self-motivation is the best motivation
- ▶▶ You have to be highly motivated in order to motivate others
- ▶▶ Check out the performance of your subordinate in the last month and compare it with that of the previous month. What do the results tell you?
- ▶▶ Motivation is not always measured by success. In short run, that which looks a failure may be winning strategy in the long run.

Thus, the better motivation and empowerment of the employees can be ensured by changing our traditional values into appropriate new values.

TRADITIONAL VALUES	NEW VALUES
Distrust people	Trust people
Man is essentially bad	Man is essentially good
Individuals are unchanging	Individuals are ever changing
Positive / no evaluation of employees	Confirm individuals are human beings
Individuals can only do the specified job	Individuals are whole and can do more
Process feedback is unproductive & risky	Feedback is essential for effectiveness
No expression of feeling	Appropriately express & utilize feelings
Avoidance of risk taking	Willingness to take risk
Emphasis on competition	Emphasis on collaboration

BEING A MOTIVATING MANAGER

1) **Treat staff well:** Subordinates have to be treated with diligence. The manager has to stay friendly as well as maintain a level of distance with his staff. It's a tricky ground to tread. The staff looks up on the manager as their leader. They expect maturity, rationality and understanding from their superiors. Simple things like calling people by their first name, chatting about their families for a while or even a general inquiry about their well-being, brings in a feeling of belongingness. Small gestures of this type help in building up of a cordial relationship.

(2) Think like a winner: A manager has to handle two situations, "The Winning" and "The Losing". The crux is to think like a winner even when all the odds seem against you. It is necessary to equip yourself with all the tools of a winner. Always remember that winning and losing rotate in a cycle. If you have been losing for a long time, you are very near the winning edge.

(3) Recognize the differences: All employees in the organization vibrate to a different pace. A treatment that motivates one may de-motivate the others. Understanding the difference in temperament in between the individuals is important.

4) Set realistic goals: Set moderate goals. Setting too high a task creates a feeling of non-achievement, right from the beginning itself; the goals set should be feasible to the employees to be achieved. A slightly higher target than expected provides a challenge.

(5) Prevent De-motivation: A job of the manager is to motivate people. His task requires him to punish and penalize people. This might create resentment in the minds of the staff members, which may affect the productivity of the workforce. Henceforth, care should be taken to ensure that punishment and penalties are used as a controlling technique and that they do not de-motivate.

(6) Job-financial enrichment and small job changes are handy: To make jobs more effective and to break the monotonous routine, small task additions and minor changes are always welcome. Even small suggestions of the manager seem valuable to the employees. A few challenges in the same job can enrich it.

(7) Non-financial rewards: Monetary rewards have always had a high motivational capacity. However, non-monetary rewards are equally helpful. A thank you note, a letter of appreciation or even few words of praise can help smoothen the creases between the different levels of management.

MOTIVATE YOURSELF TO MOTIVATE OTHERS

“If we want to motivate others, we have to motivate ourselves”

Everybody has his or her potential within. It is a general tendency to believe that motivation is a personal trait of every individual. Some people have it and the others don't. In practice, some are labeled to be lazy because they do not display an outward sign of motivation. That's why some are winners and some others are losers with the difference shown below.

WINNER	LOSER
Makes mistakes and says I was wrong	Says it was not my fault
Works harder, has more time	Too busy staying in a failure
Goes through a problem	Goes around it
I am good, but not as good as I ought to be	Well, I am not as bad as lot of persons
Looks up to where he is going	Looks down at others
Takes responsibility for more than his job	Says I only work here
Says there ought to be a better way of doing it	Says this is the best way of doing it

TO MOTIVATE YOU:

- (DuBrim, 1988)

- ⊕ Identify and seek your motivators
- ⊕ Set goals for yourself
- ⊕ Increase your expectation
- ⊕ Raise your level of self-expectation
- ⊕ Get feedback on performance
- ⊕ Apply behaviour modification to yourself

TO MOTIVATE OTHERS:

- (Denny, 1993)

Give them an opportunity to satisfy important needs or motives.

- ⊕ Remove de-motivators
- ⊕ Find out what they want?
- ⊕ Show them how to get it

RESEARCHES ON MOTIVATION AT WORK IN KERALA
AGRICULTURAL UNIVERSITY

The key to motivation:

The result of a 20-year study was in the answer of the question,
What really motivate people? The answer was; 'Go ask your people'

Major variable in motivational research:

JOB CHARACTERISTICS	INDIVIDUAL CHARACTERISTICS	ORGANIZATIONAL CHARACTERISTICS
<ul style="list-style-type: none"> • Identity • Variety • Significance • Autonomy • Feed back 	<ul style="list-style-type: none"> • Locus of control • Achievement motive • Power motive • Affiliation motive • Equity sensitivity • Growth need • Relatedness need • Existence need • Preferred org. culture 	<ul style="list-style-type: none"> • Work climate • Communication patterns • Management style • Morales

Perception of organizational climate and job satisfaction of scientists in Kerala Agricultural University reported that a higher proportion of researcher (40.91 %) and teachers (38.33 %) perceived organizational climate as **facilitating**, while about 1/3rd of the respondents viewed organizational climate as **most facilitating**.

- (Siddaramaiah and Rajeev, 1993)

Majority of the respondents, researchers and teacher of Kerala Agricultural University (70.67 %) perceived the work climate as good, it has shown positive and significant relationship with work - motivation.

- (George, 1996)

SUMMARY

At one time, employees were considered just another input into the production of goods and services. Employees are not motivated solely by money and employee behavior is linked to their attitudes. Understanding what motivates employees and incorporating that knowledge into the management style is the most challenging task of an efficient manager.

Many contemporary authors have also defined the concept of motivation. Motivation has been defined as the psychological process that gives purpose and direction to behavior; a predisposition to behave in a purposive manner to achieve specific, unmet needs; an internal drive to satisfy an unsatisfied need; and the will to achieve. Motivation is operationally defined as the inner force that drives individuals to accomplish personal and organizational goals.

Major approaches that have led to our understanding of motivation are Maslow's need-hierarchy theory, Herzberg's two-factor theory, Vroom's expectancy theory, Adam's equity theory, and Skinner's reinforcement theory etc.

According to Maslow, employees have five levels of needs physiological, safety, social, ego and self-actualizing. Maslow argued that lower level needs had to be satisfied before the next higher level need would motivate employees.

Herzberg's work categorized motivation into two factors: motivators and hygienes. Motivator or intrinsic factors, such as achievement and recognition, produce job satisfaction. Hygiene or extrinsic factors, such as pay and job security, produce job dissatisfaction.

Vroom's theory is based on the belief that employee effort will lead to performance and performance will lead to rewards. Rewards may be either positive or negative. The more positive the reward the more likely the employee will be highly motivated. Conversely, the more negative the reward the less likely the employee will be motivated.

Adam's equity theory states that employees strive for equity between themselves and with other workers. Equity is achieved when the ratio of employee outcomes over inputs is equal to other employee outcomes over inputs.

Skinner's reinforcement theory simply states those employees' behaviours that lead to positive outcomes will be repeated and behaviours that lead to negative outcomes will not be repeated. Managers should positively reinforce employee

behaviours that lead to positive outcomes. Managers should negatively reinforce employee behaviours that lead to negative outcomes.

Why do we need motivated employees? The answer is survival. Motivated employees are inevitable in our rapidly changing workplaces. Motivated employees help the organizations to survive. Motivated employees are more productive. To be effective, managers need to understand what motivates employees within the context of the roles they perform. Of all the functions a manager performs, motivating employees is arguably the most complex. This is due to the fact that what motivates employees changes constantly.

Knowing what motivates employees and incorporating this knowledge into the reward system will help extension identify, recruit, employ, train, and retain a productive workforce. Motivating extension employees requires both managers and employees working together. Extension employees must be willing to let managers know what motivates them, and managers must be willing to design reward systems that motivate employees.

Thus, accept responsibility for making things the way they are and assume responsibility for changing them. Enjoy the responsibilities of being a motivator.

DISCUSSION

Q1: How motives differ from motivation?

A motive is a socially learnt force that requires satisfaction. Such as the desire for power, affiliation, achievements etc. whereas motivation is the drive to satisfy a want or goal. It is concerned with goal-oriented behaviour.

Q2: How to motivate others?

If you understand what motivates people, you have the most powerful tool at your command to deal with them. You can follow a three-step approach to accomplish that task,

- 1: Remove the demotivators / barriers.
- 2: Find out what they want
- 3: Show them how to get it.

To motivate someone successfully provide them an environment in which they can satisfy their basic wants.

Q3: What is self-actualization need?

It is the highest level of need in Maslow need hierarchy. Self-actualization need is the drive to become what one is capable of becoming. It is the need for self-fulfillment. It includes growth, achieving one's potential etc.

Q4: What is frustration –regression dimension?

This is the special feature of Alderfer ERG theory. It refers to the situation when a higher need level is frustrated, the individual's desire to increase a lower-order need level takes place. For instance, inability to satisfy a need for social interaction might increase the desire for more money or better working conditions. Therefore, frustrations can lead to a regression to a lower level.

Q5: What about motivational climate in KAU?

A research conducted by Alexander George regarding work motivation among teachers and researchers of KAU revealed that Majority of the respondents, researchers and teacher of Kerala Agricultural University (70.67 %) perceived the work climate as good, it has shown positive and significant relationship with work - motivation. It shows that work climate of Kerala Agricultural University is most facilitating.

Q6: What is the message from equity theory?

Actually, individuals are not only concerned with the absolute amount of rewards for their efforts but also compares with others. Such as what another worker gets for doing the similar work. It emphasizes on workers desire to get a equitable reward for work done. If people feel that they are not equally rewarded they either reduce the quantity or quality of work or migrate to some other organization. However, if people perceive that they are rewarded equally they will be motivated to work harder. Therefore, manager should strive to treat all employees equitably.

Q7: What is the difference between motivation and manipulation?

Motivation is not what one person does to another that is manipulation. Motivation is what we allow people to do themselves. Thus,
Motivation is getting somebody to do something because they want to do it.
Manipulation is getting others to do something because you want them to do it.

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ANIMATION AS AN EXTENSION TOOL

14/6

By

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SEMINAR REPORT

**Submitted in the partial fulfillment for the requirement of the course
Ag.Extn. 651 Seminar**

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ABSTRACT

Animation is a deliberate, systematic and meticulous endowment of an inert symbolic object with the appearance of thought, emotion and personality. An animation creates the illusion of motion with a series of images - whether those images are created by pen of a cartoonist, the knife of a sculpture, the posing of a living body or the pixel manipulation of the computer artist, the principles of animation are the same.

There are several credits involved in the production of an animation film. Starting from the development of concept, the animation film passes through several steps like script writing, storyboard, character designing, layout, background, pencil testing, ink and paint, photographing and editing

Extension education aims at bringing out changes in the attitudes, knowledge and skill of farmers. The more we will be able to influence the behaviour of farmers the better will be their adoption of technology. The selection and use of the combination of methods and aids is of great significance as they greatly influence the success of transfer of technology. Educational animation is a recent introduction which can inform, entertain and educate people on a variety of subjects. Effective animation films can provide solution to the problems raised by farmers. Technical information on different crops and enterprises, Integrated Nutrient Management (INM), Integrated Pest Management (IPM), breaking of seed dormancy, etc. etc. can be effectively convinced to the farmers very well through animation films.

In the present era of information technology visual communication has advanced very much as evident from various concepts like cybercafe, internet kiosks etc. But in extension we are lagging behind. We have to advance more to sustain ourself to cope up with the recent advances to reach the world information technology field. We can use animation as one of the techniques for creating more impact to our presentation. This can motivate people as well as catch their interest to a great extent. In extension education animation has got a tremendous potentialities and its application in the field of cyber extension is yet to be explored.

“IN THE FIELDS OF OBSERVATION CHANCE FAVORS ONLY THE MIND THAT IS PREPARED.” LOUIS PASTEUR.

ANIMATION AS AN EXTENSION TOOL

INTRODUCTION

Audio visual aids are instructional devices that are used to communicate messages more effectively through sound and visuals. The aids help in stimulating the sensory organs like ears and eyes and facilitate quick comprehension of the message by the audience. These may be used for literate as well as illiterate people. The use of audio-visual aids has several advantages.

Among different types of methods and aids, the projected audio visual aids are the motion picture (cinema) and video-audio visual aids can be effectively used singly or in combination with other aids and extension methods. Motion pictures and videos are not so common in extension programmes. Several hindering factors like high cost of production, good deal of preparation and technical skill, need for careful handling of maintenance, may be the reason why it is not so popular.

Animation films in video format have several advantages.

- People will be more attracted and motivated with animation films than live action films or videos
- We may be able to reproduce a past event that has already been occurred
- We can create a film of events that is going to be happened in future
- The greatest advantage is that animation films are the ideal medium for representing the farthest reaches of the imagination. An illustrator can present whatever he or she sees in the minds' eye without relying on special effects or trick photography. Some of the advantages of animation films are
- The power of animation medium is very impressively revealed. There is animation used in medical films, physics, arithmetic, history and biology as well as many animated explanations of process of machinery and chemistry.
- Illustrations and graphic animations use visual stimuli to inculcate knowledge that would otherwise be difficult to grasp by the traditional textbook method.

- The film can present the most complex theories in visual form.
- Animation took care of the dullness and boredom of traditional lecturing with humorous ways, but with full of information and motivation.

To 'animate' is literally 'to give life to'. 'Animating' is moving something that can't move itself. Animation adds to graphics the dimension of time that vastly increases the amount of information that can be transmitted. In order to animate something, the animator has to be able to specify, either directly or indirectly, how the 'thing' is to move through time and space

The basic problem is to select or design animation tools which are expressive enough for the animator to specify what he wants to specify while at the same time are powerful or automatic enough that the animator doesn't have to specify the details that he is not interested in. Obviously, there is no one tool that is going to be right for every animator, for every animation, or even for every scene in a single animation.

The appropriateness of a particular animation tool depends on the effect desired by the animator. An artistic piece of animation will probably require different tools than animation intended to simulate reality.

Animation, like colour, is a matter of human perception. If it isn't happening in the brain, it isn't happening.

The human visual system is designed with a thing called 'persistence of vision,' so when we blink, the world doesn't suddenly go black, but we have a constant impression of the visual field in front of us." This has always been the "received wisdom" among filmmakers, animators in particular, but apparently, we're the only people left on the planet who believe in this animal "persistence of vision" is no longer accepted among psychologists and scientists who study perception. In fact, persistence of vision, and the phenomenon of the afterimage is too slow to account for why a series of still images seem to move. So, what do these perceptual wizards say makes still images move in our brain? The "phi phenomenon," which is defined as that phenomenon in which still images appear to move.

Audiences can look at their lives reflected in a world that would be filtered by their vanity were they to simply look in the mirror. All this is done through poses and seemingly magical tricks which aren't so magical once we have learned them. This can make characters that don't just move, but with which people can identify, sympathize, empathize, laugh, be entertained and be frightened.

Animation is the ability to give life to an inanimate object or character whether it be drawn, modeled or computer generated. This life is given by combining several similar images that when put in sequence and shown a speed, trick the audience into believing the character is moving

HISTORY OF ANIMATION

EARLY PERIOD :BEFORE DYSNEY

A forerunner of today's comic strip can be found in an Egyptian wall decoration circa 2000 B.C. In successive panels it depicts the actions of two wrestlers in a variety of holds. In one of Leonardo da Vinci's most famous illustrations, he shows how the limbs would look in



various positions. Grotto's angels seem to take flight in their repetitive motions. The Japanese used scrolls to tell continuous stories.

Since the beginnings of time, human beings have tried to capture a sense of motion in their art

From the eight-legged boar in the Alta Mira caves of Northern Spain to paintings alongside the remains of long-dead pharaohs, this quest for capturing motion has been a common theme throughout many of mankind's artistic endeavors.

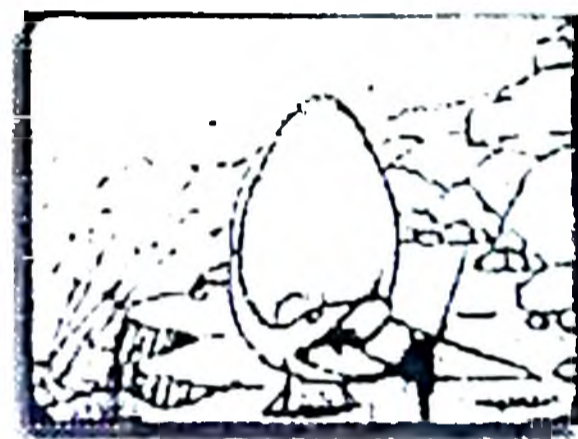
True animation cannot be achieved without first understanding a fundamental principle of the human eye: the persistence of vision. Frenchman, Paul Roget, who invented the thaumatrope, first demonstrated this in 1828. It was a disc with a string or peg attached to both sides

One side of the disc showed a bird, the other an empty cage. When the disc was twirled, the bird appeared in the cage. This proved that the eye retains images when it is exposed to a series of pictures, one at a time.

Two other inventions helped to further the cause of animation. The *phenakistoscope*, invented by Joseph Plateau in 1826, was a circular card with slits around the edge. The viewer held the card up to a mirror and peered through the slits as the card whirled. Through a series of drawings around the circumference of the card, the viewer saw a progression of images resulting in a moving object. The same technique applied to the *zoetrope*. In 1860, Pierre Desvignes, inserted a strip of paper containing drawings on the inside of a drum like cylinder. The drum twirled on a spindle, and the viewer gazed through slots in the top of the drum. The figures on the inside magically came to life, endlessly looping in an acrobatic feat.

The development of the motion camera and projector by Thomas A. Edison and others provided the first real practical means of making animation. Even still, the animation was done in the simplest of means. Stuart Blackton, issued a short film in 1906 entitled *Humorous Phases of Funny Faces* where he drew comical faces on a blackboard, photographed them, and then erased it to draw another stage of the facial expression. This "stop-motion" effect astonished audiences by making drawings come to life.

In the early twenties, the popularity of the animated cartoon was on the decline, and movie exhibitors were looking elsewhere for alternative entertainment media. The public was tired of the old formula of stringing sight gags together without including a story line or any character development. What the art of animation could accomplish was not yet evident in this period, except for in the works of Winsor McCay such as *Gertie the Dinosaur*, 1914. McCay's major accomplishment was the fact that he had developed a character in his dinosaur, something that had previously only





been seen in Otto Messmer's, *Felix the Cat*. McCay's piece had a galvanizing effect on audiences. The notion of a dinosaur coming to life on the screen was astonishing. Of all the early animations, *Felix the Cat* developed the strongest screen personality, but failed to develop any further, relying on crude visual tricks to entertain the audience as opposed to developing a stronger screen persona.

At this time, many of the animations were based on primitive gags and violence, which is still true of cartoons today. One character would beat another mercilessly, only to have his victim instantly recover and return the favor. Perhaps the hero would swing his sword and reduce the villain to baloney slices, only to have him reappear as if magically rejoined.

A big change came over the industry in the mid twenties: commercialization. Big studios took over the smaller cottage industries and set standards for animation.

DISNEY

Walt Disney was, of course, the overpowering force in the history of animation. Not only did his studio contribute several technical innovations, but the Disney studio, more than anyone else, advanced animation as an art form.

Some of Disney's innovations in animation technology were the use of a storyboard to review the story, the use of pencil sketches to review motion, and the multi-plane camera stand. In addition, Disney pioneered the use of sound and color in animation (although not the first to use color). Disney also studied live action sequences to create more realistic motion in his films. When he used sound for the first time in *Steamboat Willie* (1928), he gained an advantage over his competitors.

Camera stand animation is more powerful. A camera stand allows the parallax effect - moving of backgrounds at different rates as the observer pans across an environment to create the illusion of depth - and zooming. Each of the planes can move six directions (right, left, up, down, in, out) as well as the camera moving in and out. By keeping the camera lens open during movement, figures can be made to appear extruded into shapes of higher dimension, simulate motion blur, and exhibit depth attenuation.

With regard to the art form of animation, Disney perfected the ability to impart unique, endearing personalities in his characters including Mickey Mouse, Pluto, Goofy, the three little Pigs, and the seven Dwarfs. He also developed mood pieces of animation including Skeleton Dance and Fantasia. He also promoted the idea that the mind of the character was the driving force of the action and that a key to believable animated motion was the analysis of real life motion.

The Move To Computerized Animation

As with most aspects of modern life, computers have become central to the production of new animated films and television shows. Some productions are entirely computer generated, with characters designed, animated, and coloured without any pencil drawings or painted cels. Examples of fully computerized cartoons are Disney's Toy Story and A Bug's Life.

Frequently, animated productions combine traditional and modern techniques in what is referred to as "digital ink and paint". In this form of film making, animators create traditional pencil drawings that are scanned into a computer to be digitally coloured and output to film. As a result, no painted cels are created.

There are many examples of this sort of animation. Disney feature films including The Lion King, Beauty and the Beast, Aladdin, and others, as well as television shows such as Futurama.

HOW CARTOON FILMS ARE MADE?

Animating a film is very much like making a flip book, where we flip the pages and the figures on them seem to move. In commercial animation studios, there will be three stages by which an animation film is produced.

They are production, pre production and post production. Overall management is done by a creative director.

Pre-production	Production	Post production
CREATIVE DIRECTOR OF THE FILM		
Concept team	Animation director	Pencil tester
Script writer	Animator	Ink and paint
Storyboard artist	Lay out artist	Compositor
Character designer	Background artist	Editor
Dubbing artist	Inbetweening and clean up	Sound editor
Music	Animation checking	Graphic designer
PRODUCTION ASSISTANT DEPARTMENT		
ADMINISTRATION DEPARTMENT		

I. PRE PRODUCTION

CREATIVE DIRECTOR

The creative director or art director is responsible for developing the overall look-the visual style- of the product he is responsible for overall activities concerning a film- animation ,music, camera, dialogue presentation, dubbing, theatre, technical aspects everything is controlled by him

CONCEPT MAKING

Any project comes from very specific ideas to the whole concept A feature may start out very nebulous, with the creative team soliciting story ideas from everyone down to the janitor. The concept team together develops the concept

SCRIPT WRITING

A good story ,even if it is very small, is crucial to a successful animation. Every good story must have a premise, which must suggest character, conflict and conclusion.

Script is the blueprint. A properly formatted script tells each member of the production team what has to happen in order to tell the story. Each scene is described in the script for picture and sound.

STORY BOARD

The storyboard and the script are the building plans and the film is constructed on these foundations.

Each scene is described in the script for picture and sound. The scene title describes the characters, the sound, and the type as (1)CLOSE – UP,(2)MEDIUM CLOSE – UP,(3)MEDIUM SHOT,(4)MEDIUM LONG SHOT,(5) LONG SHOT. The transition from one scene to the next is described as (1) CUT-TO,(2)CROSS-DISSOLVE,(3)FADE-OUT,(4)FADE-IN,(5)TRUCK-BACK-TO,(6)TRUCK-DOWN – TO,(7)WIPE

A storyboard is the basic plan of an animated cartoon film, it resembles a page in the newspaper comics. Artists in a story department develop the story line of the film by attaching these sketches onto a large blackboard size board with pushpins. The story men will replace drawings and re-edit the storyboard constantly as they visualize and originate additions and changes to add humor to the story.

For the cartoon film director, storyboards offer firm control at the very beginning of the sprawling process of animation. A view of the visual flow, shot composition and interrelation and the development of both the narrative and the characters' personalities, for the live action director there are similar benefits.

The storyboard is a fairly recent cinematic device. At the Disney studio "first real storyboards" were created for Three Little Pigs, a silly Symphony released on May 27, 1933. Creating stories was a casual process in the early animation studios established in New York City around 1913-1914. In animation's Jurassic period, storyboards did not exist, nor did a story Department. A drawing or story sketch made for the storyboard,

which conveys visually the plot and action of a scene or shot. The storyboard serves as a preliminary guide for the artists.

Storyboard is the *graphic script*. The story men began to draw rough sketches of the salient scenes and gags, gradually adding more and more drawings, until it became customary to draw the entire story. A scene is a collection of shots all in the same set or location and a shot is the footage between one camera cut and the next. In traditional animation a scene refers only to what can be filmed without a change in background - requires the background to be redrawn whenever the camera moves.

CHARACTER DEVELOPMENT AND CHARACTER DESIGNER

Each character has its own shape, personality, features, and mannerisms. The animator has to take these qualities into consideration to make the characters seem lifelike and believable. Develop the basic shape of the figure and nature of the character to create.

In average sized studio, this job does not exist. Characters are designed by the layout person or by one of the animators. However in large organization - the Disney Studio, for e.g. a designer is a very important crewmember.

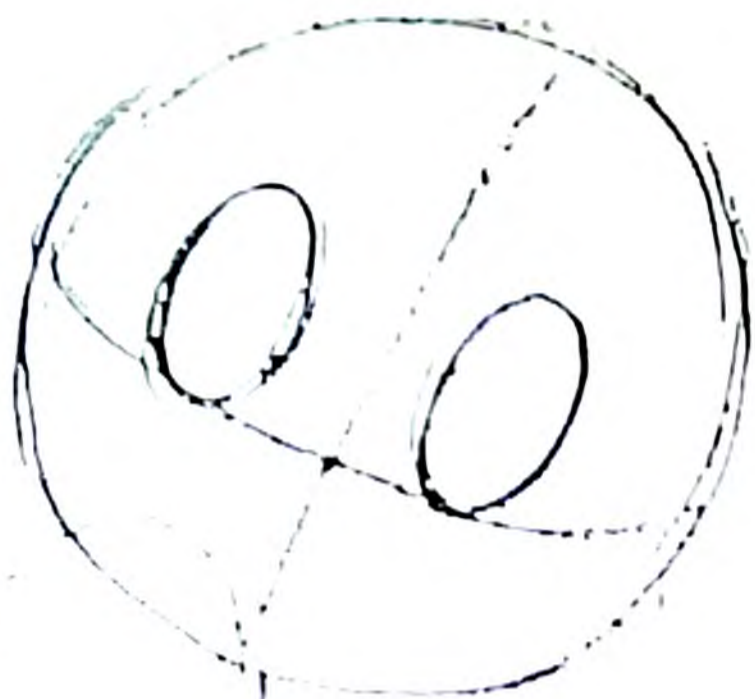
In a way, being a character designer is very similar to working as a casting director on a live action film. A cast has to be revealed that will make a plausible combination of shapes and proportions that can have the personalities in the story. Normally an artist has favorite combinations of sizes, shapes and proportions, which he or she will probably use all during working life.

A model sheet should contain a number of views of a character in a neutral pose, and cover all aspects of the action in the storyboard.

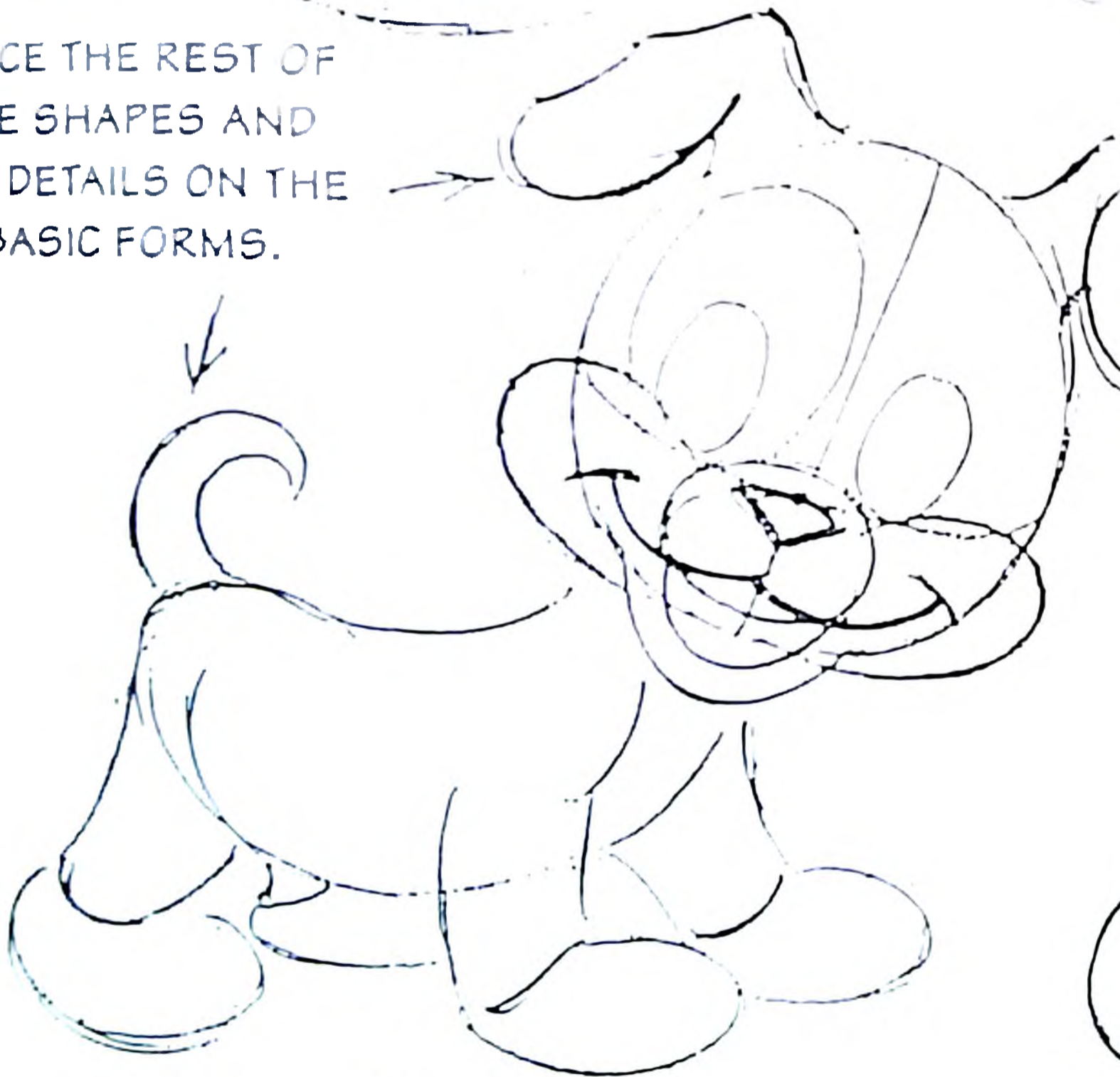
If the time of budget permits, it is useful to draw a number of poses depicting various emotions. But more valuable to the animator is the information about what the character looks like in relaxed state.

DEVELOP THIS PUP
WITH CIRCLES AND
ROUNDED FORMS.
PLACE THE EYES.

①

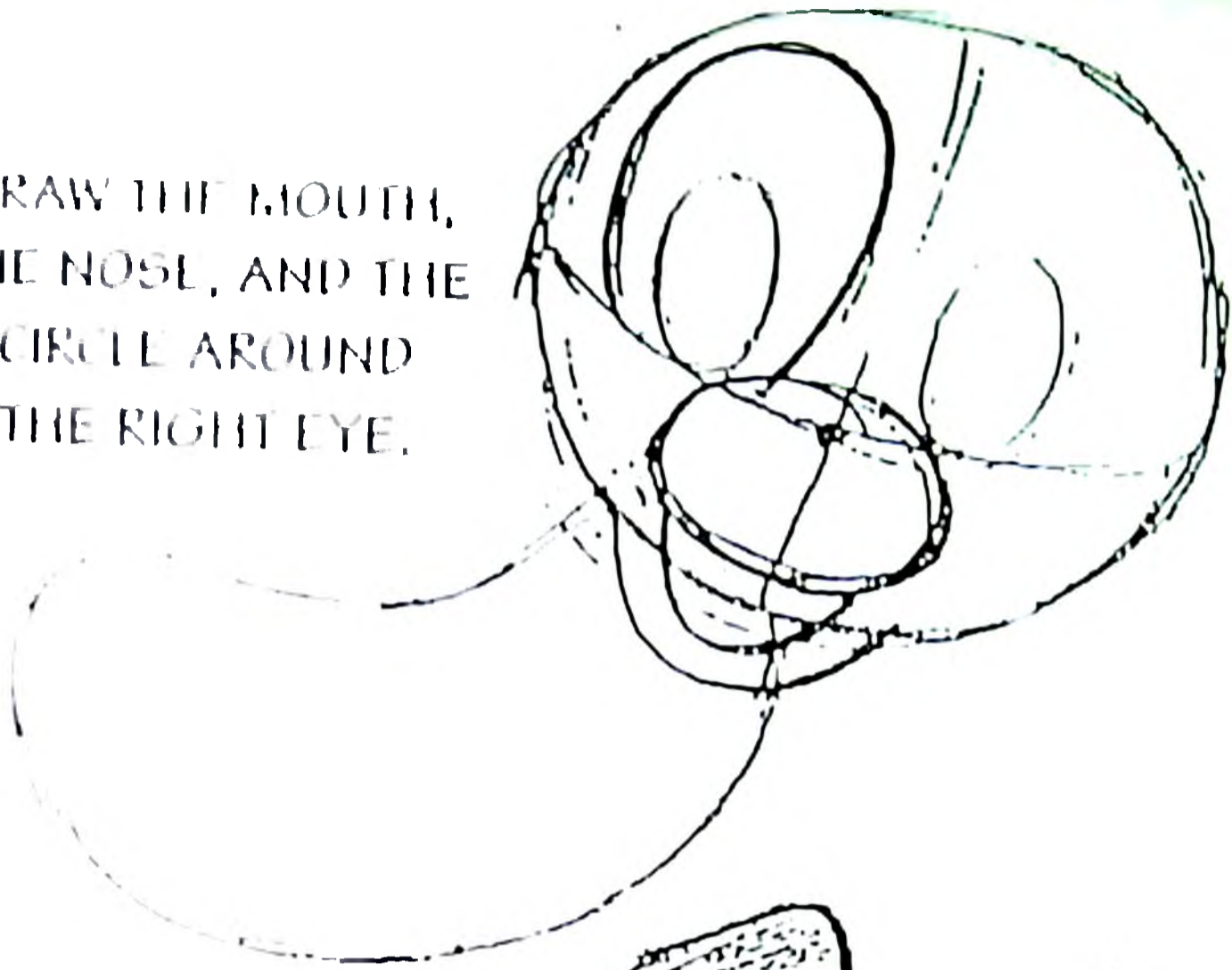


PLACE THE REST OF
THE SHAPES AND
THE DETAILS ON THE
BASIC FORMS.

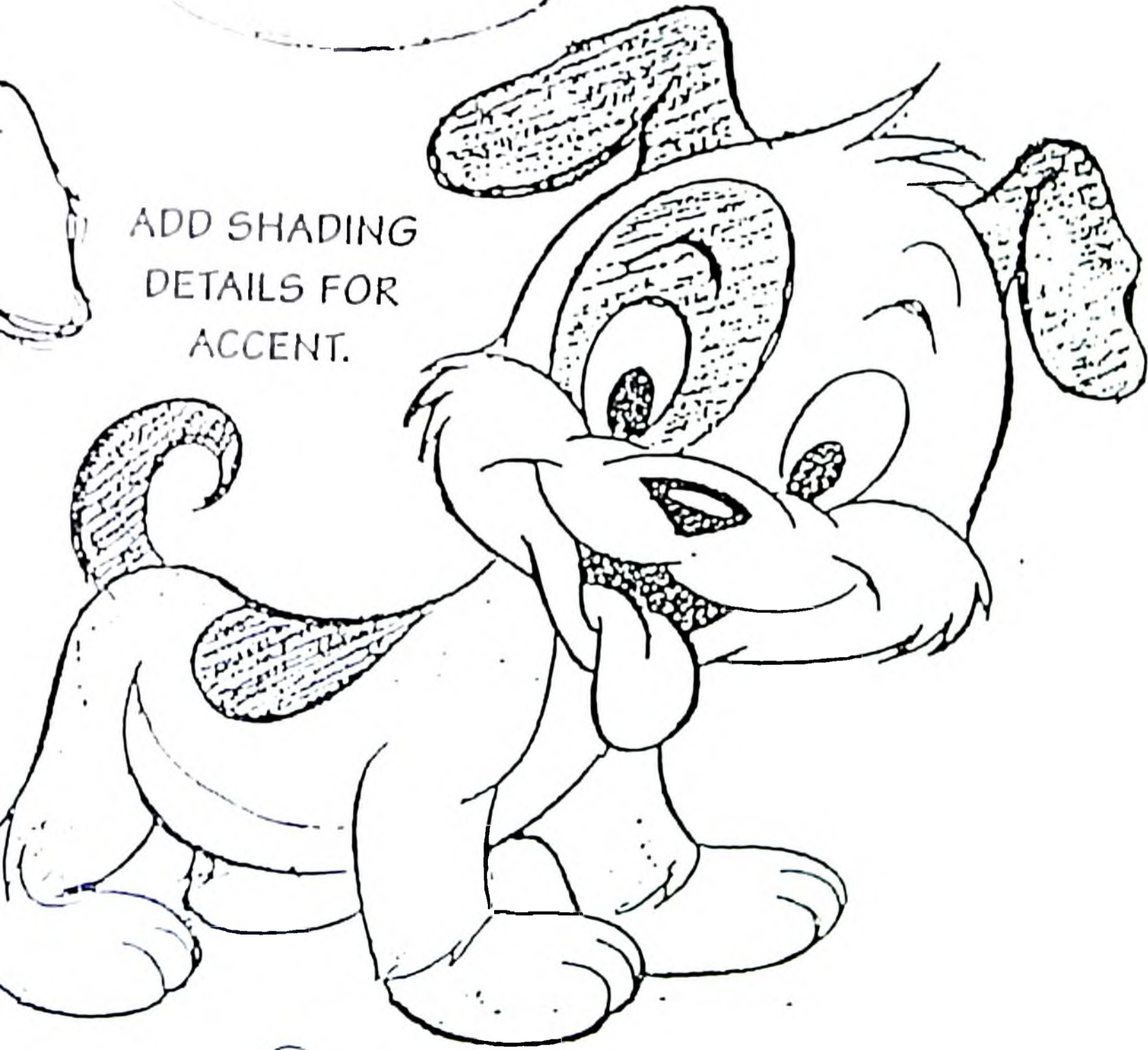


③

DRAW THE MOUTH,
THE NOSE, AND THE
CIRCLE AROUND
THE RIGHT EYE.



ADD SHADING
DETAILS FOR
ACCENT.



④

1427

A character may have gone through many major changes during the course of its development, but the final judgment of the character's usefulness has to come from the animation department.

DUBBING ARTIST

Unlike live action film in most animation films sound is animated before animating the drawings. The animator hears the sound by running the cassette over and over until he understands the pattern of the sound. Then he will make sketches of the salient poses

MUSIC RECORDING

In music recording, again there are several crews involved. Director, artists, sound editor, singers etc. Music is a natural adjunct to animation.

II. PRODUCTION STAGE

ANIMATION DIRECTOR

If the project is a large one, animators may be working under an animation director or supervising animator. The supervising animator hand over the shot materials to the animator. Thus he hands out works to the animators as well as he approves the drawings done by the animator. The animator is called into the director's office to pick up a sequence, the direction will be explaining about the ideas of several other people through storyboard, layout drawings and exposure sheets

ANIMATOR

Animators task is to breathe the illusion of life into a model by creating a sequence of poses that communicate character. The materials the animator uses to create an animation can include storyboards, exposure sheets, model sheets, film footage to be matched, objects and scenes

ANIMATION DRAWING

These are the original, one-of-a-kind drawings, penciled by the animator that cels are eventually made from. Drawings can be rough, or the more refined CLEAN-UP drawings. Sometimes, set-ups are available with matching drawings and the cel that was made from it.

CELS

Cel is short for celluloid acetate, the transparent material upon which traditionally animated films are created. Each movement of a character requires an individually hand-painted cel. One or more cels are then laid over a background painting and photographed in an animation camera to create a frame of the finished film.

By painting on clear cels, animators are able to create the illusion of life as characters move throughout the environment created by the background painting.

Through our affiliation with the world's leading animation studios, Animation Alley offers our collectors an opportunity to own these one-of-a-kind cels, as well as several types of limited edition cels

MODEL SHEET

A model sheet should contain a number of views of a character in a neutral pose and over all aspects of the action in the storyboard

EXPOSURE SHEET

The exposure sheets plan the animation production timing of an individual scene. Each frame, foot and scene has a number. Exposure sheet or X-sheet or dope sheet is just a simple and efficient form where animators write down the action and dialogue (or music beats) for a scene or a shot plus the information for shooting.

Animator is the actor of the animated cartoon films. It is the animator's job to portray emotions, which is highly individual task. That is why animation is an art, an art of expressing one's own personality.

Action occurs in three parts. The preparation for the action (anticipation), the action proper and termination of the action (reaction). Without anticipation many actions are abrupt, stiff and unnatural. In one sense it is the preparation for the anatomical provision for an action. A foot must be pulled back before it can be swung forward to kick a ball. Since muscles in the body function through contraction, each must first be extended.

Anticipation is also a device to catch the audience eye to prepare them for the next movement and lead them to especially before it actually occurs. Anticipation is often used to explain what the following action is going to be. Anticipation is also used to direct the attention of the audience to the right part of the scene at the right moment.

ANIMATION BOARD

An animation board will be a great help in the study of animation. When we turn on the light under the board, we will be able to see through several sheets of paper and note how the series of drawings varies in position.

ACTION

In analyzing action, if the animator is animating from his feeling, all the actions he has drawn describe arcs, some shallow, some deep. Very often the body's action tells more about the emotions involved than the face. There are rarely actions that move in straight lines. There are no straight lines in the natural movements of any living creature - man, animal, bird or fish.

Most action tends to start slowly, accelerate in the middle and slow down to a stop. For this they are using spacing charts. It indicates the position of inbetweens by using spacing charts (*ladder*). If the drawings are more in the top of the ladder the action will be slow to fast and vice versa. If the drawings are equally spaced in a ladder the action will be uniform.

Animators get the character from here to there, doing this and that while staying within the character's personality. Full animators do 'Key poses' while in-between artists do all

the drawings of action between the key poses and clean-up artists make sure each drawing has sharp, clear lines.

Key drawings/ animator's drawing is used as the e, created to establish the look and emotions of a character in that basis for creating animation cells. Animators "Rough" are typically very sketchy and looser in their moment.

An "Extreme drawing" is often two rough drawings that show the character at the beginning and end of a movement or action.

PRINCIPLES OF ANIMATION

In an article by Lasseter, the principles of animation, as articulated by two of the Nine Old Men of Disney, are related to computer animation. Lasseter is a conventionally trained animator who worked at Disney before going to Pixar where he was responsible for many celebrated animations including the first Oscar-winning computer animation, *Knack-Knack*. The principles are listed here with the intuitions relating them to computer animation.

SQUASH & STRETCH, TIMING AND SECONDARY ACTIONS

It establishes the physical basis of objects in the scene. A given object possesses some degree of rigidity and intuitively has some amount of mass. This is reflected in the distortion (squash and stretch) of its shape during an action. The animation must support these notions consistently for a given object throughout the animation. *Timing* has to do with how actions are spaced according to the weight, size, and personality of an object or character. *Secondary actions* support the main action, possibly supplying physically based reactions to what just went on.

SLOW IN & SLOW OUT, AND ARCS

This has to do with how things move. They ease into and ease out of actions, typically. And they don't usually move in straight lines. These movements also support the quality of physical realism with respect to such principles involving inertia and gravity.

THE WIDE VARIETY OF EXPRESSIONS SHOWN HERE IS THE RESULT OF STRETCHING AND SQUASHING SELECTED AREAS OF THE FACE. NOTICE THAT THE EYES REFLECT THE EXPRESSION OF EACH STRETCH AND SQUASH.



SHOCKED



LIGHTHEARTED



PLEASED



SURPRISED



CONTEMPLATIVE



PUZZLED



BEGGING



ANGRY



SMUG



ASHAMED



TIRED



SMILE



IMPATIENT



AWE



COY



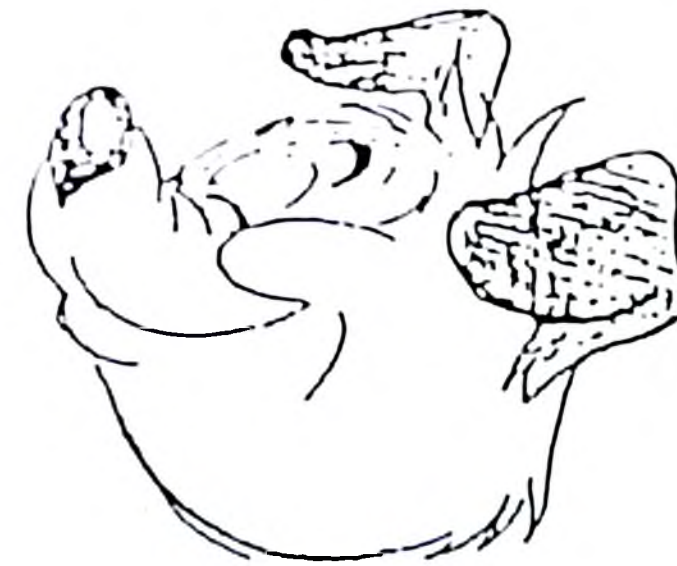
WINK



KNOCKED-OUT



SAD



SMILE



CRYING



SNEER

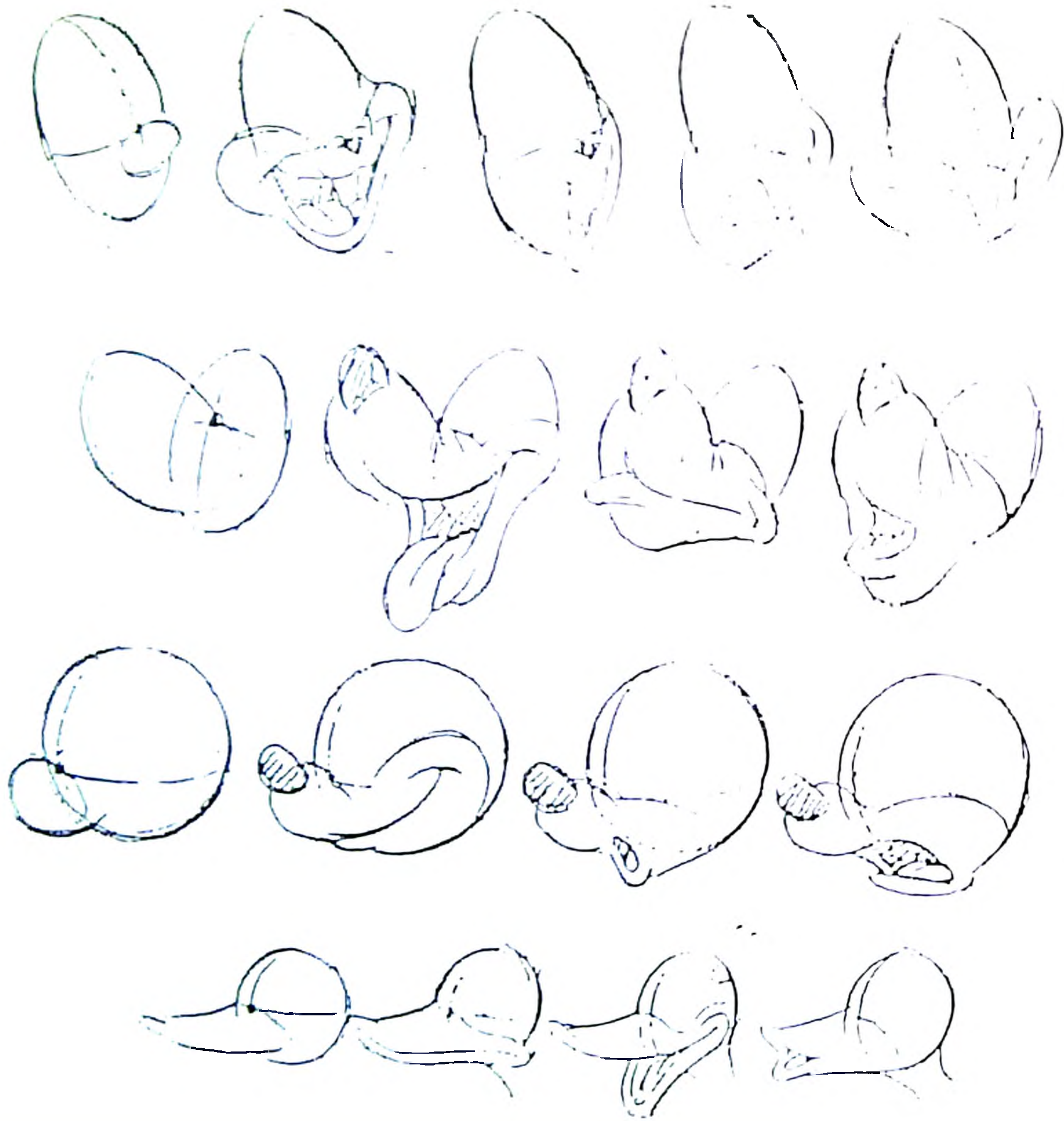


SEVERE



CONTEMPT

FLEXIBLE FEATURES—THE MOUTH AND CHEEK MASSES ARE VERY FLEXIBLE, AND, AS THE JAW MOVES, THEY TAKE ON MANY DIFFERENT SHAPES, CREATING VARIOUS EXPRESSIONS AND MOUTH POSITIONS IN SPEECH. THE EYEBROWS AND THE EARS ARE ALSO FLEXIBLE, BUT THE BASE OF THE EARS AND THE NOSE REMAIN FIXED TO THE HEAD. THE EYES ARE FLEXIBLE WITHIN FIXED SOCKETS.



STRAIGHT AHEAD VS. POSE TO POSE

It considers how a motion is created. *Straight ahead* refers to progressing from a starting point and developing the motion as we go. Physically based animation could be considered a form of this. *Pose to pose* refers to the approach of identifying key frames and then interpolating intermediate frames between them.

ANTICIPATION AND STAGING

This has to do with how an action is presented to the audience. *Anticipation* dictates that an upcoming action is set up so that the audience knows it (or something) is coming. *Staging* follows up on this notion of presenting an action so that it's not missed by the audience. *Timing* is also involved here, to the extent that an action has to be given the appropriate duration for the intended effect to reach the audience.

FOLLOW THROUGH OVERLAPPING ACTION, EXAGGERATION AND APPEAL

These are principles that address the design of an action or actions. Exaggerate it so it can't be missed or so that it gets a point across and make it enjoyable to watch. In addition, actions should flow into one another to make the entire scene flow together.

LAYOUT ARTIST

Layout artist is a job title that will only be found in large organizations. He will be setting the scene with camera, characters, sets and basic lighting.

In composing layouts, there are really two working areas: the full field and the television field. Anything outside of a television field will stand a good chance of not appearing on the television screen. All important actions and all lettering must stay within the television field, otherwise it will not appear on the tube.

The layout artist's job is very important because of the responsibility for the appearance, the graphic style of the film. A triad - the director, layout artist and background artist - are equally concerned.

The human eye likes to work. Watch out for sequences of scenes that follow each other and have very similar compositions. The audience may find the film having it is a pleasure to have to keep adjustments to variations of camera positions, different horizon placements, sudden moves from long shots to close ups. All these visual exercises are a delight to the eye.

Thus throughout the picture, the layout artist is trying to manipulate the eye by swift changes in composition, providing adequate space for action and giving satisfaction to the eye by mix of long shots, close-ups, pans and trucks that the artist and the direction are using to interpret the story.

Character position, perspective, proportion in the frame all are decided by layout artist. Drawings or layouts may show proposed action of animated characters with characters roughly drawn in blue or red pencil.

BACKGROUND ARTIST

Background is a piece of artwork that placed under the cels during photography. Backgrounds are made for every scene, according to the sketches of the layout artist. The paper used is the same size as the cels and like them, is equipped with peg holes. The background establishes the location and overall mood of the scene. Typically, a background artist creates a drawing to establish the content of the scene, placement of characters, perspective and camera angle.

Based on this drawing the background artist creates a preliminary painting to confirm all the scenes details, then the final production background which is used in the filming of the scene.

The backgrounds can be done in any medium - oil, water colour, coloured pencil, pastels, cutout bits of coloured paper. Since cels are transparent, when they are combined with a background, the whole assemblage looks like one complete picture.

INBETWEENER AND CLEAN UP ARTIST

Animator draws the key movements of a given action, numbers the drawing and annotates them to the exposure sheet. The work then goes to the assistant animator or inbetweener who follows the instructions on the exposure sheet, adding more drawings.

Clean-up artist make sure each drawing has sharp, clear lines. After the drawings have been cleaned up, the work will go to animation checking artist.

ANIMATION CHECKING

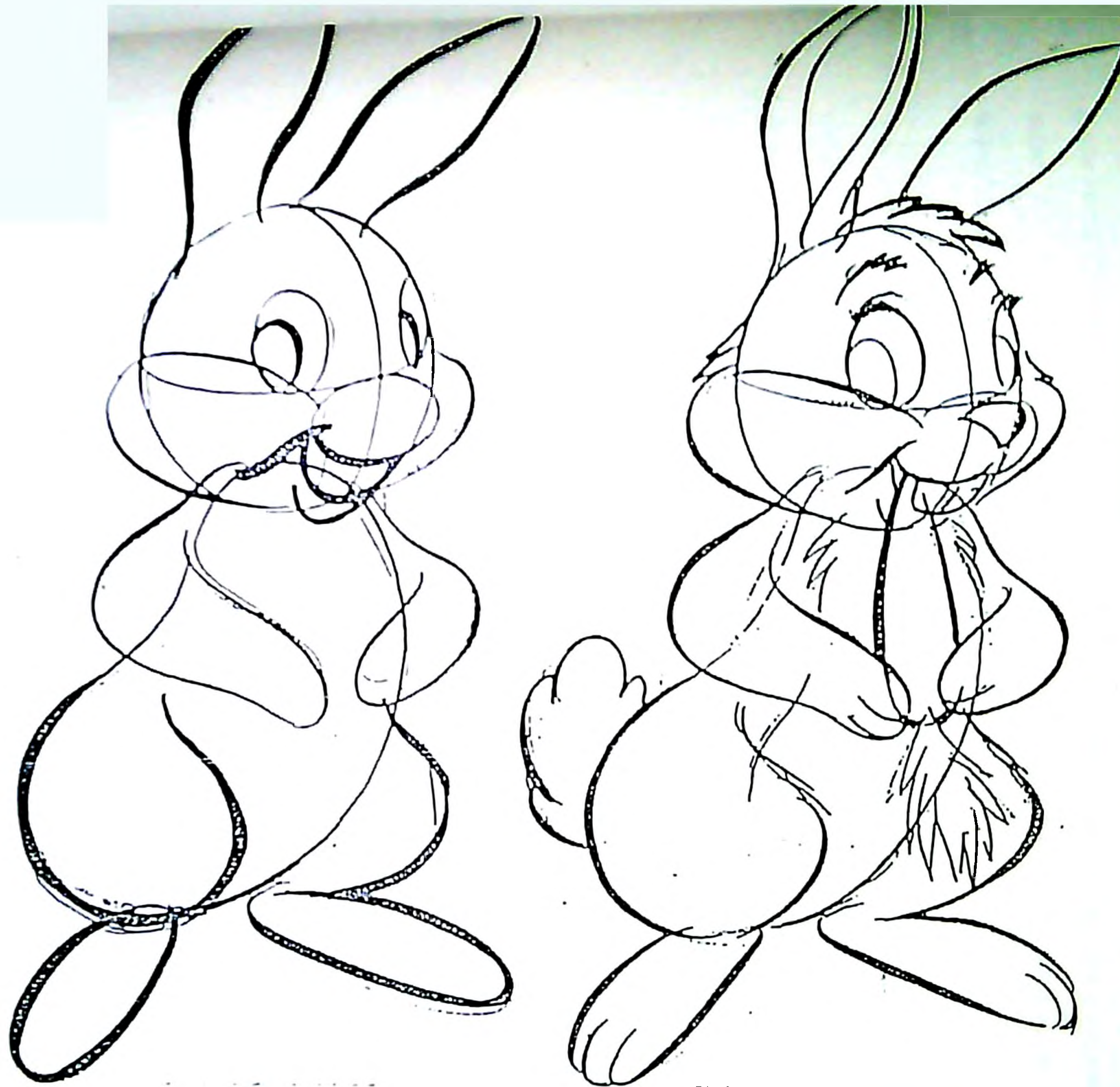
It is a purely mechanical work. He will check the drawings for errors and correct. He will also check whether the number of drawings are matching with number associated in the exposure sheet and time duration.

III. POST PRODUCTION

PENCIL TESTER

The drawings are photographed under an animation camera. The table under the camera is equipped with the same kind of pegs and bottom light that the animation crew works with.

The camera is rigged to shoot one exposure at a time, and can slide up and down the column to make long shots, close-ups and trucks. Now a day's camera activities are done in special computer software. The resulting footage (film that has been exposed by the camera operator) is shown in a projection room and reviewed by the animator, story crew and the director. It is at this point that major corrections or additions are made. The revised animation is reshot and screened once again. If the work is approved, all the drawings are transferred to punched acetate sheets the same size as the drawing paper. Ink and paint artist does this.



FINISH THE DETAILS,
AND THEN ERASE
THE CONSTRUCTION
GUIDELINES.

INK AND PAINT

Cel inkers transfer the animator's drawing into transparent acetate sheets. The transfer is made either by tracing each drawing in ink or by a Xerox machine for this purpose. The word "cel" comes from "Cellulose nitrate" an early form of the acetate material used today.

The acetates, called 'cels' are then coloured, using opaque paint. One complication is that while the transparent cell themselves seem to be colourless, they actually have a colour tone. Very often as many as four or five cels are used to make up a single exposure, so the paint has to be carefully graded to offset the colour build up in the cels as the sheets accumulate

A character that was on the bottom level of a five-cel scene, and for technical reasons has to be moved to the top level, cannot be coloured with the same palette for both sets of drawings. The cels on the bottom have to be painted with lighter values than the ones on the top level, otherwise there will be a very perceptible colour jump.

Today, the tracing of line work into celluloid sheets has been replaced by automated scanning, hand painting reduced to click fill in many studios.

After a scene is inked and painted, it must be clean - cel by cel - necessary because every scene ends up with several cels spattered by ink and paint.

FINAL CHECKING

The checker looks for spots the cel polisher missed, areas that have been painted with an incorrect color, registration, where the art work is matched to some point in the background, the instructions for pans.

CAMERA WORK

Since the cels are transparent, when they are combined with a background, the whole assemblage looks like one complete picture. Before photographing, the camera operator fastens the backgrounds art securely to the camera's table, because it is not going to be

removed until the scene is finished. Then, following the animator's instructions on the exposure sheet, the first combination of cels is placed on the background, and the indicated number of exposures is made. This group of cels is then stripped off and another set placed down. This operation continues until all the cels have been photographed.

COMPOSITOR

According to the directions of layout sheet the compositor makes the scene in the computer.

EDITOR

One who deletes or adds scene to a picture by following the instructions of the director.

MUSIC EDITOR

An editor who is specialist in editing music tracks.

MIX

A recording section during which all the tracks for dialogue, music and sound effects are combined. The sound track may consist of as many as a dozen separate reels. Perhaps several have music that was recorded prior to the start of production, others may be sound effects. Dialogue may be on several tracks. After the colour photography has been done and approved by the director, all these sound tracks are combined on one track. If this print is satisfactory, the production is complete.

APPLICATIONS FOR COMPUTER ANIMATION

There are a variety of uses for computer animation. They can range from fun to practical and educational ones. As you will find out in the following links, computer animation has found its way into fields that you might have not thought that there were any uses for. Here is a list of some of the places where computer animation is used:

- flight simulation
- medicine
- engineering

- video
- education
- chemistry
- multimedia
- military
- television
- space exploration
- scientific visualization
- forensics
- film
- entertainment
- art
- architecture
- archeology
- advertising
- simulation

FLIGHT SIMULATION



© 1993 Graphic Simulations Corporation

Using computer animations in flight simulation is a very useful tool. Using animation a programmer can replicate real time flying. By creating a camera showing the view through the cockpit window, a pilot could fly through either virtual worlds or real

animated places with all the natural disasters, and difficulties that could happen if flying a real plane.

In this virtual world, the pilot would witness the usual distractions that a real pilot would, for instance, transport buses move drive along the runway, and other planes take off and land. The programmer can put any type of weather condition or scenario into the animation. Fog can be made for any thickness, and simulating clouds is just as easy. In lightning storms, the programmer can program the animation to light up the screen each time there is a lightning bolt.

Creating the animations for the flight simulators can take up to eighteen months to create. The reason for this long wait is that major airports are usually located near cities, and the animators have to animate the buildings that stand out, or that are well known. Large buildings have to be modeled three or four times and different detail levels each time to make the illusion of the building growing larger and more detailed as the pilot fly closer

Even before the very first Boeing 777 was flown, pilots knew how to fly it.

MEDICINE

It is very hard for a doctor to get inside a living human body and to see what is happening. Computer animation once again comes in very useful. Every single organ in the body has already been modeled in a computer. A doctor, for example, can fly through these models and explore the area of the body he or she is going to be operating on in order to get a better picture of the operation and possible increase in the success rate.

Another very important use of computer animation in medicine is to look at living tissue or organ of a patient and to explore it and to see what if anything is wrong with it without even making a single incision. Data can be gathered from a living specimen painlessly by the means of various sensing equipment. For example an MRI (Magnetic

Resonance Imaging) scan takes pictures of cross sections of a part of a body (brain for example) every half a centimeter. Then the data is transmitted to a computer, where a model is constructed and animated. A doctor can get a very clear picture of undisturbed tissue the way it looks in a body. This is very helpful in detecting abnormalities in very fragile parts of the body such as the brain.

With recent advances in the computer industry, people have developed faster and better computer hardware. Systems are underway which allow doctors to conduct operations with only a couple of small incisions through which instruments can be inserted. The use of virtual reality has allowed the doctors to train on virtual patients using this procedure without once opening up a cadaver.

ENGINEERING



CAD has always been an imperative tool in the industry. For instance in automobile design, CAD could be used to model a car. But with the advent of computer animation, that model could now be changed into a full 3-D rendering. With this advantage, automobile makers could animate their moving parts and test them to make sure these parts don't interfere with anything else. This power helped the makers a lot by ensuring that the model of car will have no defects.

One very useful use of using animations for industry is for stop-frame animation. For instance an oilrig crew would want to know the exits or the rig in case of an emergency. With stop-frame animation, a photographer would have to take a picture of every frame. This process could take two to three days.

To save time and energy, an animator could make a model in a CAD program and then animate it so it seems like the viewer was "flying" through the rig to the exits.

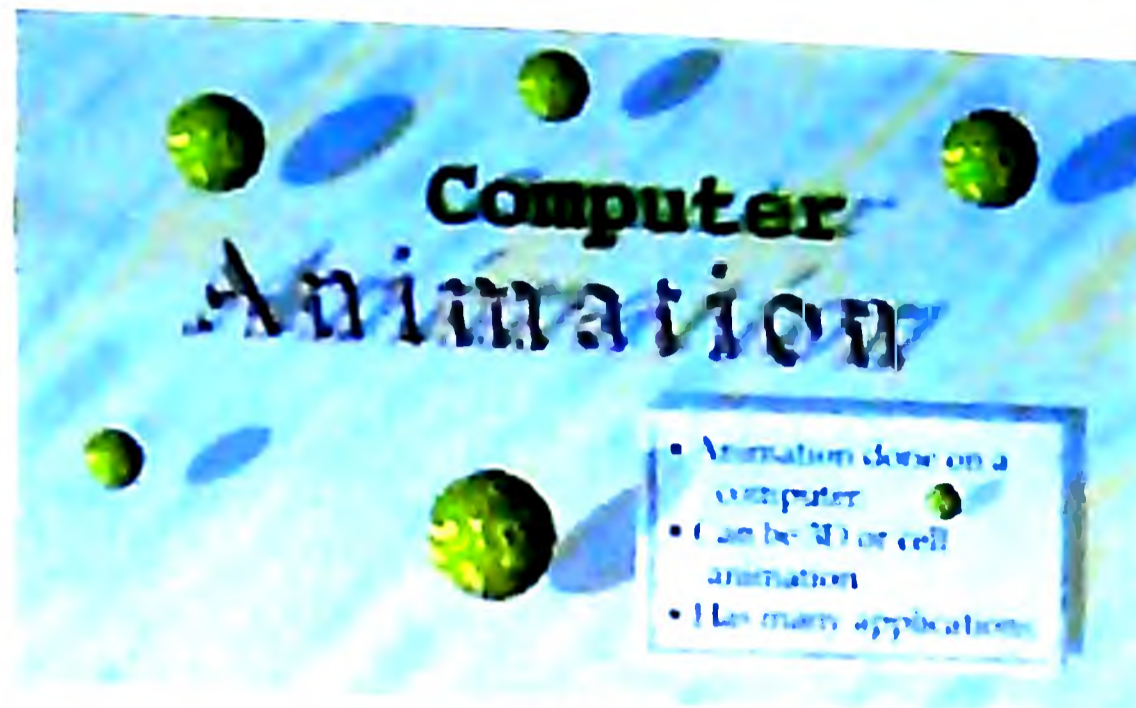
VIDEO



There is a new era of cartoons emerging on television. Computer animation. Computer animated cartoons can be produced much faster than cell animated ones. This is because the animator does not have to draw every single frame, but only has to create keyframe and the computer generates the in between frames.

Computer animation also has a better look most of the time. It looks more realistic. Sometimes it is even possible to create computer animations that look so realistic so that a person might not be able to tell if it is real or not by simply looking at it.

MULTIMEDIA



Multimedia is the use of various media to present a certain subject. This presentation itself is a multimedia presentation in the sense it brings together graphics and text. Multimedia presentations can include text, graphics, sounds, movies, animations, charts and graphs. Using computer animation in multimedia presentations is growing excessively popular since they make a presentation look more professional and more pleasing to the eye. Computer animation is also very useful in demonstrating how different processes work.

MILITARY

In order to enter the military, one has to go through a lot of training. Depending on whether you want to be in the army, navy, or the marines, you might be working with equipment worth hundreds of thousands or even millions of dollars. The military wants to be sure you know how to use this equipment before they actually let you use it.

Training in simulators instead of on the battleground is proving to be a much cheaper and safer approach. Let's take the air force for example. One has to learn how to fly a fighter jet. Using a flight simulator instead of the real thing is better in many ways. If you are sitting in front of hundreds of dials, levers, and controls, you are much more comfortable and less nervous knowing that you will not crash when you use the wrong one. A second reason why it is better to use a flight simulator instead of a real jet is that it is cheaper and faster. One real jet might cost more than the development and building of one simulator, and you can't crash the simulator. You don't have to refuel and do

safety checks on a simulator and a second student can use right after the first one has finished. Third, it is safer to fly a simulator since you can't crash it. Finally, using a simulator, the instructor can gather a lot of data about the student and point out mistakes much easier.

Computer animation can also be used to simulate the landscape in which an operation will be going on. A satellite altitude picture can be converted into a 3D model using software and then animated with trees and under different weather.

TELEVISION

Computer Animation plays a great role in television. Most of the titles on the television programs, newscasts, and commercials, are done with computer animation. In the past when computers were not a part of the process, animations were done with live video, cel animation, scale models, and character generators. Now with the advent of computers, special programs could be used (ie. computer painting, 3-D animation, motion control, and digital composition programs).

Computer animation has made television program titles quite easy and to make. Because of the versatility of computer generated animations, almost anything is possible. An animator can have a totally computer generated animation or have an animation with live video integrates, or even live video with animation integrated.

Computer animation has advantaged the media also desires. With computer animation, professional animators can use pre made templates to create animations for broadcasting within minutes of receiving the news.

SPACE EXPLORATION

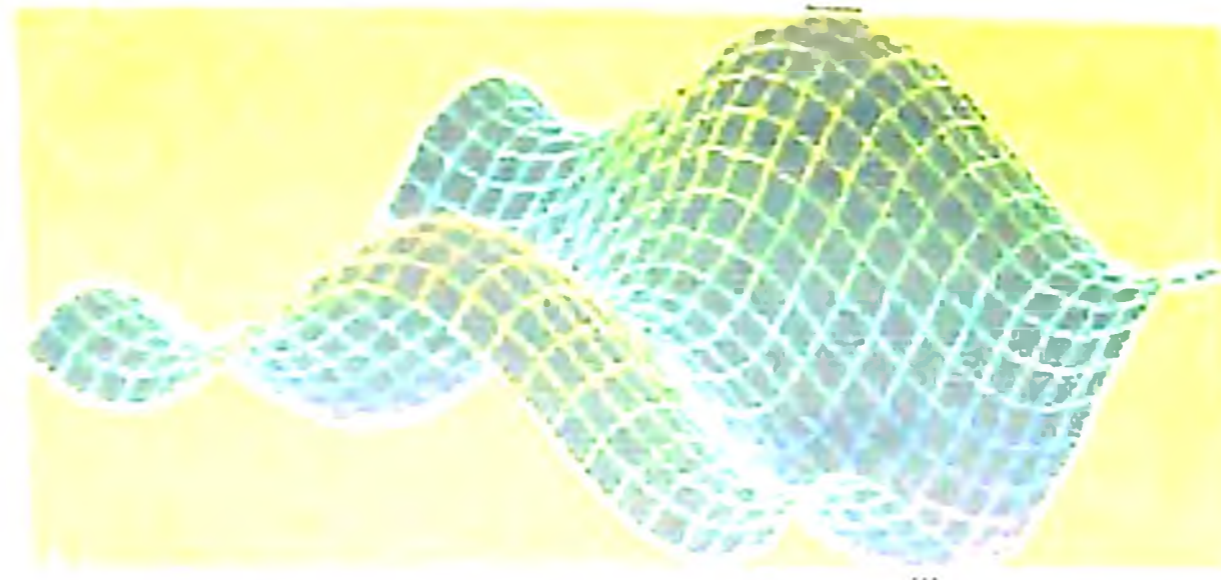


As of now, the farthest point away from earth that the human was on is the moon, but we continually want to learn more. A trip by a human to another planet would take way too long. This is why we have sent satellites, telescopes, and other spacecraft into space. All of these spacecrafts continually send data back to earth. Now all we have to worry about is presenting that data so it makes sense. This is where computer animation comes in. It can show an incredible amount of data visually, in the way that humans perceive it the best.

Much of the data sent from spacecraft can be input into a computer that will in turn generate an awesome looking animation so that one may actually navigate, explore, and see the distant worlds as if we were actually there.

Computer animation can also be used to design satellites and other space craft more efficiently. Another possible use of computer animation is to plan the routes of future ships to make sure there is nothing wrong with the path and so that a ship can gather the most data possible.

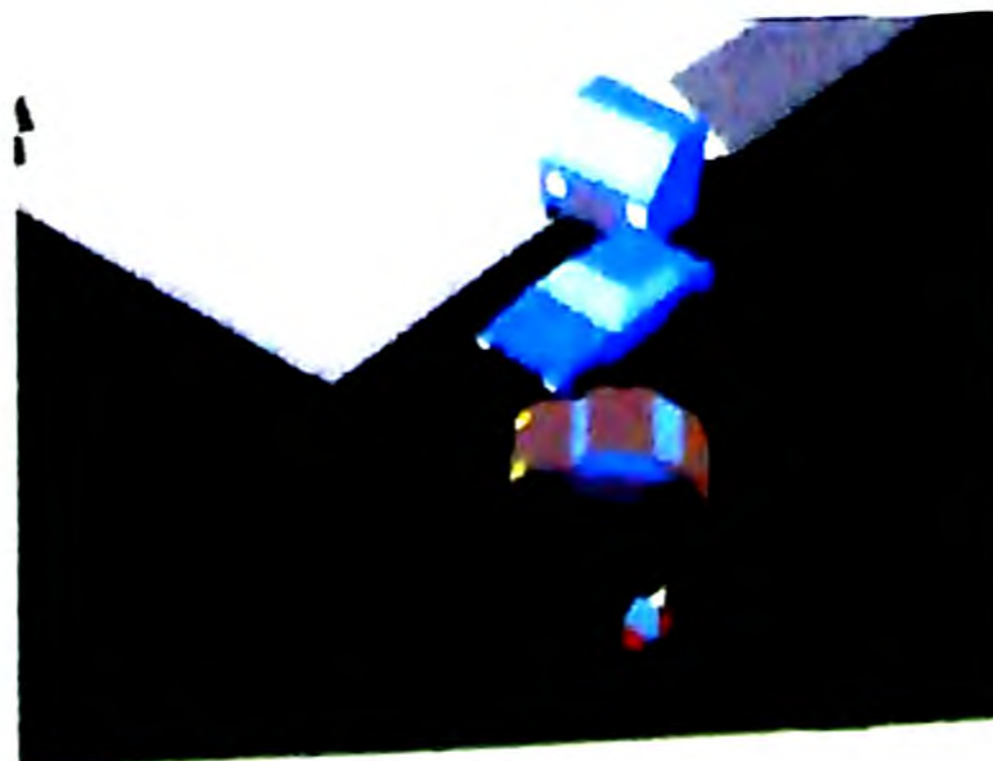
SCIENTIFIC VISUALIZATION



In the 1970s, a 12 inch drum plotter was the normal computer graphics machine. The plotter was run by a large mainframe which had about 24 kilobytes of memory. This machine was basically used for creating graphs, which helped in the foundation of scientific visualization.

From those days many new and useful machines have been invented (i.e. The PC, graphics workstation, minicomputers, massive mainframe systems, and the super computer) Even with the birth of these machines, graphs are still being drawn by hand. But now with the machines, the graphs can be displayed rather quickly in full color with full three dimensional surfaces. The advent of computers has made sciences such as geology, astronomy, oceanography, and high-atomic physics much easier by sorting its data sets. The only problem with data sets is that most of them have more than two variables (i.e. pressure, temperature, velocity, direction, stress, direction etc.)

FORENSICS



Accidents happen every minute. Very often, there are no witnesses except for the individuals involved in the accident or worse yet, there are no surviving witnesses period. Accident reconstruction is a field in which computer animation has been very useful.

The use of computer animations in court cases has been very controversial. People arguing against it say that the animation is based on no factual evidence and happens the way the artist wants it to happen. People arguing for it say that it offers the ability for the court to witness the accident from more than just a bystander's perspective. Once the reconstruction has been done, the camera can be placed anywhere in a scene. The accident may be seen from either driver's perspective, or even birds eye view. Another reason for which computer animation in accident reconstruction may be useful is that it may show that a certain view was obstructed by an object.

New animation systems allow detectives to recreate terrains and surroundings and actually calculate different things such as angles of bullet shots or levels of visibility. This is extremely useful since very often, the site of an accident

FILM



Computer animation has become regular and popular in special effects. Movies such as "Jurassic Park", "Terminator 2: Judgment Day", and "The Abyss" have brought computer animation to a new level in their films. Scale models are a fast and cost

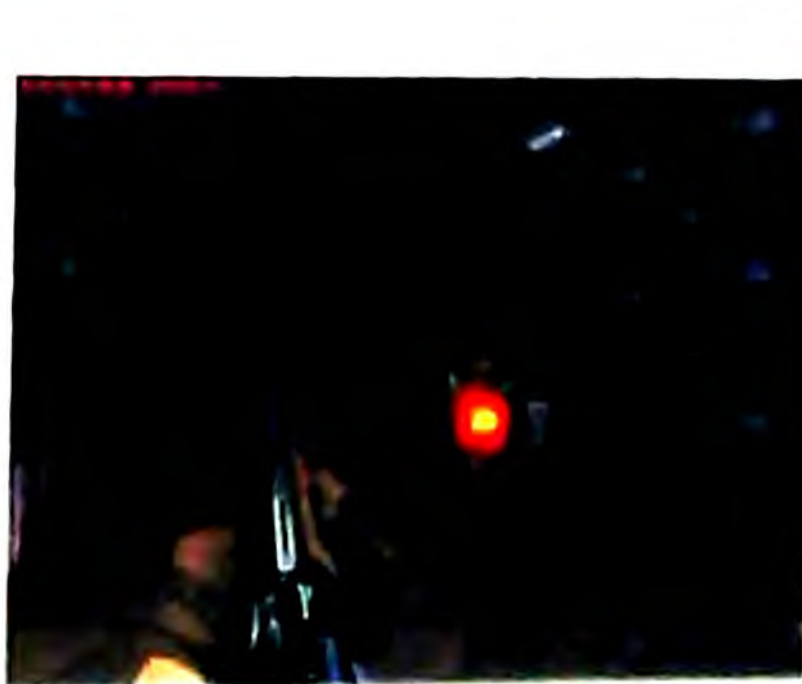
effective method of creating large alien scenes. But animation has done just as well in animating fire, smoke, humans, explosions, and heads made out of water.

A major part in integrating live film and the computer animation is to make absolutely sure that the scale and perspective of the animations are right. The scale is important to making the animation believable. The animators go through a great deal of work to make sure this is right

Usually computer animation is only used when the scene needed would be impossible or very difficult to create without it. Computer animation takes a long time to render. Let's assume that we have five minutes of computer animation at a rate of 25 frames per second. This requires about 7500 pictures, and if these pictures are of high quality, then each frame could take fifteen minutes to render. With all these variables, the entire animation could take 1875 hours to render! That's over two months if rendered on one computer.

Usually there are many animators working on one animation, each with a powerful workstation, so this time is cut drastically.

ENTERTAINMENT



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Virtually every game on the computer uses computer graphics or animation. This includes PacMan, where simple sprites (graphics) are moved up and down on the screen, to such games as Doom, where the action is viewed from the first person

perspective and the graphics are rendered on the fly. Some CD games are actually interactive computer rendered movies such as "The Seventh Guest."

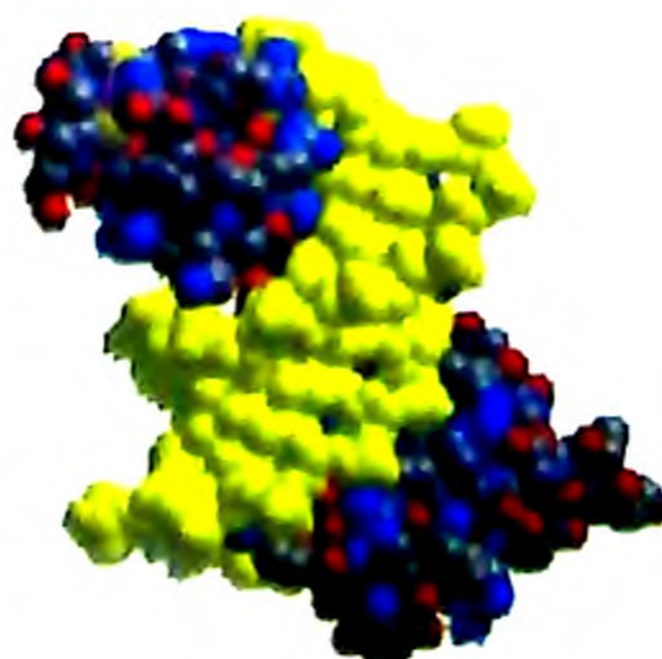
EDUCATION



People are always looking for new ways to educate their children. If they are having fun, they learn better. Computer animation can be used to make very exciting and fun videos into which education can easily be incorporated. It is much more interesting to learn math for example when the letters are nice and colorful and flying around your TV screen instead of solving problems on plain black and white paper. Other subjects such as science, English, foreign language, music, and art can also be taught by using computer animation.

Instructors can also use computer animation to demonstrate things visually exactly how they want to since they have control of every aspect of the simulation. It can be used to show how things come together and work together. In science for example computer animation might be used to show how our solar system works, and in math, a computer animation might show a student how one can algebraically manipulate an equation.

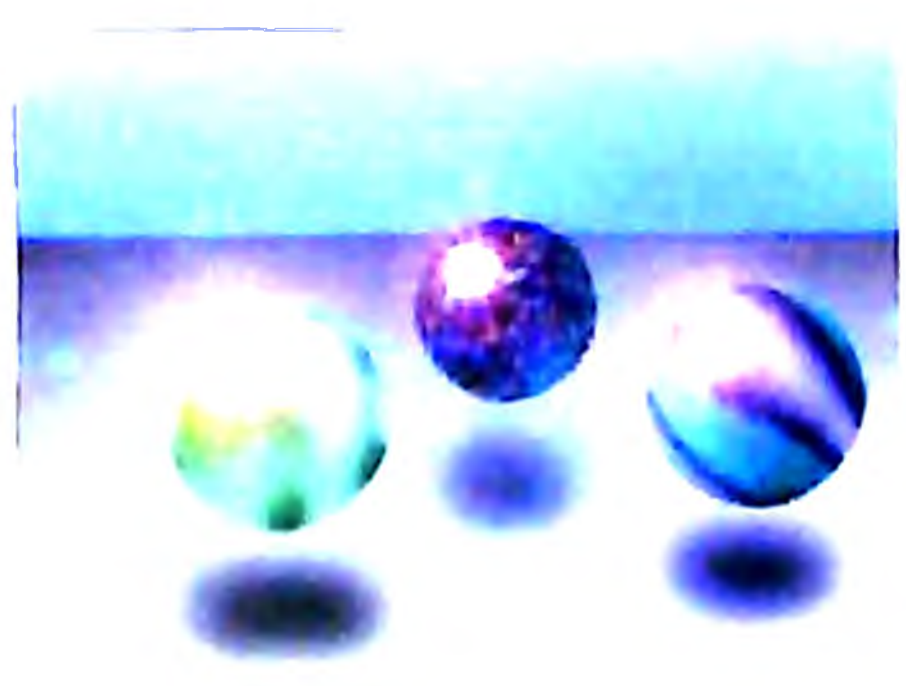
CHEMISTRY



Computer Animation is a very useful tool in chemistry. Many things in chemistry are too small to see, handle, or do experiments on, like atoms and molecules for example. Computer animation is the perfect tool for them. Chemists can create realistic models of molecules from the data they have and look at the way these molecules will interact with each other. They can get a full 3D picture of their experiments and look at it from different angles

Computer animation also allows chemists to do things that would be extremely hard to do in real life. For example, a chemist is able to construct models of molecules out of little spheres with sticks connecting them and then explore them. These so called ball-and-stick models are very useful, but when molecules with hundreds of atoms have to be constructed, it would be highly impractical to use ball-and-stick models. It is much easier to model these molecules on a computer.

ART



Just like conventional animation, computer animation is also a form of art. A multitude of effects can be created on a computer than on a piece of paper.

An artist can control a magnitude of things in a computer animation with a few clicks of a mouse than he can do in the conventional animation methods.

A light source can be moved very easily, changing the way an entire scene looks.

Textures can be changed just as easily, without redoing the whole animation.

Computer graphics are not very likely to replace conventional methods anywhere in the future. There are still many things that cannot be done on the computer that an artist can do with a paintbrush and a palette. Computer graphics is simply just another form of art.

ARCHITECTURE



One of the reasons for the development of virtual reality (which is actually a form of computer animation) was that it was going to be very useful to architects. Now that has proved to be true. A person can hire an architect half way across the world over the Internet or other network. The architect can design a house, and create walkthrough animation of the house. This will show the customer what the house will actually look like before anyone lays a hand on a hammer to build it.

Computer animation can also be helpful to architects so that they can see any flaws in their designs. This has proved to be very cost and time saving because no one has to build anything. This is one field in which computer animation has proved to be extremely useful.

With the computer as the architect's tool, the whole process of drawing the initial layout, and creating a 3D model can be speed up dramatically.

Many architects still use their traditional tools for their work, but with faster, cheaper, and easier technology this is slowly changing.

ARCHEOLOGY



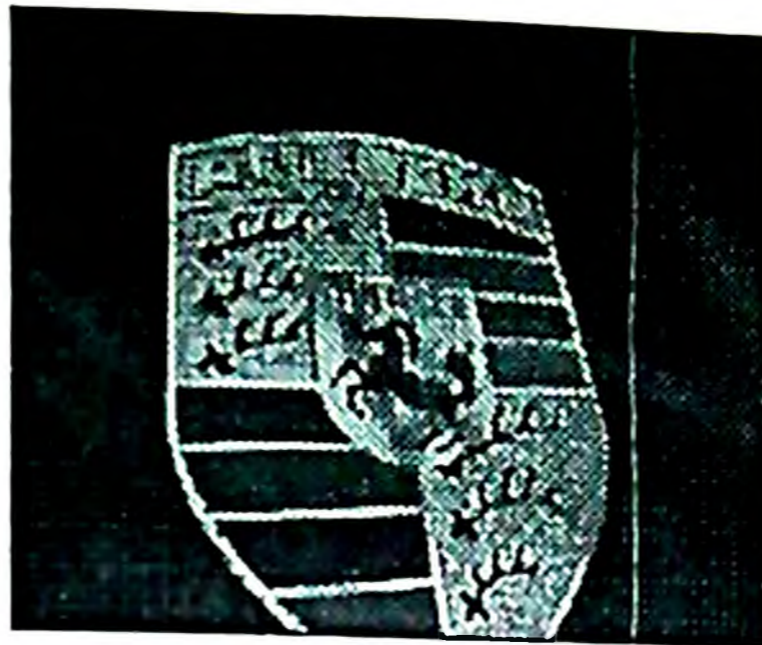
The study of archeology can tell us a lot about the past. Archeologists gather data from various expeditions and digs, which can later be used to make computer models of the site. Up to now, they have made physical models, which are very fragile, take a long time to make, and need to be cared for.

With the advent of the computer, the archeologist has acquired a new tool: computer animation. A model of an object can be made relatively, quickly and without any wear and tear to the artifact itself using a 3D digitizer. All the scenery is modeled and put together into a single scene. Now the archeologist has a complete model of the site in the computer. Many things can be done to this model. The exact position of artifacts is stored in the computer and can be visualized without visiting the excavation site again.

The computer model can also be used for another purpose: recreating the original scene. This can also be done on a conventional model, but modifications are harder. In a virtual world, objects can be moved into any location desirable, even if the laws of physics might not allow it in the real world. This eliminates the use of ugly supports that can really get into the way.

Because the technology is fairly new, it is still not very widely used, but in the near future, the computer might be found more and more in this field of science.

ADVERTISING



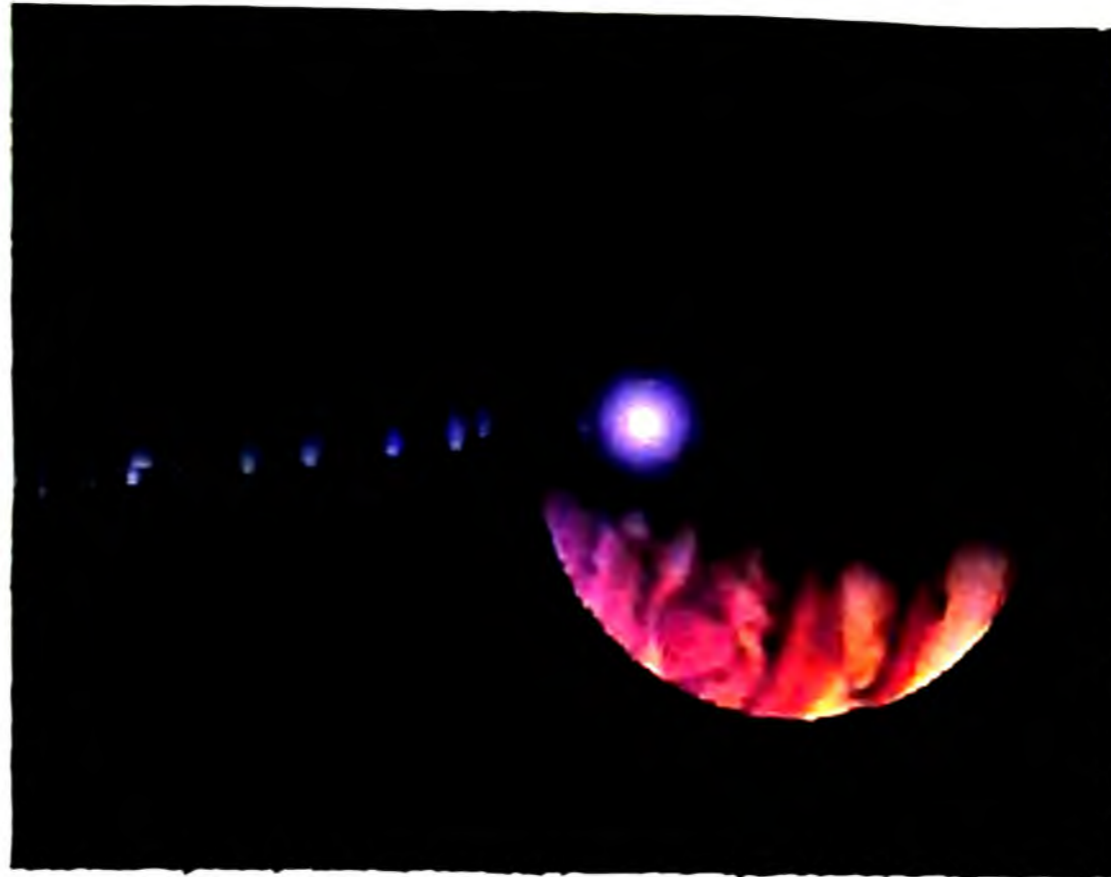
One of the most popular uses for computer animation is in television advertising.

Some of the models that the commercials would call for would be extremely difficult to animate in the past (i.e. Saxophones, boxes of detergent, bathrooms, kitchens etc.) The modeled objects would then be animated, and incorporated with live video. The process involved in modeling and creating the animation could take a many weeks.

Since modeling is a very difficult and time consuming job, some short cuts that the animator would do is to only model the sections of the object that would be shown in the commercial. This is a very frustrating process because if all of a sudden the storyboard changes then that object would have to be modeled again in the right perspective. Selecting the right texture, lighting, and colors for the object can cause the animation to be rendered over and over again.

In most cases, advertising needs media to be inserted. Usually, animation is used with images derived from live film. Sometimes the animation detail is so high, that viewers can't tell if what they are seeing is real or not.

SIMULATION



There are many things, places, and events people cannot witness in first person. There are many reasons for this. Some may happen too quickly, some may be too small, others may be too far away. Although people cannot see these things, data about them may be gathered using various types of sensing equipment. From this data models and simulations are made. Using computer animation for these simulations has been proven very effective. If enough data has been gathered and compiled correctly, computer animation may yield much more information than a physical model. One reason for this is that computer animation can be easily modified and simply rendered to show changes. It is not that easy however to do this with a physical model. Another reason for using computer animation to simulate events as opposed to models is that variables can be programmed into a computer and then very easily changed with a stroke of a button.

TYPES OF ANIMATION

TRADITIONAL CEL ANIMATION

First feature film - Snowwhite and the seven dwarfs by Walt Disney

All the activities are done manually.

Drawing the characters on cels that are then positioned on top of the background before one frame of film is shot creates drawn animation. This cel is then removed and replaced with a similar cel with slight movement from the previous one. One frame is shot like before and the process continues. It normally takes about 24 frames of film for every 1 second. This is the traditional method for cartoons however computers have superseded this technique.

TRADITIONAL ANIMATION

Postproduction is completely handled by computer.

First feature film – Beauty and The Beast.

CLAY ANIMATION



Characters are made using clay modeling. The artist starts developing the character with the clay, by forming the clay into shapes that look like the character he created in his mind. He starts with basic shapes and eventually works to the more difficult details such as eye, colours, teeth, and mouth shapes, hair shapes and finger and toe shapes. He keeps adding and adding and sculpting and sculpting until the character is ready.

A digital camera is used to shoot the images, because it takes individual shots and is less expensive than the other cameras. The images can be put into a computer programme and there manipulations can be done.

Will Vinton, who created the first clay animation feature in 1985, *The Adventures of Mark Twain*, as well as the famed California Raisins commercials, can't say why clay is so appealing.

Certain stories really work well in clay. Maybe they relate to the three-dimensional quality of the clay characters. They're tangible and tactile. They really do exist. It is a palpable reality.

Tim Burton's film utilized clay as one of many techniques but was billed as "stop-animation." Like George Pal's *Puppetoons* and even *Chicken Run*, *Nightmare* used molded "replacement parts" that are swapped for others as needed, as opposed to re-shaping plasticine as the action develops in pure clay animation.

Each frame is sculpted. It's very tedious, very realistic. It is extraordinarily expressive because it doesn't repeat and recycle mouth shapes, for instance."

MOTION CAPTURE ANIMATION

Aladin by Penta media is the first of its kind. The movement of an object is traced by a computer to which the desired image can be fixed.

STOP MOTION ANIMATION (3D)

This type of animation is more complicated because you are dealing with real characters in three dimensional space. The process however is almost the same. The characters are modeled into their movements by the animator who takes on the role of the actor giving his performance through the clay character.

3-D ANIMATION (Computer Animation)

All the production as well as post production stages are controlled and done by computers. computer is making the 3-D model of the objects.

This method is becoming the default method for the animation industry as both 2D and 3D animation are performed on the computers virtual environments.

3D+LIVE ACTION

More challenging is the use of CG (computer graphics) to create realistic models of creatures that are familiar to the audience. *Jurassic Park* (1993, ILM) was the first to completely integrate use of CG character animation in which the graphics were designed so as to blend in with the live action so that it was difficult to tell what was computer generated and what wasn't.

CONCLUSION

Extension education is bringing out changes in attitudes, knowledge and skill of farmers. The more we will be able to influence the farmers, the better will be adoption of technology. Selection and combination of methods and aids is a great significance, as on it generally depends the success of transfer of technology projects. In a country like India with large population and diverse situations, the extension workers have preferred to use traditional methods and aids along with modern methods and aids like workshops, onfarm tests, video tape etc. in extension work.

Educational animation is a recent introduction that can inform, entertain and educate on a variety of subjects of the farms. Good animation films can provide all answers to the problems raised by farmers - technical information on all crops and enterprises, importance of balanced fertilizer application along with organic matter, Integrated Nutrient Management, methods of fertilizer application, Effect of overdose or under dose of fertilizer application in plant and soil, Action of biofertilizers in the soil (microbial activity), Importance of integrated pest management, How parasites and predators act as biological control agents, working of centrifugal pump or submersible pump, problems of heavy application of pesticides in environment, recommended package of practices of crops, nodule formation in legume plants, action of vascular arbuscular mycorrhizal fungi (VAM) all these things can be demonstrated. In the present era of information technology visual communication has advanced very much as evident from various concepts like cyber cafe, internet Kiosks etc. But in extension we are lagging behind we have to advance more to sustain our self to cope up with the recent advances to reach the world information technology field. We can use animation as one of the techniques for creating more impact to our presentation. This can motivate people as well as catch their interest to a great extent. In Extension Education animation has got a tremendous potentialities and its application in the field of cyber extension is yet to be explored.

DISCUSSION

1. Basic requirements for the production of an animation film?

Concept (subject matter), professionals, computer software.

2. Software used commonly for animation film production?

Maya software (3D films)

3D Studio MAX

Hash Master

Animo (2D films)

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COMMUNICATION REVOLUTION THROUGH RADIO

By

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(2001-11-49)



SEMINAR REPORT

Submitted in partial fulfillment for the
requirement of the course
Agrl. Extn. 651 - Seminar

**DEPARTMENT OF AGRICULTURAL EXTENSION
COLLEGE OF HORTICULTURE
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ABSTRACT

One of the early but vital, innovation that resulted in the Information Revolution was radio and the advantages of it are the immediate dissemination of information and the broadcasting of entertainment programmes.

History of radio at Global, National (pre and post independence) and State level will enable us to understand the time line in the information revolution and its importance in agricultural extension.

The basic motto of AIR (All India Radio) is “Bahujan Hitaya, Bahujan Sukhaya”. Providing information, education, production and transmission of different programmes, broadcasting developmental programmes, providing service to the rural illiterates and under privileged, designing and producing special programmes for youth and farmers and promoting social justice and national integration are the various objectives of AIR.

General programme composition of AIR includes 40% music programme, 35% spoken word programme and 25% news programmes. The growth and development of AIR is well evident from the fact that 105 million households use radio and 55% of all radio sets in India have FM (Frequency Modulation) facility.

The different types of radio are Analogue radio, HAM (Help All Mankind) radio and Satellite Digital radio. Numerous agricultural programmes in Kerala with special emphasis on agricultural extension are aired through AIR - Kozhikode, Thrissur, Alappuzha, Thiruvananthapuram, Kannur, Kochi, Devikulam and Manjeri.

Listening to sound is one of the mechanisms through which one may absorb information. Radio is an audio medium, “a theatre of mind”. Radio all through the way has occupied top position in the minds of everybody by educating, informing and entertaining functions. All the more radio is simple and commercially cheap. It is a mobile medium and an instantaneous form of communication.

INTRODUCTION

India has achieved self-sufficiency in food production in recent years. However, still there is a wide gap between the production potential and the actual production. The present rate of agricultural production could be increased many fold if the available technologies are brought to the farmers in an effective way. One of the major bottlenecks in acceleration of the pace of agricultural production is the lack of effective transfer of innovations. A large number of innovations have been developed by various agricultural universities and research institutes. However, very few of these innovations have gone to the field. This indicates that even though research findings have made a big headway, the benefits of research have not been fully utilized by users. Innovations have no value if they do not reach to actual clients. The fruits of research remain unutilized if it is not transferred to the field. Thus in order to reap full benefits of research in agriculture, the innovations must reach potential users at right time. To meet this target several communication technologies are available and radio is one among them. (Dhaka, 2000).

Radio is the oldest information technology tool and provides entertainment to masses largely, with a great emphasis on agricultural extension services. In recent past, its reception facilities through local Radio, regional broadcasting stations and FM transmitters have increased dramatically. These have opened the possibilities to bring area/regional specific technologies and consequently the development and refinements to provide conceptual or issue based information. Smooth transfer of messages can easily and effectively done through the print media like newspapers and farm magazines and the audio media- radio, audiovisual media-TV. Radio is a part of broadcasting journalism which in turn is a part of mass media, otherwise known as "companion medium" which started service in India during 1927. The strength of the mass media like radio is of great help to extension worker in providing cost effective and efficient service to farmers (Chandrashekara, 2001).

All India Radio, "the voice of India", turned 75 years of its service in July 2002. AIR remains India's foremost rural medium and that alone makes it firmly relevant in a country whose population is primarily rural. Not just for every votary of public service broadcasting, but also for audiences and most importantly these days, for the market. For fast moving consumer goods, targeting the rural sector, it remains the medium of choice. As per the Audience Research Unit of Prasar Bharathi, the current number of radio sets in our country comes to 12.5 crores, so assuming three listeners per household, total listenership comes 30 to 32 crores a day (Ninan, 2002).

Though there are so many communication media such as TV, radio, newspapers and farm magazines, radio assumes significance due to its very accessibility by both rich and poor as well as rural and urban masses. Technology revolution has brought the Analogue radio to the level of Digital Satellite Radio, which provides more clarity and more information worldwide. Still there are villages in the country having no power, communication or transport connectivity. Under such situations radio especially dynamo-operated type (clock radio) will be most effective. Trevor Baylis has been credited with the invention of clock radio, which is under use by UN for creating awareness against AIDS in African nations. Let us have a detailed view of how radio has revolutionized the entire communication scenario.

RADIO

Radio is a part of broadcasting journalism. Broadcasting is an electronic system for recreating sound at many places simultaneously via. Wireless transmitter. Radio is a good source of communication of ideas to the rural and urban people especially in countries like India. Radio is an audio medium which enjoys a number of discrete characteristics, which have contributed to its wide spread use. It can be as up-to-date as the latest broadcast. They give news bulletins, special programme for rural people, housewives and children. This is a good source of dissemination of agricultural information to farmers. Radio has emerged as a widely used mass

communication device in India. Farmers accord it a very high credibility as a source of reliable and latest farm technology for them through on the spot broadcasts or through simulated broad casts, radio can actually overcome the barriers of space and time. Radio has the advantage of being able to bring the first hand experience of an authority on a subject within the reach of every radio listener. This medium commands a universal audience by geographic spread (90% of national territory), income, education, age and, sex etc. and thus reaches an audience not as often reached by other mass media. Furthermore, education through radio is inexpensive compared to other media. It is very suitable for achieving a favorable attitude and motivating listeners to action. Further, rural radio forums may also be very useful in traditional areas (Sandhu, 1993).

In short, the Radio is highly useful as,

- Morning medium of the masses.
- Literate medium for the illiterates
- Mass medium with mass audience
- Influence moral standards and values
- Suitable medium for technology transfer including agricultural and allied subjects.
- Reaches more people quickly at low cost
- Provides cosmopolite approach
- Serve as informer, entertainer, educator and companion audio medium
- Stimulates the "sense of hearing" and leads to an action

HISTORY OF RADIO AT GLOBAL LEVEL



MARCONI: Father Of Radio (western concept)

Early history of radio: 1840-1919

With the advancement of magnetism and electricity, in 1844 Samuel F.B. Morse gave the first transmission of electromagnetic message. In 1895 Jagadis Chandra Bose, an Indian scientist, gave the first public demonstration of transmission wireless communication or transmission using electromagnetic waves to ring a bell and to explode a small charge of gunpowder from a distance. He used microwaves with wavelengths in the millimeter range, not radio waves. The Daily Chronicle (England) reported, "the inventor has transmitted signals to a distance of nearly a mile and here in lies the first and obvious and exceedingly valuable application of this new theoretical marvel". Alexander S. Popov in Russia was on the same track but working on radio waves. In 1901 Guglielmo Marconi an Italian was quick to appreciate its usefulness and he commercialized Trans-Atlantic wireless communication and is today celebrated as the Father of Radio. There is some controversy about whether Bose and not Marconi should be considered as the father of the wireless. In recent years, some Indian scientists have spearheaded a movement that says that it was Bose's naivete and failure to

seek a patent that has denied him his due. However, by all accounts Bose was never interested in the lucre. His was the intellect that invented for the greater good of society. The British Navy was in his 'coherer' to establish radio links between ships and torpedo boats, so it is not as if Bose was unaware of the monetary significance of his findings. In spite of that he wrote to Rabindranath Tagore in 1901, "..... I wish you could see that terrible attainment for gain in this country..... that lust for money...Once caught in that trap, there would have been no way out for me". Acharya P.C. Ray had once said that had he (Bose) taken out patents for the many apparatus and instruments that he had invented, he would have made millions. Bose was not interested in simply making money. He wanted knowledge to remain in public domain. "This is not a laboratory", he had said, about the Bose institute, "but a temple". A true karma yogi, he carried on his work without a thought as to the gains thereof. Moreover, Bose made the Cresco Graph to measure the plant growth. He studied the effects of electromagnetic radiation on plants. With J.C. Bose had begun the era of modern science in India. Anyway, we the Indians consider him as the Father of Radio.



Dr. J.C. Bose: Father of Radio (Indian concept)

Other timelines in the history of radio at the global level are

- 1920- "Birth of Modern Radio Broadcasting" started in the Westing House, USA, where the first radio station in the world is located.
- The period from 1929-1945, recognized as the "Golden Age of Radio".
- From 1946-1959- "Decline Period of Radio".
- 1935- the first FM radio developed by EDWIN ARMSTRONG.
- 1960- Recognized as "Renaissance Period"; with this, the real radio revolution has begun.

HISTORY OF RADIO AT NATIONAL LEVEL



The first radio broadcasting started at the then Bombay and Calcutta in 1927. First news bulletin went on the AIR on 23-7-1927 from a privately owned radio station at Bombay. The Government of the British regime took this in 1930 and renamed as "Indian Broadcasting Service". In 1933 radio rural programs started at Bombay. In 1935 the North Western Frontier Government and Marconi company jointly started rural broadcasting. All India radio (AIR) started functioning in 1936 simultaneously the Punjab government started rural radio broadcasting centers. The first News Bulletin through News Division went on AIR in January 1936.

The rural broadcast was arranged under the direct supervision of F.L. Brayne, ICS, the then rural reconstruction commissioner, who had evinced keen interest in rural broadcasting. To recognize his great effort to popularize the rural broadcasting F.L. Brayne is considered as the "Father of Rural Broadcasting in India". Another event that needs special mention is the radio

broadcast that began on October 16 1938 from the Delhi station for the benefit of Delhi residents. The broadcast reached the people through 120 community receivers established in villages having a population of more than 600 each. The broadcast made from Midnapur in Calcutta failed because of the long distance involved. The arrangements made at Madras for broadcasting with the cooperation of the Madras Radio Club continued until the opening of the AIR station on June 16 1938. From The first of November 1938, the All India Radio had its own rural programs and broadcast them (Vadavathoor, 2000)

IMPORTANT MILESTONES SINCE INDEPENDENCE

On august 15th 1947 when India became an independent nation, we had only 6 radio stations all over the nation say at Bombay, Delhi, Calcutta, Madras, Tiruchirapalli and Lucknow. The other events that revolutionized the radio communication in our country are as follows.

- The first Radio Sangeet Sammelan started in 1954. At present every year, All India Radio conducts Sangeet Sammelan at different places. Dr. Sumati Mutatkar, a renowned vocalist and musicologist joined AIR in 1953 as the director of music and have been associated with Sangeet Sammelan planning for many years. (Prasar Bharati, 1998)
- Radio Rural Forum started at Pune in 1956. This was a novel agricultural information extension programme, organised under the joint auspices of the Information and Broadcasting Ministry and UNESCO. It was formed on the Canadian model "read, listen, discuss and act" intended for farmers.
- All India Radio renamed as 'Akashvani' in 1957, by the national poet, Rabindranath Tagore.
- Vividh Bharathi services started on 3rd October 1957
- Yuvavani- a youth programme started at Delhi in July 1st 1969
- The first FM Radio station in India established at Madras on 23rd July 1977

- The first National programme on music started on 20th July 1982
- National channel introduced on 18th May 1988
- Commissioning of Integrated North- Eastern radio service took place on 8th April 1985
- The 100th station of AIR established at Warangal, Andhra Pradesh on March 2nd 1990
- The 150th station of AIR established at Berhampur in Orissa on 1st April 1993
- Four 500 KW super power short wave transmitters established at Bangalore on 28th September 1994. With this installation, Bangalore became the biggest transmitting Centre in the world.
- The 175th station of AIR established at Nasik on 31st October 1994
- Multi track recording studio opened at Chennai on 5th August 1995
- Laid down the foundation stone for new broadcasting house at Delhi on 1st February 1996
- AIR started internet facilities on 2nd May 1996
- AIR renamed as Prasar Bharathi Corporation on 23rd November 1997
- The first Digital Audio Broadcasting started from Delhi on 1st April 1997
- "The radio on demand service" started on 26th January 1998
- The AIR, "news on telephone" and "AIR live on Internet" started on 25th February 1998
- Second FM channel commissioned at Delhi and Kolkata, with Yuvavani service on 15th August 1999
- The AIR celebrated platinum jubilee year in July 2002.

HISTORY OF RADIO IN KERALA



The first radio station in Kerala was started on 12th March 1943 at Thiruvananthapuram



This station was took over by AIR in 1950

1474

- ☞ Farm and Home programme started at AIR Thrissur in 1950 as *Nattinipuram* or *Radio grama rangam*
- ☞ *Vayalum veedum*, programme started first time in 1966 at Thrissur AIR station. This was started as part of the Intensive Paddy Development Programme of Kerala Government with emphasis to Thrissur, Palakkad and Ernakulam districts.
- ☞ As on January 1st 1981 there were 115 radio rural forums, functioning under AIR Thrissur and most of them are still functioning well. All Kerala Radio Listeners Association also function at state level, to send comments on different programmes of the AIR and to suggest creative ideas for making changes in the AIR programme.

A VIEW OF THE AIR (ALL INDIA RADIO)

The All India Radio works under the Prasar Bharati Corporation, of the Ministry of Information and Broadcasting. Persons occupying key posts are.

Union Minister for Information and Broadcasting	- Smt. Sushama Swaraj
Chairman, Prasar Bharati Corporation	- Prof. U.R. Rao
C.E.O., Prasar Bharati Corporation	- K.S.Sharma
Director General, AIR	- T.R. Malakar

OBJECTIVES OF ALL INDIA RADIO

The motto of ALL INDIA RADIO is "*Bahujan hitaya Bahujan sukhaya*", i.e., the benefit and happiness at large sections of people and strive to.

- Provide Information, Education and Entertainment.
- Production and Transmission of different programmes to enrich all sections.

- Broadcast developmental programs – Extension work in Agriculture, Education, Family Welfare, Child Development, Poverty Alleviation, Science and Technology.
- Serving the rural illiterates and under-privileged population.
- Special programmes for Youth, Social and Cultural Minorities and Tribals.
- Promote social justice and National Integration.
- Combat exploitation, inequalities, untouchability and parochial loyalties.
- Uphold the unity of the country and the democratic values enshrined in the constitution. (www.allindiaradio.com)

GROWTH AND DEVELOPMENT OF AIR

- First radio programme in India started at Bombay, in 1923, by the radio club, with 18 transmitters of which six were medium waves and 12 were short waves. Even though the original Radio broadcasting service was started in 1927.
- During 1947, our nation had only 2,75,000 Receiving Radio Sets and at present 196 million Radio sets as per 2001-2002 report
- 105 million households use Radio in India.
- One in four Indians listen Radio regularly.
- 55% of all radio sets in India having FM facility (7.1crores).

(Ninan, 2002).

PRESENT STATUS OF AIR

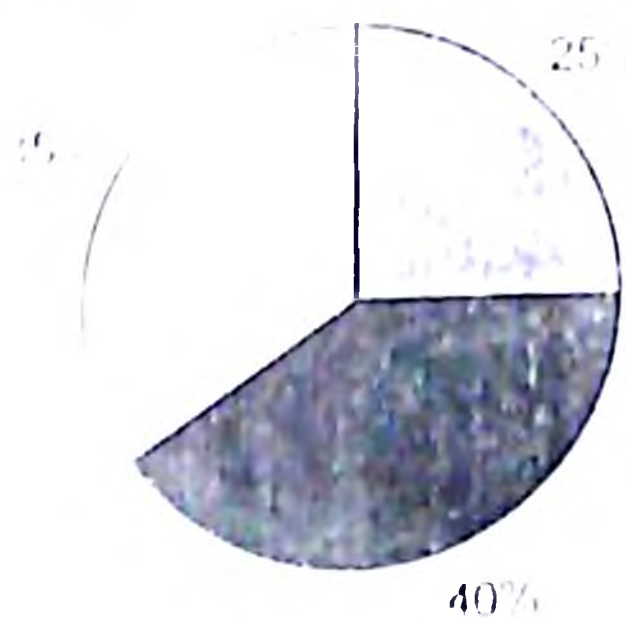
Air covers 99% of population and 90% of the national territory. At present the broadcast scenario has drastically changed with 210 broadcasting centers, 313 transmitters, 184 small radio stations, 10 relay centers and 3 Vividh Bharathi for commercial purposes. AIR has a three-tier system of broadcasting namely national, regional, and local. The AIR earned the highest revenue income of Rs.97crores in 2002, which was up from Rs.73 crores in 2001.

A single window facility now enables someone in Mumbai to book advertising on a station in Himachal Pradesh; tariffs are as low as Rs.800 per station for 10 seconds on Vividh Bharathi and Rs.550 on the primary channel. Of course, advertisers take multiple stations so that adds up.

Sponsorship rates for programmes have just been rationalized to draw in more takers, with the rates actually being dropped by 60-70%, to about a third of what they used to be. All of this is intended to make AIR competitive, again even as perky private FM stations are popping up in metros, with names like "Radio City", "Red" and "Radio Mirchi". Radio is increasingly a morning medium, listen to in the car, at home and by the farmers in his field or street dwellers in the street. The country's rising car population presents a growing audience for radio but private FM's seductive crooners are there, waiting to seduce listeners away from stodgy AIR.

PROGRAMME COMPOSITION OF AIR

Spoken word Programmes: Talks /skits /dialogue /interview /discussion /feature/ drama/commentary /announcement/weather forecast



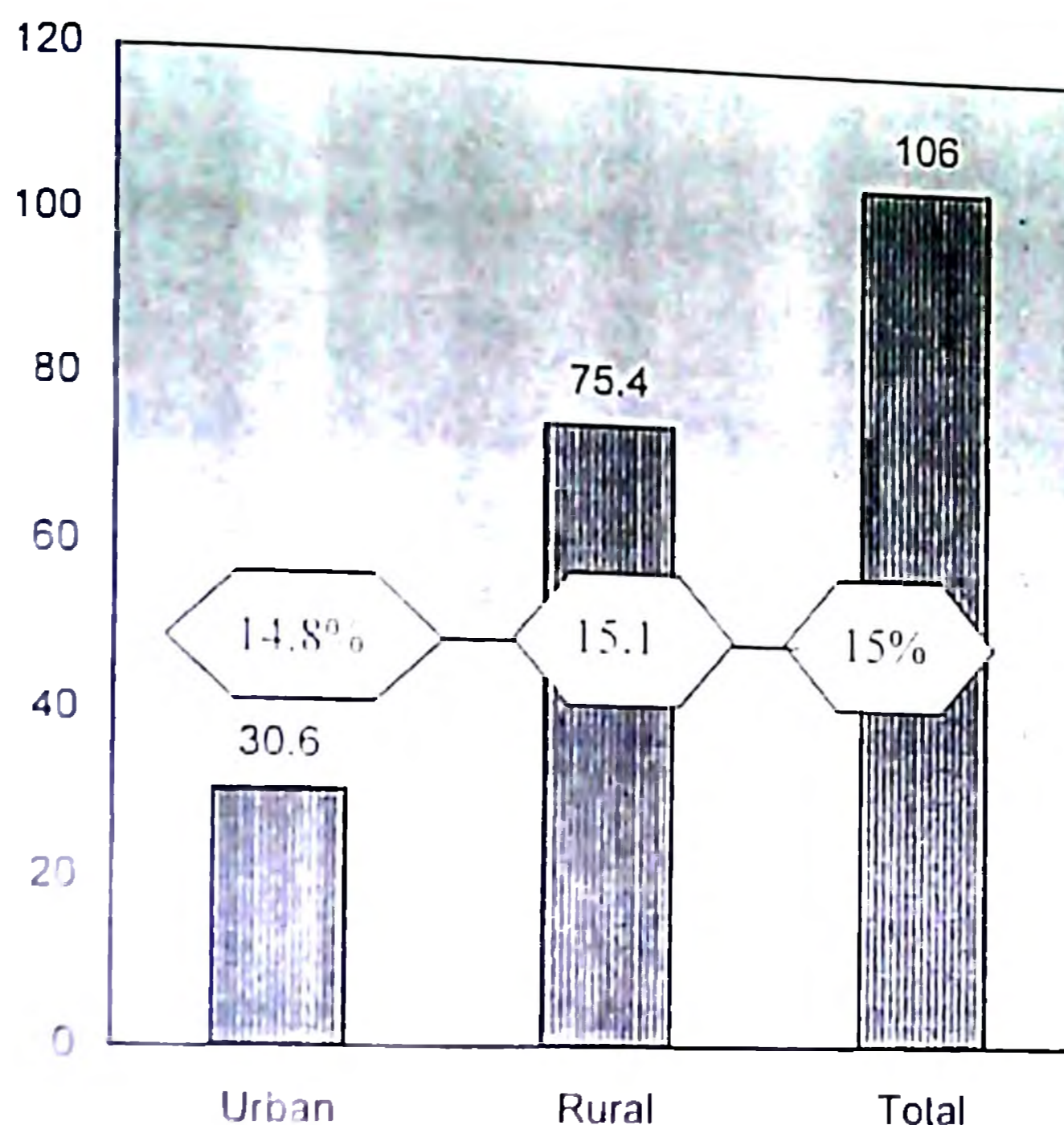
News:
Home/Regional/External Services

Music programmes:
Classical/Folk/Light/Devotional/
Film/Western music

REACH OF RADIO AMONG RURAL AND URBAN POPULATION

 Reach in %

 Reach in million



Source: Hindu, 2002

News, music and spoken word programmes constitute the three major pillars of AIR's programme composition. Music includes classical, folk, light, devotional, film and western music programmes. Talks, discussions, interviews are regularly arranged to provide a forum for all shades of opinion about standing national and international issues. While some of the programmes are arranged for being relayed by a number of stations, a much larger number are presented by individual stations in their respective languages. Radio drama is also an important ingredient of AIR's programme and figures both in its general programmes as well as in the programmes for specific groups. Radio features and documentaries are other programmes which employ the entire range of audio formats in a single programme, eg, narration, music, drama, interviews, poetry, sound effects, etc

Programmes for rural listeners are broadcast from almost all AIR stations in different languages and in local dialects to provide educational and informational support to agriculture and rural development programmes.

Special programmes for women are broadcast from all stations of AIR. These programmes are directed to housewives and working women. Though these programmes provide items of information and of educational nature, and also as entertainment. Programmes on health, family welfare, household chores, nutrition, and problem of working women, are broadcast. The programmes for children are broadcast for tiny tots and children up to the age of 14 years.

Educational programmes of AIR cover a wide spectrum, primary, secondary, tertiary and university levels. Enrichment programmes are also broadcast for teachers. Programmes on sports are very popular with the listeners and these constitute an important feature of AIR's programmes. All the important sports events of international, national, regional and local levels are given due coverage through running commentaries, despatches and radio reports apart from two 5-minute daily news bulletins. AIR also broadcasts two half-hour sports magazine programmes.

SPECIAL AUDIENCE PROGRAMMES

For farmers- *Farm and Home (Vayalm Veedum) Krishi Paadam*

For women- *Rural and Urban (Mahilalayam Veettammamarkku Vendi/Vanitha Rangam)*

For children- *Balarangam*

For youth- *Yuvavani*

For industrial workers- *Thozhilali Rangam*

For senior citizens/ armed services

SURVEY FINDINGS OF ZARCA INTERACTIVE

A recent survey among Radio listeners across all the main metros has shown that "Radio Mirchi" has forged ahead of its competitors with an audience share of 44.95%, ahead of next in line "Radio City 91 FM", which had a listener ship of 23.42%. In Pune, "Radio Mirchi" dominated the charts

with a share of 53.48%. The survey was conducted by zarca interactive an online market research agency among 20,000 Radio listeners (above the age of 16), during the second week of October for a period of one week in the four major metros viz. Mumbai, Delhi, Bangalore and Pune. In New Delhi, 107.1 FM dominated with 30% of the listener ship closely followed by Vividh Bharati (21.8%). In Bangalore, "Radio City 91 FM" was ahead with an audience share of 85%. The age group listening most to the radio is in the 23-30 year group, which constitutes 38% of the total listeners of FM.

The listener ship gender brake up was 61% men and 39% woman. People working at the executive/managerial positions led listener ship with 21%, followed by students (20%) and IT professionals (17%). The survey contrary to popular opinion that the favorite time for listening to radio is late night showed that 56% of the respondents prefer to listen to FM in the morning from 8am 12noon. Among the competing radio stations, respondents were exposed to include seven channels – Vividh Bharati, 107.1FM, Radio Mirchi 98.3, Radio City91, GO92.5, Red93.5 and Win94.6 (Economic Times, 2002)

ZONES OF AIR

Mainly there are four zones, namely

- ① Eastern Zone - located at Kolkata
- ② Western zone - located at Mumbai
- ③ Northern zone - located at Delhi
- ④ Southern zone - located at Chennai & Bangalore

RADIO STATIONS IN KERALA

- I. Thiruvananthapuram- There are two stations,
 - a) 50KW Short Wave (SW)
 - b) FM Music Channel

2. Alappuzha

- a) 200KW-Medium Wave (MW) High Power Station, it covers the entire south India

3. Thrissur

- a) 630 KHz-Medium Wave (MW) 100KW

4. Kozhikode

5. FM radio stations at Kannur, Kochi, Devikulam, Manjeri.

TYPES OF RADIO STATIONS

Mainly there are two types of radio station namely, Frequency Modulation (FM) and Amplitude Modulation (AM). The range of FM varies from 88 to 108 Mega cycles where as that of AM varies from 535 to 1605 Kilo cycles .Amplitude Modulation can be of Medium Waves(MW) and Short Waves (SW).They differ with respect to their mode of transmission. Medium wave follows the Earth Transmission, where as Short Wave follows Sky Transmission.

TYPES OF RADIO





There are different radios such as Analogue or Common radio, HAM radio or Amateur radio, Clock radio and Satellite/ Digital radio. Let us discuss the types one by one.

I. ANALOGUE RADIO

Indian scientist Jagadis Chandra Bose did rudimentary work on wireless communication, the forerunner of radio in 1895 in Calcutta. The Italian Guglielmo Marconi later commercialized it for sending telegraphic messages across the Atlantic. Human voice was heard for the first time over wireless in 1906, heralding the age of radiotelephony. The idea of using radio as a means of entertainment, however, came much later, when in 1920, Westing house in the United States set up the first full scale radio station in Pittsburgh, Pennsylvania. Early radio sets used a crystal detector to tune into a

station and headphones for listening. But they were soon replaced by the newly invented thermionic valves, which could be tuned better and could also amplify the signal to drive a loud speaker. The first pocket-sized radio using transistors was released by an American company in 1954, to be followed in next year by Sony in Japan. The coming of the transistor radio made a common house hold object, making news, sports, commentaries and music available to all. Soon small pocket sized FM Radios were available which produced fantastic stereo sound with head phones (Basu 2000).

Major features of analogue radio are as follows

-  Low cost
-  More rural based
-  Large area coverage
-  Unidirectional, that is , we can tune to only a single station at a time

II. HAM RADIO OR AMATEUR RADIO

The Indian wireless telegraphs (Amateur Service) Rules 1978, describe it as "A service of self training, intercommunication and technical investigations carried on by Amateurs, that is by persons duly authorised under these rules, interested in radio techniques solely with a personal aim and without pecuniary interest". Unlike the common radio set, which is unidirectional, Amateur radio is bi-directional that is a two-way communication system where in we can listen to as well talk to one another.

HISTORY OF HAM AND CURRENT SCENARIO

The origin of the word "HAM" could perhaps be traced to the early days of the radio, because of a popular magazine called HOME AMATEUR MECHANICS published by Hugo Germsback. HAM could also be expanded

as **HELP ALL MANKIND** considering the vital role played by HAM in times of calamities.

The motto of HAM Radio is "Friendship through Communication". J.C. Bose is considered as the Father of HAM Radio.

In 1923 the first amateur radio license was issued in India. In 1998, we have celebrated both the centenary year of Amateur radio at global level and the platinum jubilee year of Amateur radio in India along with the golden jubilee year of our independence.

Current scenario of HAM

There are more than 3.5 million HAMs in the world. The largest chunk comes from Japan (1.3 million), while in India there are more than twelve thousand HAM users.

IMPORTANT HAMS-FOREIGN AND INDIAN

FOREIGN	INDIAN
EAOJC Juan Carlos, King of Spain	VU2RG Rajiv Gandhi, former Prime Minister of India
KB6LQR Jean Yeater, Voyager 86 Pilot	VI2SON Sonia Gandhi, Congress Party leader
K2ORS Jean Shepard, author	VU2SCU Charuhassan (Tamil cine actor and brother of Kamal Hassan)
UAILO Yuri Gagarin, Cosmonaut	VU2MIK Mansoor Khan (Director of successful films like Qayamat Se Qayamat Tak, Jo Jeeta Wohi Sikander)
PO5GJ Marlon Brando Aka Martin Brandeaux, actor	VK2ILAD Ved Kamal (Became Australia's youngest HAM at the age of 8½ years in 1995)
SUIVM/P Prince Talal of Saudi Arabia	VU2MS. Suri (Founder of National Institute of Amateur Radio, NIAR)

(Asha, 2001)

A license issued by competent authorities is essential to establish and operate Amateur radio stations. Just as we have names and telephone numbers for identification purpose, HAMs are assigned "official call signs". It is a combination of alphabets and numbers by which they are recognized by other HAMs. At the time of issuing the license, the concerned authorities assign these call signs, making sure, no two HAMs have the same call sign.

The first two or three characters in the call sign indicate the country of the HAMs, for eg. VU represent India, VK represent Australia, DX represent distant or foreign station and C5A represent Gambia. All women are addressed as YL (Young lady) and OM means Old Man, irrespective of age.

HOW TO GET A LICENSE

If you want to set up and operate an amateur radio station, you must get a license issued by the WPC (Wireless Planning and Coordination) wing of the Ministry of Communication, Government of India.

To obtain this license you have to pass the examination depending on what category of license you would like to have.

You must have the thorough knowledge about basics of electronics, Rules and Regulations governing Amateur Radio and the Morse code.

Morse code consists of Greek and Latin and only through regular practice a user can familiarize the codes.

Amateur radio, conducts, various contest, awards and certificates are given to winners, who makes the largest number of contacts in the specified period.

HAM RADIO- EQUIPMENT

It comprises of three essential elements viz.

- A Radio Transmitter
- A Receiver
- An Antenna

A compact combination of radio transmitter and receiver is termed as

Transceiver

If you have sufficient perseverance and basic knowledge about electronics, you can design and assemble yourself or you can buy it from the

market. If you assemble your own set, it could indeed be a challenging, exciting and satisfying experience.

The other elements or components of HAM radio are

Station

The location from which a HAM operates. This could be a mere corner of a room or the space under the staircase, where the equipment is set up.

Shack

The way of speaking or in HAM parlance

The other accessories in the shack are

A Clock, a HAM World Map (Indicating the zone numbers), QSL cards to receive other HAMs from other parts of the world and QSO to receive Indian languages card.

Amateur radio is allotted several bands in the Short Wave (SW) range or HF (High Frequency) of the radio spectrum and HAMs are required to strictly adhere to these bands given by WPC wing. HAMs are forbidden to barge into other frequency bands, so that no interferences is caused to the communication underway.

ADVANTAGES OF HAM RADIO

As the motto of the HAM, radio is "Friendship through Communication". It promotes

- ❑ Universal brotherhood and bonding people across the globe.
- ❑ Exchange of information, just about anything under the sun.- family, friends, interests, warnings, everyday events etc. purely for non commercial purposes.
- ❑ It helps as a unique way of sharing trials and tribulations of life by "voice friendship" similar to "pen friendship".
- ❑ Amateur radio is bi-directional i.e. two-way communication is possible.
- ❑ Very useful during the periods of calamities or disasters like earthquakes, floods, cyclones, typhoons, fires, accidents etc. when all other normal means of communication breaks down or in case of

major power failure. At such times, Amateur radio remains the sole means of communication offering instant hope and mobility banishing the sense of helplessness and insecurity.

- Amateur radio can form a link with remote areas in providing medical and health care.
- For eg. HAMs saved many lives by procuring life saving medicines and facilitating consultations with specialists free of charge.
- Eg. GEMNET (Radio Hospital) - General and Emergency Medical Net. It was started in 1989 by O. M. Gajapathi.
- Indian psychiatrist P.K. John Willwodale of Canada coordinates Indian World Widenet.
- HAMs can be used to get Information regarding Agriculture and allied activities. In Kerala several people utilize the facility of HAM radio. one of the active listener of agri programmes of VOA through HAM is Suresh Kumar, Chathankulam House, Kongad, Palakkad.

He and his wife, Rupitha, both of them are active HAM members According to him HAM radio is the best medium to communicate with farmers. There are HAM RADIO FARMER NETWORKS, by which the useful tips on farming, pests and diseases surveillance, weather forecasting etc. can be easily passed to the network farmers. Once the HAM rules are loosened there will be more number of HAM users in our state.

- Universal friendship is assured by HAM. We can talk to scientist in an expedition to Antarctica or a paleontologist engaged in excavation in Egypt or an Anthropologist working in deep jungle of Africa or a captain of a ship in the Pacific or we can have an air-chat with a busy housewife in Scotland.
- As a fantastic hobby it aids in educative informative, and sometimes therapeutic values, giving a sense of special identity eg. OSCAR- Orbiting Satellite Carrying Amateur Radio (The 1st Non-Governmental, Non Military satellite launched in 1961 by a group of Radio Amateurs in California, USA) for Educational programmes.

GENDER ROLE IN HAMS

Although majority of HAMS are men, women are not lagging behind in winning contests and setting records. One shining example is Y L Barathi (VU2RBI), fondly nicknamed by other HAM as RBI.

III. CLOCK RADIO

A British inventor Trevor Baylis made the clock work radio for the first time with a dynamo operated working model. This is a simple, yet revolutionary gadget. To fight AIDS in Africa, where the electricity was not available in many interior regions. It was designed to spread of information among the masses.

Radio requires electricity and people were bartering their rice and maize in order to get them. Some people were buying batteries which were horrendously expensive. So Trevor Baylis decided to design a radio that can run with the dynamo derived power. Finding no takers for his invention, he had to literally struggle to get a manufacturer for his product, which came only after his invention was featured in a BBC television programme in 1994. In recognition of his work, he was awarded the OBE by the British government and the presidential gold medal by the institution of mechanical engineers in 1997

Baylis recently visited India in 2000, to participate in the 'Bright Sparks 2000' organized by the British Council. This type of radio is highly useful in the interior remotest areas of our country especially in the North Eastern forest areas where the facilities for the availability of electricity or battery are not available. At present, a company in Cape Town in South Africa is making two lakh pieces of clock radio per month.

(Basu, 2000)



Trevor Baylis: Father of Clock Radio

IV. DIGITAL/ SATELLITE RADIO

This is one of the latest trends in the radio communication scenario. A high power digital receiver is connected with satellite or without satellite. It has several added advantages, say the high clarity of sound, digitalized effect of sound. Digital satellite radio can bring more information from other countries with more clarity. The popular brands of digital/ satellite radio available in our country as well as in the world are the following.

BRANDS OF DIGITAL RADIO

i) World Space Satellite Radio

The motto of this radio is "Are you listening? And this is the world's first satellite digital audio broadcast service, and it is now available in our country too. This is powered by three satellites in deep space, world space beams down exclusive channels of Rock, Pop, Jazz, Dance, Reggae, Classical, Country, Indipop, Hindi, Tamil, Malayalam, Kannada songs and much more. This is characterized by the digital sounds that lend unbelievable clarity to music. The sound will be so crisp and clear. There are several branded services of the world space, say Sunrise (Hindi), RBC (Hindi). Some Indian broadcasters are RM Radio (Kannada), RM Radio (Malayalam), VRC (Tamil), Radio India (Hindi). There are several world space receivers

manufacturers in the country. Viz. Hitachi, JVC, Panasonic, Sanyo. This type of radio service is noted with high gain outdoor antennae, low noise and buffer amplifiers and clear path protectors.

Source:(www.worldspace.com)

More information about this can be obtained from the following address

World space corp. office: Worldspace (I) Pvt. Ltd., 9th floor, Sankaranarayana Chambers, 25/2, M.G. Road, Bangalore. In Kerala it is promoted by Ernakulam Radio Company. The world space Satellite/Digital radio being used to receive programmes that are rebroadcast to hand-wound radio sets spread in rural areas of Niger in Africa. World space radio can be used to download educational content in remote areas and spread it through cost effective, hand held computers, simputer, the 'poor people's computer developed in Bangalore and Worldspace together aims to bring basic education to tribal children in Central India. The digital broadcaster, world space radio has planned an interactive education programme for rural children in the remote areas of Bastar district of Central Chattisgarh state. The Rainbow partnership organization the SAF (South Asia Foundation) initiate that promotes cooperation among the seven member of South Asian Association for Regional Cooperation (SAARC) will fund the project. It is expected to benefit about 2000 students in the sixth month pilot phase. About 100 simputers will be used to receive digital data content broadcast by Worldspace, which has been broadcasting digital data along with its popular voice broadcast of news and entertainment. Personal computers tend to use up a lot of disk space to store voice files. However, the text-to-voice capability of the simputer makes the process easy. This is a boon for non-formal education, as it would allow a student to progress at his or her own pace and standard. This can be used for broad rural application viz. microcredit, agricultural data storage and retrieval. It can facilitate village census, agricultural data collection and routine services such as railway ticket reservation.

ii) Bose Radio

There are two models, say Platinum White and Graphite Grey. The motto of the Bose wave radio is "Better Sound Through Research". This radio is the most acclaimed in the United States and presently available in our country too. The Bose radio set can be obtained from the following addresses.

Bose radio show room, B-13, Inner circle, Connaught place, New Delhi, 110001

Bose radio show room, C-319-322, cross roads, 28, Pandit M.M. Malviya Road, Haji Ali, Mumbai, 400034.

Source: www.bose.co.in

FARM AND HOME PROGRAMMES IN KERALA

Farm and home units of All India Radio

At the Akashvani head quarters, Delhi, the work of the Farm and Home unit is conducted and supervised by the director (F&H), who has a joint director and a Farm Radio Reporter to assist him. Each of the unit is headed by a Farm Radio Officer who may be a graduate in Agriculture or not necessarily always; and should have practical experience of work in villages and has received training in extension methods. He is assisted by one or two Farm Radio Reporters (B.Sc. Ag. or Diploma holders) and a scriptwriter with a good journalistic caliber. Each unit is provided with Ultra Portable Tape Recorder for interviewing farmers and extension workers in the field. These recordings are then suitably used in the programme broadcast.

(Vadavathoor, 2000)

Farm broadcasting in Kerala started in 1950 as *Naattinpuram/Radio grama rangam*, but the regular programme with the new name as *Vayalum Veedum* (Farm and Home) started first time in AIR, Thrissur in 1966. This was based on Canadian model – "Read, Listen, Discuss and Act" and this model gave rise to the origin of Farm Radio Rural Forum.

The original objectives of farm and home programmes are to provide relevant, timely and problem-oriented technical information to farmers.

FARM SCHOOL ON AIR

This is a method of providing systematic education on farming to the farmers through the process of distance learning. This was started based on the concept developed by the experts of the Extension Department of University of Philippines. Abraham Joseph, the former Farm Radio Officer, who had contributed to agricultural information extension in our state and is considered as the brain behind the farm school on AIR in Kerala state. The first programme on paddy cultivation was directed by him and K.R.Kurup. The other Farm schools on AIR delivered by AIR in Kerala are as follows

Farm school on coconut-1974

Farm school on rubber-1975






Farm school on tapioca-1976

Farm school on pepper-1980-81

Some of these lessons are published as books

Eg. *Kanakam Koyyum Kashumavu* published by AIR Thrissur and Cashew Development Directorate, Kochi. The present name of the farm school on AIR is the '*Krishi Paadam*'. Some of the programmes already delivered by the different stations of AIR in Kerala are as follows.

Illam Nira, Vallam Nira [AIR Kozhikkode 1993] for this programme and the other agricultural programmes organized and broadcasted through AIR Kozhikkode bagged the best farm journalism award - "*Karshaka Bharathi*" of Kerala Government in 1993. The main brains behind this achievement were Farm Radio Officer, N. Saidalavi, and the farm radio reporters Muraleedharan Thazhakkara and Leena P. Baby. (Deshabhimani, 1995)

-  *Krishihavanlude (Through Krishi bhavan)*
-  *Kathirum, Pathirum*
-  *Kanakam Koyyum Kashumavu (AIR Thrissur)*
-  *Kera Samrudhi Kerala Samruddhi (AIR Kozhikkode)*
-  *Karshaka Manthram, Karshika Yanthram*

- ☞ *Matsyam Ammoollya Sampathu* (FM Kochi)
- ☞ *Kadalekum Kanivukal*
- ☞ *Rubber Enna Kalpadhenu*
- ☞ *Krishiyude Raksha Naadinte Suraksha*(AIR Thrissur)
- ☞ *Mulberriyil Vijayam*(AIR Thrissur)
- ☞ *Mriga Sampathu, Dhana Sampathu*(AIR Thiruvananthapuram, 2002)

Other Rural development programmes - *Veettammamaarkku Vendi, Kudumbashree, Vanitha Rangam, Sthree Sakthi and Grama Shree.*

Important Agriculture oriented programmes and their timings

- a) "*Vayalum veedum*" 6.50 pm –7.25 pm
From 6.50 pm to 7.20 pm there would be interviews, documentaries, feature, etc. "*Kambola nilavanam*" follows for the next five minutes
- b) "*Krishupaadam*" Mostly on Tuesdays and Fridays (7.05 am to 7.25 am)
- c) Interaction programme: a part of *Vayalum Veedum*
- d) Farmer's choice: a part of *Vayalum Veedum*
- e) Field based special programmes (7.35 am) exclusively on FM Kannur on Wednesdays
- f) Phone-in-programme: (one per month as a part of *Vayalum Veedum* in FM Thiruvananthapuram only)

Quiz competitions for the listeners of *Krishupaadam* also conducted as a reward for the listeners. Only a person who knows the farmer intimately and who maintains good relations with field of agriculture can be a good broadcaster of the Farm and Home Programme. A commitment to the profession and training in the field are essential pre-requisites.

TYPE OF RADIO FORMATS

There are different formats followed in radio such as talks, dialogues, discussion, interviews, plays, (drama), features, lessons, quiz, skits etc.


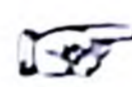








Let us discuss in details each one of these formats.

Talks: This is a very important format in radio. Here a person communicates his ideas or messages by using spoken language in an attractive form. There are three types of talks, say

1. Argumentative talks (Disputable/ Debatable talks)
2. Humorous talks (Funny/Amusing talks)
3. Expository talks (Explanatory talks)

Voice culture is very important in radio talks. The talker should not shout but should speak friendly with realism and sincerity. Normally a five-minute talk may consist of 500 to 600 words; 10 minutes talk, 1000-1200 words and 15 minutes talk contains 1500-1700 words.

Some other tips used for a successful talk are

-  Aim of the talk should be clear
-  Purpose should be specific
-  Don't tell all the points, relevant points only to be highlighted
-  Do not conduct an exhaustive talk
-  Introduction should be more interesting
-  Talker should have a good background with respect to education, knowledge, experiences and socio-economic conditions.
-  Should consider the listeners as friends and hence the talker should not use authoritative type of presentation.
-  Use only simple sentences
-  Use spoken language only
-  Good delivery, diction and presentation are must

Dialogues: Two persons will converse on a given subject or topic. The concept of redundancy should be monitored. The participant should not repeat, what the other persons said already.

Discussions: In this format two or more but not more than four participates. Anything that interest or affect the public may be suitable for this format. Listeners will be happy to listen each participant representing their views, expectations and aspirations.

Interviews: Radio interviews are very powerful. In television interview the viewer may be watching the person and his mannerism, expressions etc. in the process he may miss the message. The exact tonation of the speaker is also not there. it is only through radio interviews the listener may feel the sense of realism

There are three types of interview

1. Informative interview
2. Interpretative interview
3. Emotional interview

Play (drama)

Radio play is a beautiful format. It consists of words, music, sound effects, silence and pauses. There are two types of radio play scripts.

1. Narrative script
2. Flash back type script

Types of Play

- a) Social plays
- b) Historical plays
- c) Scientific plays
- d) Thriller plays
- e) Verse plays
- f) Humorous plays
- g) Adaptive plays

Feature: A feature is a documented programme on a single theme or subject composed and presented in an attractive format. It is a part theatre, talklet, an interview, music, commentary and so on.

TYPES OF FORMAT FOR FARM AND HOME PROGRAMME

There are different types of format suitable with respect to the farmer's interests. Some of the formats are given below with the time allotted for the programme.

- Straight talk -(*prabhashanam* in Malayalam): 5 to 8 minutes
- Interview -(*Abhimukham*) :10 to 17 minutes
- Dialogue -(*Sambhashanam*) : 10 to 15 minutes
- Panel discussion -(*Sangacharchha*) : 15 to 20 minutes
- Lessons -(*Paadangal*) :20 to 25 minutes
- Quiz -(*Prashnothary*) : 25 to 30 minutes
- Songs -(*Pattukal* –traditional farmers' songs ,local songs)
- Drama -(*Naadakam*)

Burakatha, Yekshaganom(Karnataka), Paadipandalu (Andhra Pradesh) etc. are also used for the dissemination of farming technologies to the field (Mannar and Vijayan,1996)

Communication research has pointed out that 'group listening' followed by 'discussion' produces a higher impact than 'individual listening'. It is the hope of Akashvani that small and marginal farmers and the rural poor generally can be organised in to listening forum or radio clubs for establishing a sure fire- way communication, with this vital section of the community in the villages (Vadavathoor, 2000).

The present trend is the convergence of the existing communication and broadcasting technologies into a single system is likely to benefit the users and the operators. This type of convergence will not only optimize utilization of the available bandwidth and revolutionize, infotainment, but will also make long distance communication cheap. The first step in the convergence of technologies came in the shape of the Internet. It was the result of decades of development in the fields of radio, telephony, computers and satellites (Basu, 2001).

Summary

Radio is the oldest information tool, which forms a part of the mass media. Radio covers many people in less time and cost. It forms part of broad casting journalism. It is popularly known as 'companion medium'. Among the various communication media, radio assumes significance due to its very accessibility by rich and poor as well as rural and urban. It is recognized as a literate medium for the illiterates. It helps the extension worker in providing cost effective and efficient service to farmers in addition to the various ordinary program net works. Radio scenario has witnessed a tremendous revolution from the common radio sets to the Digital Satellite radio. The types of radio include Analogue radio, Clock Radio, HAM radio, Digital Satellite radio.

Analogue radio is the common radio sets, which are very popular at the layman's level. Clock radio is very much useful for countries like India, where the majority of the population still lives in the remote villages without access to power and transport facilities

HAM radio is specially suited for the situation such as period of emergencies like earthquakes, floods, fires, accidents and pest out breaks. Digital radio is the latest radio type, though it provides more clarity with digitalised sound effects. It has the disadvantage of higher installation costs.

In India AIR is the pioneer and the most important radio network. AIR has some special audience programs, which include program for farmers, women, children and so on. Various formats of radio programs include drama, interviews, features, songs, discussions etc.

Convergence of various communication technologies in to a single system will enable us to optimise the utilization of different technologies

Discussion

Q. 1. *Whom the Indians consider as 'the Father of radio'?*

The Indian Physicist Jagadis Chandra Bose was the first to try out the wireless communication in 1895, although he did not patent his invention. One of his papers on the invention of a better detector for receiving wireless signals was published in the proceedings of the Royal Society in 1895. A contemporary of J.C. Bose, the Italian inventor Guglielmo Marconi, used the same detector for the demonstration of the transatlantic wireless communication in 1901, without even acknowledging Bose's work. Not only that Marconi commercialised his invention gaining world accolade as the inventor of the wireless telegraphy, for which he was awarded the Nobel Prize for Physics in 1909. Anyway, we the people of India should consider only J.C. Bose as the 'Father of Radio'.

Q.2. *What is meant by Radio Rice?*

Actually there is no rice variety as Radio Rice. But the 'Miracle Rice' variety IR - 8 was widely known in Tamil Nadu as Radio Rice, because the farmers of Tamil Nadu were the regular listeners of the Farm and Home programs, and several community radio sets were established or installed in all the regions of Tamil Nadu. The program broadcasted through AIR on IR 8 Rice variety was very popular among them and this rice variety, people gradually started calling it as Radio Rice, other than its original name.

3. *How HAM radio played its role during the Gujarat Earthquakes?*

As the name, Of HAM itself says 'Help All Mankind' we can realise its relevance during the period of natural calamities like earthquakes, Floods, Cyclones etc.

The Indian Radio Amateurs (HAM operators) once again rose to the occasion and proved their mettle, when they rushed to the earthquake devastated areas of the Kutch in Gujarat and quickly established wireless communication links to all the parts of the country. Nearly 50 amateur radio stations became operational

in Gujarat to handle emergency communication related to relief operations and enquires from the anxious families in the rest of the country about the well being of their near and dear ones in the effected areas. HAM radio operators from the different parts of the country volunteered their service to the government agencies, NGOs, individulas and other volunteers engaged in relief operations.

Base stations were established in all the worst effected areas, viz, Bhuj, Anjar, Gandhidham and Bhchau, the control room being at Gandhinagar along with a number of mobile stations. With the installation of the HAM, radio networks the communicational problems in the rescue operations were solved easily.

4. *What is Narrow Casting?*

It is the new concept of regional wise short range casting or location specific problem oriented subjects are presented through the Radio and TV. Instead of having a whole area approach, it is limited only to only certain pockets or regions. Eg. The first Narrow Casting programme of television for agriculture started at Palakkad (15 km range) in October 2002.

5. *What is Radio net ?*

A network of wireless equipment (HAM) using computer is called Radio net. Facilities offered by this are Bulletin board services, and radio mail or r- mail similar to Internet and e- mail

6. *Whether Radio can be considered as an audiovisual medium, instead of being treated as an audio medium ?*

Radio in the real, sense is an audio medium, which gives only sounds or voices but it may produce effective effort for action by visualising the real impact of the voice. If the script of the radio is very effective to produce a strong visualisation of the real subject of the talk, it may be considered as an audiovisual medium.

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RUBBER PLANTATION INDUSTRY AND GENDER ROLE ANALYSIS

BY

JAYANTA ROY



SEMINAR REPORT

EXTN. 651 : SEMINAR

**DEPARTMENT OF AGRICULTURAL EXTENSION
COLLEGE OF HORTICULTURE
KERALA AGRICULTURAL UNIVERSITY
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ABSTRACT

Rubber plantation industry has got profound influence on the economic and social scene of Kerala. Rubber is accepted as the most versatile industrial raw material and the industry provides vast employment opportunities through rubber plantation, small holdings of rubber cultivation and rubber based industries and related institutions. The current estimated average employment in rubber plantation is 3, 20, 800 mandays and labour intensity is 0.62 per hectare. Both men and women are engaged in the major roles in rubber sector as farmers, labourers and entrepreneurs. It is reported that 16-18% of rural women are working in the rubber plantation industry in Kerala. It is also to be noticed that 15-20% of the small holdings of rubber cultivation are owned by women in Kerala. In this context gender analysis can throw light on the category wise technological and extension needs of the farmers, labourers and entrepreneurs.

The term "gender" is to be understood as the socially constructed differences of men and women which vary over time, culture, caste, class etc. while "sex" refers to the biological differences between men and women. The gender roles are the differences in tasks, responsibilities, activities and behaviour of men and women constructed and sustained by the society and social institutions. Gender analysis can provide answers to the questions of 'who does', 'what' and 'who receives' - 'what' and 'why'. This consists of activity profile analysis, resource profile analysis and constraint analysis of the social actors in the farming system and related enterprises to identify the activities in which women and men are engaged, technologies and institutions available and constraints faced. Specific gender disaggregated information generated on the activities, needs and problems of male and female involved in the rubber plantation industry can help the development personnel in targeting the development efforts to its real users.

INTRODUCTION

Natural rubber is an important commercial crop. Botanical name is *Hevea brasiliensis*. Natural Rubber was brought to India by Sir William Henry from Brazil. In Kerala rubber occupies 15% of gross cropped which is almost 85% of National area and 94% of National Production.

After independence, Rubber cultivation played a vital role to boost up the socio-economic structure of Kerala. Major break through has been occurred in 1970 due to the industrial revolution.

Rubber plantation has got profound influence in the economic and social life of the people in Kerala. It is the back bone of rural economy as well as the most versatile industrial raw material. Rubber industry provides vast employment opportunities. The current estimated average daily employment in Rubber plantation is 3,20,80 mandays. Rubber can used for the manufacturing of 35,000 products.

GLOBAL SCENARIO IN RUBBER PRODUCTION

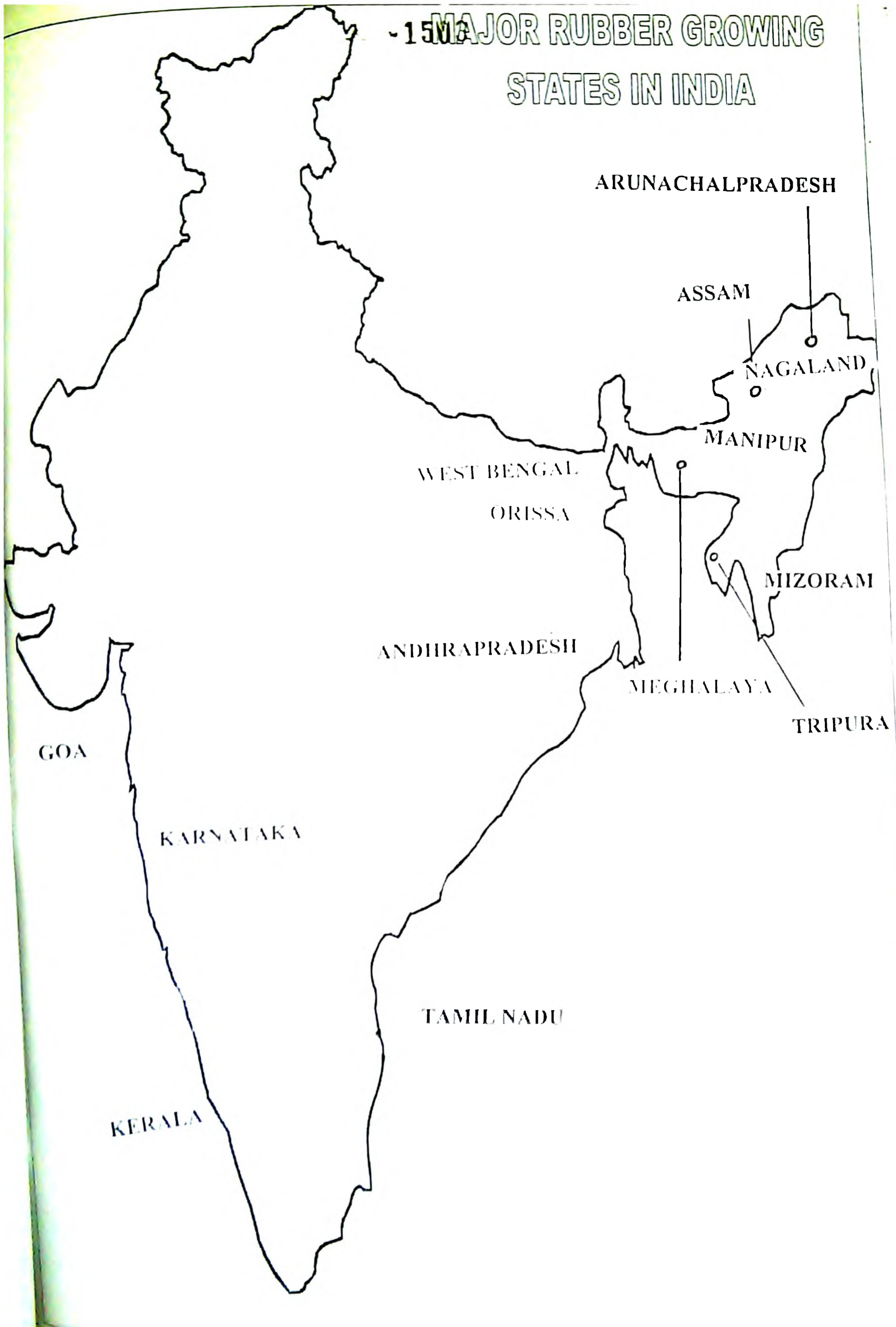
Rubber producing countries in the world are area under rubber (1000 hectares)

Country	End of	Small holdings	Estates	Total
1. Indonesia	1998	2795	549	3344
2. Thailand	1998	-	-	1972
3. Malaysia	1998	1373	195	1568
4. China	1998	-	-	618
5. India	1998	484	69	553
6. Vietnam	1997	35	240	275
7. Nigeria	1999	90	60	150
8. Brazil	1998	100	80	180
9. Sri Lanka	1998	100	58	158
10. Liberia	1999	49	60	109

Indonesia is the major rubber producing country with respect to its acreage and production.

India ranks 5th with respect to its acreage and 4th in production.

-1502- MAJOR RUBBER GROWING STATES IN INDIA



NATIONAL SCENARIO ON RUBBER PRODUCTION

Taking into consideration the status of Rubber Production in India following are the states which are generally involved with rubber production activity.

State wise total area and production of Natural Rubber in India during 1999-2000

State	Extent under rubber cultivation (ha)	Production during 1999-2000 (tonnes)
Kerala	472900	572820
Tamil Nadu	18659	21134
Karnataka	19565	13115
Goa	839	215
Maharashtra	180	74
Orissa	408	-
West Bengal	285	-
Andhrapradesh	98	-
Tripura	25380	9312
Assam	11644	2867
Meghalaya	3683	1690
Nagaland	1615	159
Manipur	1610	115
Mizoram	543	3
Arunachal Pradesh	244	24

Out of the following major rubber growing states in India, Kerala ranks first in its acreage and production.

KERALA STATE SCENARIO IN RUBBER PRODUCTION

In Kerala, the major rubber growing districts are:

1. Kannur
2. Kozhikode
3. Malappuram
4. Palakkad

MAJOR RUBBER GROWING DISTRICTS IN KERALA

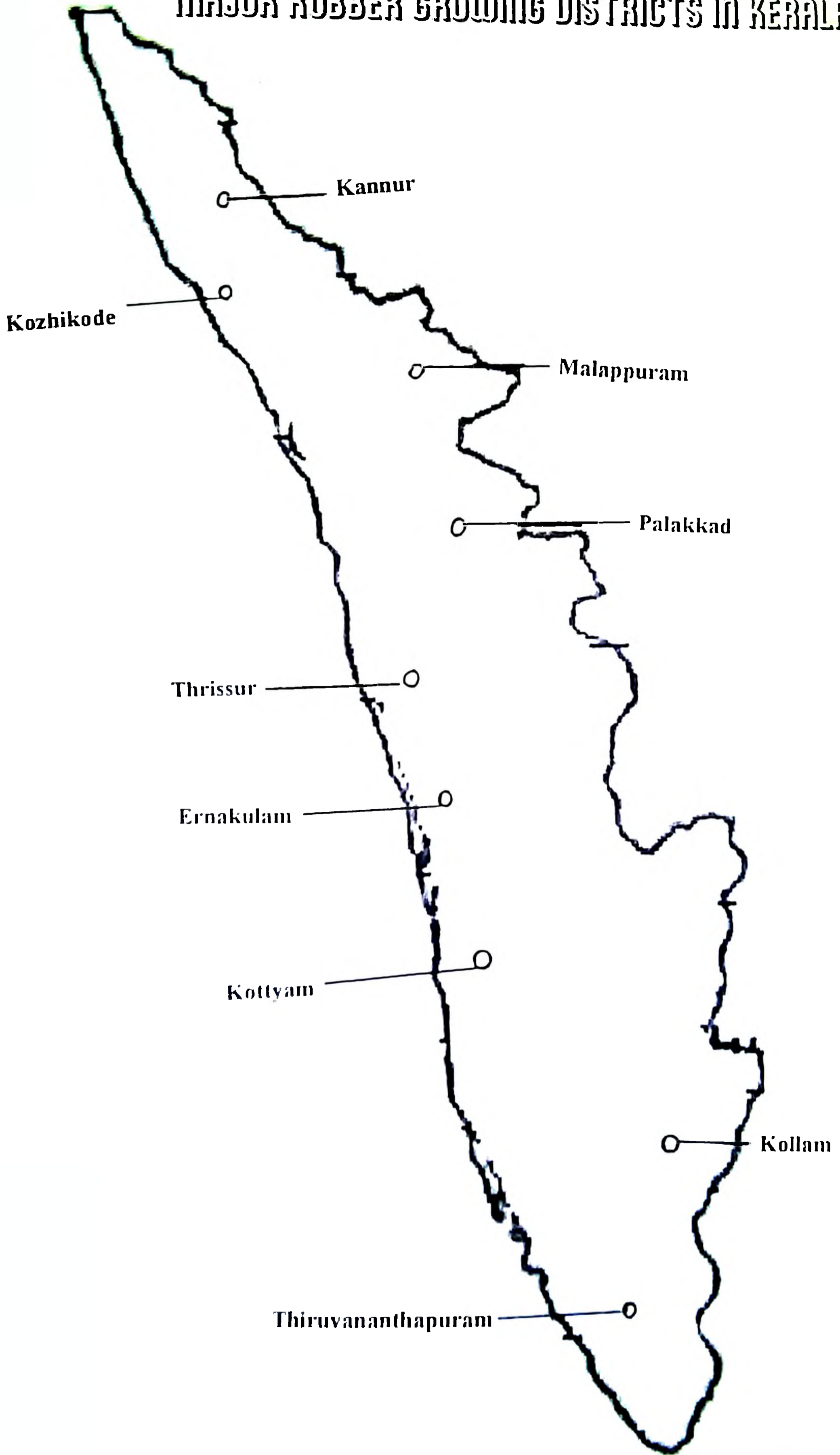
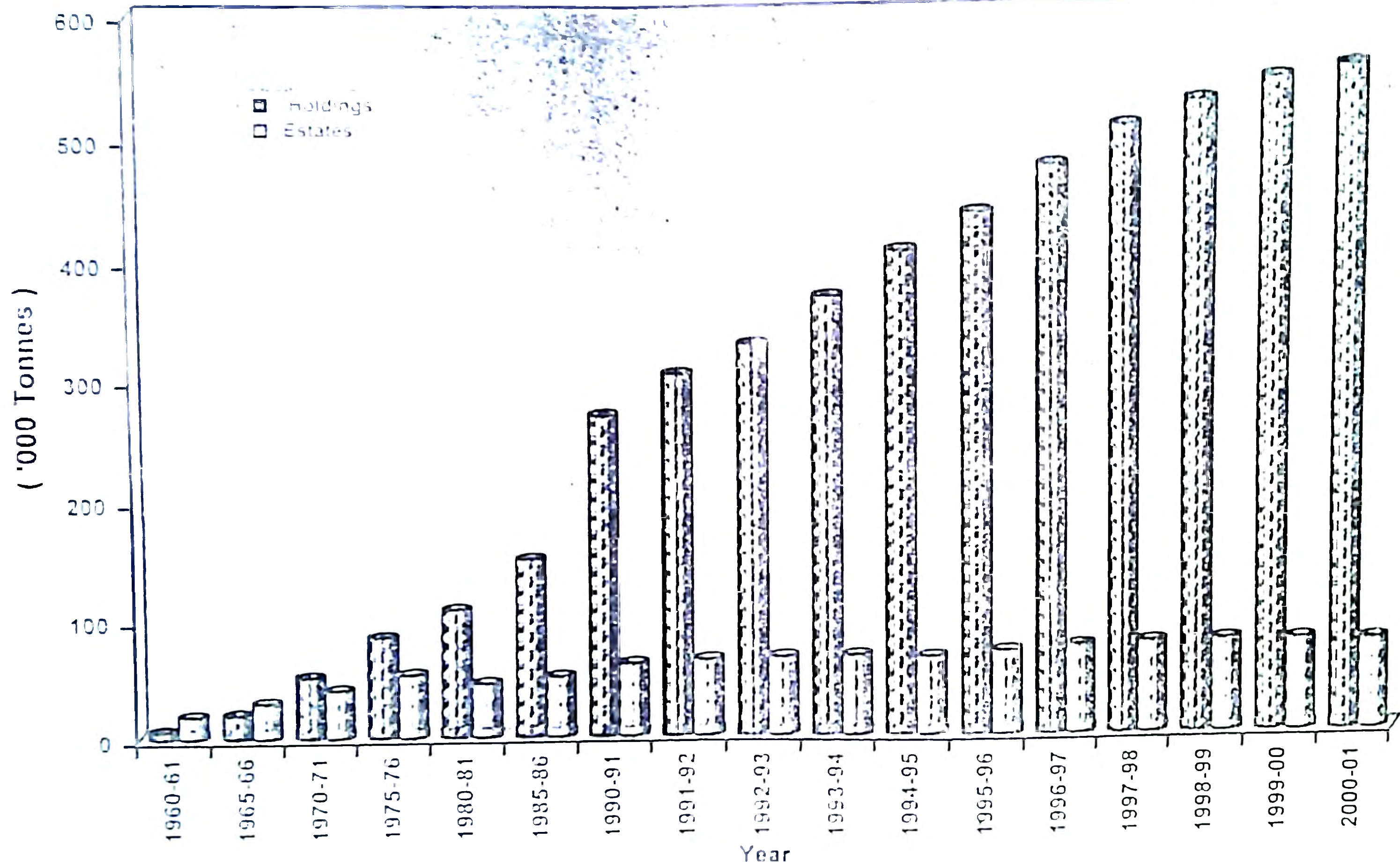


Chart 4
PRODUCTION OF HOLDINGS AND ESTATES



5. Thrissur
6. Ernakulam
7. Kottayam
8. Kollam
9. Thiruvananthapuram

In Kerala, Kottayam district ranks first in its acreage and production. In fact, Kottayam is known as the “Rubber City of Kerala”. This name could be further justified with Rubber Research Institute of India and Rubber Board Head Quarter being situated at Kottayam.

Now, the importance of Rubber Production is even more by the fact that diversification rubber industry has been initiated by “RUBCO”.

PRODUCTION OF HOLDINGS AND ESTATES

It is evident from the graph that from 1950 to 2001, there is an increase in the acreage as well as yield per hectare. But one close examination we can find that there is a sharp increase both in area and production from 1950 to 1990. This could be attributed to the fact that farmers were exposed to new research technologies like high yielding varieties, better clonal selection, improved nutrient and post management practices etc. and advanced skills in tapping, processing etc. and better market price.

But from 1990 to 2000, even though there was an increase in acreage and production, it was only in a gradual and steady manner. This was mainly due to the import policies which decreased the market price and the cultivation did not get profit as obtained earlier.

RUBBER PLANTATION (IMMATURE AND MATURE PHASE) - GENDER ROLES INVOLVED

A lot of activities and operations are taking place in the Rubber plantations. These activities are specific to different genders. Following are the activities and operation with different gender roles involve in Rubber plantation (aged upto seven years).

Rubber plantation - Gender roles involved (male, female) activities/operation in rubber plantation

Item of works	Number of mandays require per hectare area			
	Male labour (Nos)	Female labour (Nos.)	First year	Subsequent year of the immature phase
Clearing	10	-	10	-
Terracing and other soil conservation activities	45	-	40	5
Lining and pitting	71	-	71	-
Filling and planting	49	-	47	2
Fixing shade basket, propping and lime washing	10	-	10	-
Pruning and branch induction	10	-	4	6
Weeding and mulching	-	396	80	316
Manuring	-	65	5	60
Plant protection	72	-	12	60
Cover crop establishment and upkeep	-	16	13	3
Drainage and miscellaneous work	17	-	7	10
Boundary protection, fencing and footpath maintenance	45	-	17	28
Security	21	-	3	18
Total	350	477	319	508

For mature phase (annually), the main activities are manuring, spraying of oxychloride, other plant protection activities, tapping, processing, rain gourding and panel protection.

Annual labour requirement (male/female) in mature phase

Item of work	Male labour (Nos.)	Female labour (Nos.)	Number of mandays required per ha
Weeding	-	10	10
Manuring	-	5	5
Spraying of Copper oxychloride	2	-	2
Other plant protection activities	2	-	2
Tapping and processing (under 1/2 sd/2 system)	100	50	150
Rain gourding	4	-	4
Panel protection	5	-	5
Others	1	1	2
Total	114	66	180

In these two tables, it is found that different type of activities performed by both male and female which is of diversified and specific in nature. This highlights the importance of Gender Role analysis. Obviously, questionnaire, what is gender.

GENDER, SEX, GENDER ANALYSIS

1. **Gender:** Gender refers to socially constructed differences between men and women.
2. **Sex:** Sex refers to the biological differences between men and women.
3. **Gender analysis:** Gender analysis is the systematic effort to document and understand the roles of both women and men within a given social context. This is a tool of social systems analysis which seeks answer to fundamental questions as who does or uses what, how and why and who benefits and how much.

The very word "Gender" is now-a-days using common but often mistaken as related to women alone. But the term gender is to be understood as the socially constructed differences of men and women which vary over time, culture, caste, class etc. while sex refers to the biologically differences between men and women. The gender roles are the differences in tasks, responsibilities, activities and behaviours of men and women, constructed and sustained by the society and social institution. Corresponding to gender role differences, the gender relations on the power relations between men and women also vary and women always occupy a secondary status in society. Needless to say that there are differences between men and women in their access and control over production resources and benefits in the farming sector.

The three interrelated components of gender analysis methodology are:

1. Activity profile analysis
2. Resource profile analysis
3. Constraints analysis

1. Activity profile analysis

Understanding the division of labour in agricultural activities from the starting point for determining who should be involved and targeted in extension programmes. While roles vary between and within cultures, it is generally found that women and men are responsible for different, though often complementary, productive activities. Their roles may differ by type of activity such as crop, forestry, livestock, and fishery. Production as well as by stage of production, such as land preparation, planting, weeding, harvesting, crop processing, marketing and so on. Sometimes the task of women and men overlap, while sometimes they are distinctly different. The aim of activity profile analysis is to produce a clear picture on who does what? Agriculture calendars are one simple way of documenting the roles of both women and men for different crops and other productive activities highlighting seasonal patterns as well.

As women and men are not only farmers but have the roles of wives, husbands, mothers, fathers and citizens with responsibility their reproductive, domestic and community activities also need to be taken into account by extension planners and technologists. Estimate vary from region to region, but it is found that rural women work upto 15-16 hours daily while men work only 11-12 hours, a day. Because women perform more of the reproductive (nursing and taking care of children and old people) and domestic tasks in addition to their agricultural and other productive activities, women work more hours per day than men. Reproductive tanks, water and fuel collection, food processing and food preparation are particularly time consuming and are often carried out with traditional tools and process.

Through activity profile analysis scientists, extension planners and implementation can realise

- (a) The agricultural activities of both women and men in the region which can help to have appropriate technologies and targeted extension training as appropriate to their respective roles,
- (b) The inclusion of non-agricultural productive and reproductive activities of both women and men in the profile will help the scientists to identify labour

bottlenecks, highlighting areas where the introduction of improved methods or appropriate technologies would be most beneficial to overall productivity,

- (c) Time constraints related to the activities of women and men, which have implications for extension delivery methods and
- (d) Areas in need of technology generation, technology appropriation drudgery reduction etc.

2. Resource Profile Analysis

The resource profile analysis is used to delineate the resources that women and men use to carry out their activities and the benefits they desire from them. Resources include such things as land, labour, heater, technology, time, capital, skills, market information and trainings. Benefits derived from the utilization of the resources include such things as income, food, skills and status. Both access to and control over resources and benefits are often gender biased. In many regions, females one by law or traditionally not allowed to own land, cattle or housing. Women may therefore have no control a decision making power conserving these resources though they have access and use them in their daily lives, similarly in some socio-cultural contexts, access to extension is seen as a male prerogative and women are largely precluded regardless of who actually perform the agricultural tasks concerned.

The resource profile analysis can help extension scientists and implementers to understand

- (a) The resources base of both female and male farmers, especially with respect to land, credit equipment and inputs,
- (b) The relative benefits derived by women and men from their work and their utilization of resources, such as income and food and therefore,
- (c) The extension package best suited to the resources needs and constraints of both women and men so that they can participate in Extension services. For example,

group activities may be the best for women farmers so that resources can be pooled and shared to increase their bargaining power. Also, special mechanisms may be needed to ensure that women have access to credit and farm implements in order to increase their production. Example self help group and micro credit approaches, scientists can utilise these revolutions for suggesting models of better delivery of technology, resources, skills, credits, etc. through development departments and financial institution and to train the field extension functionaries.

3. Constraints Analysis

The differential impacts by gender with respect to the economic, social, environmental and institutional constraints can be identified from the information gained in the activity and resources profiles discussed above. Constraint analysis can reveal region a culture specific barriers between farmers and extension so that successful extension programme and strategies can be developed.

The farmers constraints may include illiteracy a low technology, limited resources, lack of free time, limited mobility and the socio cultural norms pertaining to male-female interactions. Identifications of training needs, technology gap, factors, related to natural resources management, related gender issues etc. of the locality that are revealed through the analysis. Can form foundation on which the objectives and programmes can be reset. Through the constraints analysis also it can be decided whether the female farmers to be in the mainstream activities of extension and its related problem. Sufficient research information on the activities of male and female farmers gained through the gender analysis as outlined each farm each base to keep the programmes as gender friendly by focussing on skill development and labour saving technologies relevant to men and women's work in the farming system. The problem of biased attitudes of scientists and extension workers in reaching women can be solves with the conviction they are able to derive through gender analysis

It is based on the gender role analysis that which comprises of activity profile, resource profile and constraint analysis, the judicious gender resource allocations, specially in case of the much neglected and marginalised but the most

important women resource is made for the overall sustainable development of rubber plantation industry.

The importance of gender role analysis is very important that it is based on these gender role identifications for the transfer of technology and the motivations of gender friendliness, many training and developmental programmes are undertaken by the Rubber Board, specially for women.

Some of these are in the field of post harvest technology of Rubber, economic activities, and health and hygiene programmes.

Different training programmes were arranged for the women groups organised under different rubber producers societies for capacity building and quality upgradation.

1. **Tapping and Processing:** To transfer the technical skill required for tapping rubber trees and to process the latex into higher grade sheets. This provides employment opportunity to women labourers and women small holders can do tapping and processing in their own holdings. Training programmes were arranged by the NGO's and RPSs, technical support given by Rubber Board.
2. **Beekeeping:** The women groups were given training for rearing of bees, collection of honey, division of colonies etc. under the technical guidance of Rubber Board, Khadi and Village Industries Corporation and other approved agencies.
3. **Production of handicraft item, furniture and toys with rubber wood** Women groups formed under RPSs were given training by the NGO that has competency in production of these articles - women were trained to work on different types of machines required for manufacture of wooden articles.
4. **Embroidery Making** The NGO has employed skilled people and given training to the women groups for stitching and garment making with embroidery work

TECHNO-FINANCIAL ASSISTANCE

Economic Activities

Women have been given financial and technical assistance to take up activities for additional income generation

- a) **Beekeeping (Apiculture):** Each trained women has been supplied with four bee units with all the required accessories. Units are established in rubber small holdings. This provides additional income to the women by tapping this resources available in rubber plantations.
- b) **Rubber sheet Processing units:** Trained women groups of marginal farmers are given assistance to construct smoke home and to motorise the rubber available to do group processing. They can process the latex produced in their own holdings to higher grade sheets fetching better price. They can do processing on contract basis, for additional income generation.
- c) **Production of handicraft items, toys and furniture with rubber wood:** All the trained women groups have been given assistance to purchase the machinery required to set up manufacturing units of their own. Working capital also has been provided which is to be revolved within the group. Women of low income group has been given employment opportunity, use of rubber wood also can be promoted through his activity.
- d) **Poultry and Goat Rearing:** Women self help groups have been formed under RPSs and selected members from the groups have been given chicks or goats after giving necessary training for rearing the animals. The assistance given by the Rubber Board is as a loan to the individual to be repaid to the group to form a revolving fund.
- e) **Cultivation of banana plants:** Women labourers and marginal farmers have been given training and assistance to cultivate banana for home-stead planting as well as for interplanting in marginal holdings.
- f) **Coconut cultivation:** Women of low income group have been supplied with coconut seedlings for home stead planting. The training required for the cultivation also had been given
- g) **Women marginal farmers were given a small percentage of the expenditure as assistance for purchase and installation of rubber sheeting rollers for quality upgradation of their own produce as well as for doing sheeting for others on a piece rate basis. This provides some additional income to the women folks.**

HEALTH AND HYGIENE PROGRAMMES

Programmes implemented were to improve the health and hygiene status and to reduce the drudgery of women.

- a) **Sanitary latrines:** Women whose family do not own a sanitary latrine have been given assistance for construction of a UNDP model sanitary latrine.
- b) **Biogas plants:** The effluent generated while sheet processing creates a foul odour. To keep the environment clean, this effluent can be treated in a biogas plant to generate gas for cooking. Women have been given assistance to set up bio gas plants, to generate gas from rubber effluent for cooking.
- c) **Supply of fuel efficient stoves:** Women of low income group have been given assistance for purchase of fuel efficient stoves to reduce their drudgery and to improve health.
- d) **Well for drinking water:** Women have been given assistance for digging of well for pure drinking water. This also is to reduce the drudgery of women and for improvement of the health of the family.
- e) **Rain water harvesting:** Women from places which experience severe scarcity of drinking water have been given assistance to construct tanks which tap and purify rain water. This water can be used as drinking water.
- f) **Health camps:** Health awareness and medical check up camps were conducted exclusively for women.

CONCLUSION

It is observed that most of the efforts of development remain as male oriented but one should not ignore the contributions of both women and men that are substantial and essential for the development of Rubber plantation. Gender bias really hinder and affect the goals of sustainable development.

It is a fact that rural women which constitute 80 per cent of the work force in Indian agriculture cannot be neglected if India is to develop socially, economically and politically.

The importance of building gender perspective among the different levels of the Rubber plantation industry is to equip personnel to take up and formulate, the right kind of policies, technologies and programmes which will help in avoiding gender bias and increasing efficiency, which will aid the ecofriendly development of the Rubber plantation industry.

DISCUSSION

1. *Day by day the price of Rubber sheet is decreasing, so how the rubber growers sustain their mental stability?*

Rubber has taken step to reduce the cost of cultivation and the cost of production (Rubber sheet).

2. *Whether India import the rubber from other country. The production of rubber of Indian can fullfil national demand*

Yes. India import the rubber sheet and rubber product, after GATT agreement.

No, present production of rubber cannot fullfil the national demand.

3. *Whether is there any award given by Rubber Board for the best performance of Rubber Producer's Society?*

Yes, from 1997 onwards the Board has instituted "Suvarnasangham" award to be presented once in two years to the best performing Rubber Producer's Society. The objective of the award give proper incentive and motivation to the RPSs which perform well and serve the growers to the desired extent in transfer of technology and enhancement of production and productivity. The award include Rs.2 lakhs in cash, a memento and a citation. The recipient of the first award was illithode RPS in Ernakulam District. The best RPS selected for 1999-2000 was Janatha RPS, Ainicompu in Kottayam District.

4. *In these any small rubber based industry in Kerala, where only the involvement of women.*

No, there is no such industry, where only women are involved. Women are working so many rubber based industry like rubber band, fingertips etc.

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