Marketing of Chillies

Problems & Prospects

Agriculture Marketing Information Service (AMIS)

Foreword

A series of reports on kitchen items including Potato, Onion, Tomato, Chili and Garlic, prepared on the direction of Mr. Fayyaz Bashir, Secretary Agriculture, Punjab, to identify problems prevailing in the supply chain of these items of daily use. This report was completed by Dr. Sofia Anwar at the pattern planned for the whole series. The national data has been sorted out and comparison is made with the international situation to assess the gap. Secretary agriculture has been kind enough to spare time to discuss these reports in detail.

In Pakistan chillies were grown on an area 120.34 million acres in 2004-05 with the production of 90.50 thousand tones, which was less than the last year. Overall acreage and production under chillies has declined over time. The major production of chillies arrives from Sindh i.e. 83% whereas Punjab, which is the major consumer, contributes only 10% of total production. On the yield front Pakistan shows a gloomy picture. Per acre yield can be increased through adoption of high yielding varieties. Prices are lowest during April to May when the Rabi crop from Sindh comes in market. Erratic price fluctuations both cyclical and seasonal are observed every year. Value addition and improvement in the storage of Chillies can help to stabilize prices and provide incentive for increase in chillies production as well as its yield. Harvest & Post harvest management is another area which can bring positive changes. The Suggestions to Regularize Supply and Prices are only to give line for new research and the detailed measures may be explained by the experts of pertinent field.

The suggestions to overcome different constraints and bottlenecks in supply chain are only indicative; detail measures can be refined and fine tuned only by the experts in relevant field.

Efforts of Mr. Muhammad Irfan Bhatti for collection and analysis of information for completion of this report are acknowledged.

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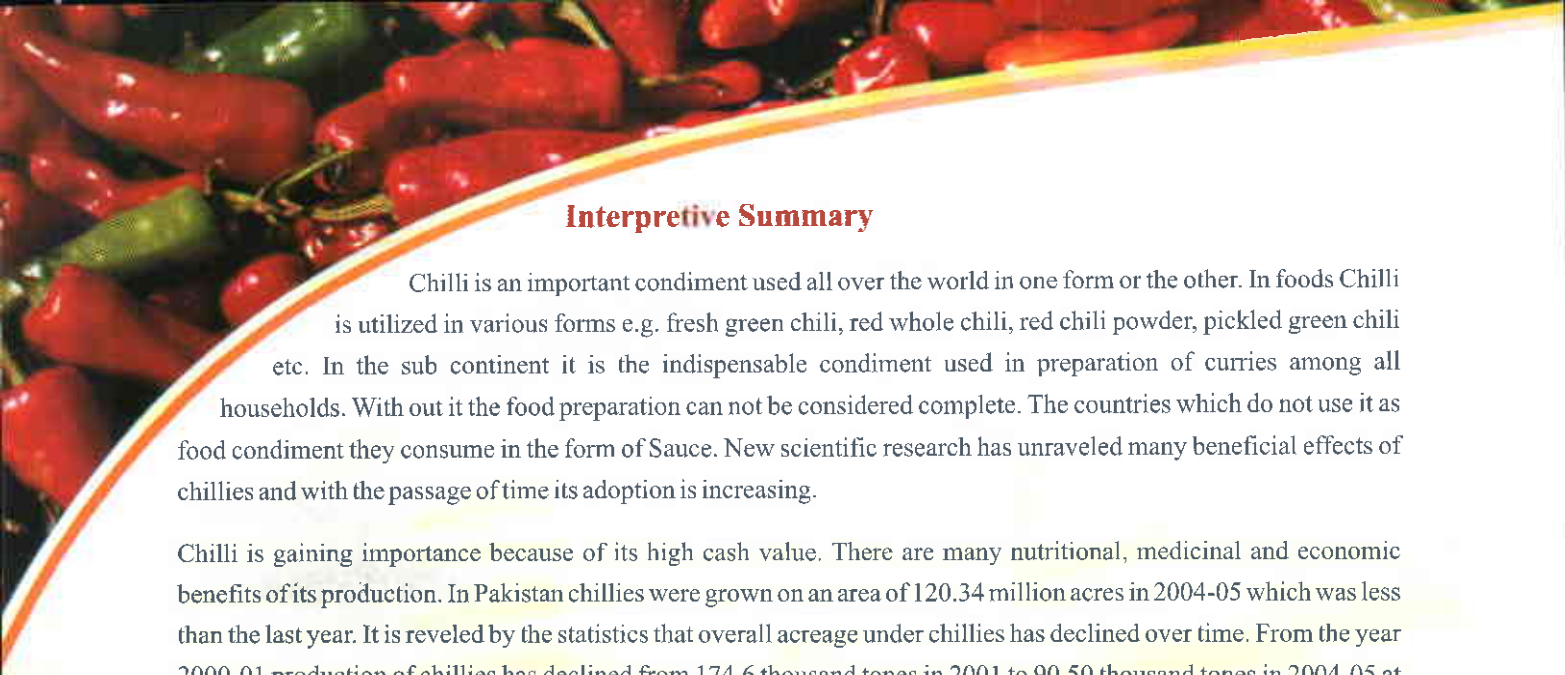


Interpretive Summary

Chilli is an important condiment used all over the world in one form or the other. In foods Chilli is utilized in various forms e.g. fresh green chili, red whole chili, red chili powder, pickled green chili etc. In the sub continent it is the indispensable condiment used in preparation of curries among all households. With out it the food preparation can not be considered complete. The countries which do not use it as food condiment they consume in the form of Sauce. New scientific research has unraveled many beneficial effects of chillies and with the passage of time its adoption is increasing.

Chilli is gaining importance because of its high cash value. There are many nutritional, medicinal and economic benefits of its production. In Pakistan chillies were grown on an area of 120.34 million acres in 2004-05 which was less than the last year. It is reveled by the statistics that overall acreage under chillies has declined over time. From the year 2000-01 production of chillies has declined from 174.6 thousand tones in 2001 to 90.50 thousand tones in 2004-05 at the rate of 9.6% per annum. Out of total country acreage more than 83% was located in Sindh contributing more than 85% of total production. Some times price distortion is noted on account of poor crop due to natural calamities and wide variation in price is experienced. Pakistan earned Rs1.127 billion during 2003-2004 by exporting red chilli powder, whereas, export earnings from all fruits were Rs5.912 billion during the same period. This reveals the potential of this non-staple crop. The potential for increasing exports of whole, powder and crushed chillies is enormous, provided the stringent quality requirements of importing countries are met through an integrated approach with the collective efforts of farmers, processors and traders.

Problem is analyzed as follows:

- Low and stagnating yield of chillies
- Little contribution of Punjab in overall production of chillies
- Heavy price fluctuations
- Lack of value addition

Suggestions to Regularize Supply and Prices

- Evolving new high yielding and disease & pest resistant varieties
- Cultivation of chilli in both Rabi & Kharif seasons in Punjab
- Improvement in harvest and post harvest management practices leading to better quality and more yields
- Timely release of area and production estimates
- Collection and dissemination of market intelligence reports
- Introduction of new advanced techniques for processing like sauce formation etc.
- Introduction of proper storage techniques to address Afflatoxin in chillies

Introduction

The Capsicum genus, chili, represents a diverse plant group, from the nightshade family, Solanaceae that includes tomato, potato, tobacco, and petunia. The name comes from Nahuatl via the Spanish word chilli. These terms usually refer to the small and hotter types of capsicum; the mild larger types are called bell pepper. It is a perennial small shrub in suitable climatic conditions. Chili fruits are considered vegetables, but are berries botanically.

Capsicum, chilli, is an essential ingredient in the fastest growing food sector in the World. In addition, many of the new uses of chilli are hidden within manufactured products. Chilli is being used as a food flavoring, a coloring agent, a pharmaceutical ingredient, and in other innovative ways. The use of the numerous cultivars within the five domesticated species has grown exponentially.

Chilli is one important spice used all over the world in one form or the other. Chilli both in ripe and green fruit stage is an indispensable spice in Asian cuisine. In foods Chilli is utilized in various forms e.g. fresh green chili, red whole chili, red chili powder, pickled green chili etc. In the sub continent it is the indispensable condiment used in preparation of curries among all households. With out it the food preparation can not be considered complete. The countries which do not use it as food condiment they consume in the form of Sauce

History

Chili peppers have been a part of the human diet in the America since about 7500 B.C. They were domesticated there between 5200 and 3400 B.C. one of the first cultivated crops in the America. Chili peppers are thought to have been domesticated at least five times by prehistoric peoples in different parts of South, Central and North America, from Peru in the south to Mexico in the north and parts of Colorado and New Mexico (Ancient Pueblo Peoples).

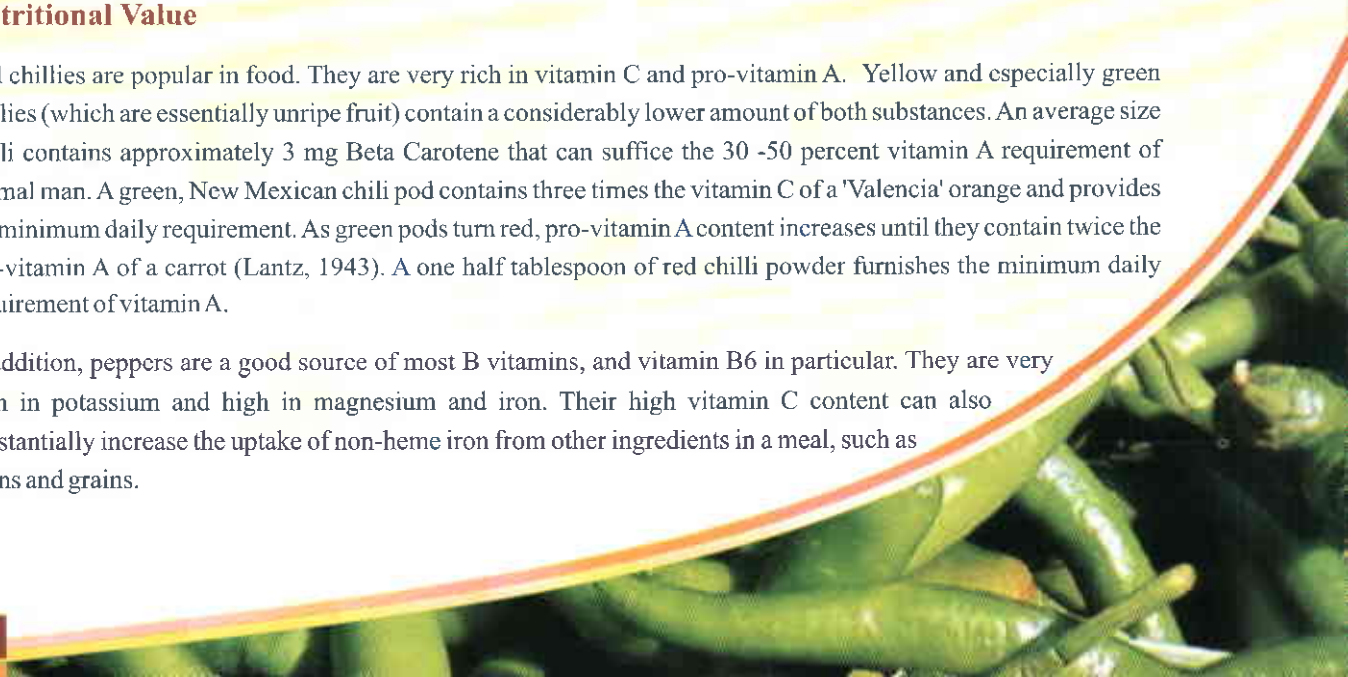
Christopher Columbus was one of the first Europeans to encounter them (in the Caribbean), and called them "peppers" because of their similarity in taste though not in appearance with the Old World peppers of the Piper genus. Diego Álvarez Chanca, a physician on Columbus' second voyage to the West Indies in 1493, brought the first chili peppers to Spain, and first wrote about their medicinal effects in 1494.

From Mexico, at the time the Spanish colony that controlled commerce with Asia, chili peppers spread rapidly into the Philippines and then to India, China, Korea and Japan with the aid of European sailors. The new spice was quickly incorporated into the local cuisines.

Nutritional Value

Red chillies are popular in food. They are very rich in vitamin C and pro-vitamin A. Yellow and especially green chillies (which are essentially unripe fruit) contain a considerably lower amount of both substances. An average size chilli contains approximately 3 mg Beta Carotene that can suffice the 30 -50 percent vitamin A requirement of normal man. A green, New Mexican chili pod contains three times the vitamin C of a 'Valencia' orange and provides the minimum daily requirement. As green pods turn red, pro-vitamin A content increases until they contain twice the pro-vitamin A of a carrot (Lantz, 1943). A one half tablespoon of red chilli powder furnishes the minimum daily requirement of vitamin A.

In addition, peppers are a good source of most B vitamins, and vitamin B6 in particular. They are very high in potassium and high in magnesium and iron. Their high vitamin C content can also substantially increase the uptake of non-heme iron from other ingredients in a meal, such as beans and grains.



Dry Chilli Fruit Contains

Crude fiber	**18-40%**
Protein	**10-25%**
Oleoresin	**8-16%**
Capsaicin	**0.2-1.5%**
Coloring matter	**0.2-0.5%**
Ascorbic acid	**0.05-0.25%**
Mineral matter	**5-8%**
Moisture	**8-10%**
Sugars	**------**
Cholesterol	**------**

Varieties of Chillies

There are five main varieties of chilli:

Capsicum annum

These are the most commonly cultivated species and include varieties such as the Bell pepper, Jalapeno & Cayenne. Their name is a bit misleading as infact they are perennials, and with a bit of care and attention can be over wintered.

Capsicum frutescens

These are smaller bushy plants, the most popular variety of which is tabasco (the main ingredient of the famous sauce). The pods are usually quite small, Prolific in number and grow 'upside down' or pointing upwards!

Capsicum chinense

The name of these plants is derived from their supposed country of origination, China, though many believe they originated from South America.

Capsicum pubescens

These are quite rare but can be easily be distinguished by their purple flowers. The pear shaped fruits are perfectly edible though they can be tricky to grow.

Capsicum baccatum

These plants (also known as Ajis) tend to produce smaller berry like fruit but tend to be fast growing and fairly easy to grow.

Ornamental Chillies

A small group of chilies can be classified as ornamental. Although edible, ornamentals are grown primarily for

their unusual pod shapes or for their dense foliage and colorful fruits. Ornamental chilies can have all the colors of the rainbow, often displaying pods in four or five colors on the same plant at the same time (Bosland et al. 1994). In the past, they have been called Christmas peppers because of the bright red fruits during the holiday season. Examples of these include Thai Ornamental, Black Pearl, Marble, Numex Twilight, and the Medusa pepper. Numex Twilight is a green plant which produces fruit starting purple, then ripening to yellow, orange, and red, meaning that the plant actually has every color of the pigment color wheel except blue. Black Pearl has black leaves and round red fruit.

Decorations, such as wreaths, made with dehydrated chili are popular in the southwestern United States, and are a major tourist product. A tradition in New Mexico is to harvest mature red chilies and string them into colorful strings (ristras). The ristra is hung near the entrance of the house as a symbol of hospitality. Ornamental chilies have become an innovative way for small farmers to produce a high-value alternative crop.

How Hot?

The substances that give chili peppers their heat is capsaicin (8-methyl-N-vanillyl-6-nonenamide) and several related chemicals, collectively called capsaicinoids. The "heat" of chile peppers is measured in Scoville units unsurprisingly named after it's inventor William L Scoville. The higher the Scoville Heat Units (SHU) the hotter the pepper. Here is a rough guide to some of the more popular varieties:

Varieties	Scoville Units
Bell Peppers	0
Jalapeno	5,000
Cayennes	4,000
Tabasco	20,000 > 50,000
Habanero	100,000 > 300,000
Red Savina	350,000 > 575,000
Naga Morrich	900,000
Anti bear Pepper spray	2,000,000

Oleoresin permit better distribution of color and flavor in food as compared to chilli powder. The food industry prefers to use highly colored and less pungent chillies for preparation of oleoresins. That is why in food and beverage industries, chilli has acquired a great importance in the form of oleoresin. Oleoresin is used in preparations of processed products and also incorporated into a number of pharmaceutical formulations. Demand for high quality oleoresin is increasing in the international market. A new variety G-4 (Bhagyalakshmi) released from Lam farm, Guntur contains high oleoresin content (111 ASTA units).

Paprika is defined in the United States as a sweet, dried, red powder. This mild powder can be made from any type of C. annuum that is non-pungent and has brilliant red color. Color is very important in paprika and chilli powder. Paprika and paprika oleoresin are currently used in a wide assortment of foods, drugs, and cosmetics, as well as for improving the feather color of flamingoes in zoos or koi in aquariums

World Chillies Area & Production

From last five years world production of chillies is swinging around 24 million tons. India is the main producer contributing about half of the world chilli production getting from 23 million acres of land. Pakistan is the 4th largest producer of the chillies and contributes about 4-5 percent of world production. In the area harvested under chillies Pakistan is ranked 5th with an average 128 thousand acres for the last five years. It is clear from the statistics that over the last five years there was no significant change in the area coverage and production in main chilli producing countries. Pakistan has followed the same trend as for both area and production pendulum is swinging between heights with insignificant difference.

Area in 000 acres

Sr. No.	Countries	2001	2002	2003	2004	2005	%age Share
1	India	2323	2323	2323	2323	2323	47.17
2	Ethiopia	704	704	717	717	717	14.55
3	Bangladesh	432	420	420	401	401	8.14
4	Myanmar	243	267	267	267	267	5.42
5	**Pakistan**	**120**	**139**	**138**	**95**	**147**	**2.98**
6	Viet Nam	124	124	124	126	126	2.56
7	China	86	88	89	89	90	1.83
8	Mexico	84	84	84	84	84	1.71
9	Nigeria	75	75	75	75	75	1.53
10	Romania	74	74	74	74	74	1.51
Top Ten		4266	4298	4310	4251	4304	87.39
Others		581	606	611	617	621	12.61
World		4847	4905	4921	4868	4925	100.00

Source: FAO

World Chilli Production

'000' Tones

Sr. No.	Countries	2001	2002	2003	2004	2005	%Age Share
1	India	1040	1100	1100	1100	1100	44.33
2	China	215	220	230	235	240	9.67
3	Bangladesh	141	136	137	138	138	5.56
4	**Pakistan**	**93**	**99**	**96**	**90**	**122**	**4.91**
5	Ethiopia	115	115	116	116	116	4.68
6	Viet Nam	77	77	77	79	79	3.16
7	Hungary	60	57	60	70	79	3.02
8	Myanmar	56	69	70	70	70	2.82
9	Mexico	55	55	55	55	55	2.22
10	Nigeria	48	48	48	48	48	1.91
Top Ten		1899	1976	1989	2000	2042	82.29
Others		420	434	437	437	439	17.71
World		2320	2409	2426	2437	2481	100.00

Source: FAO

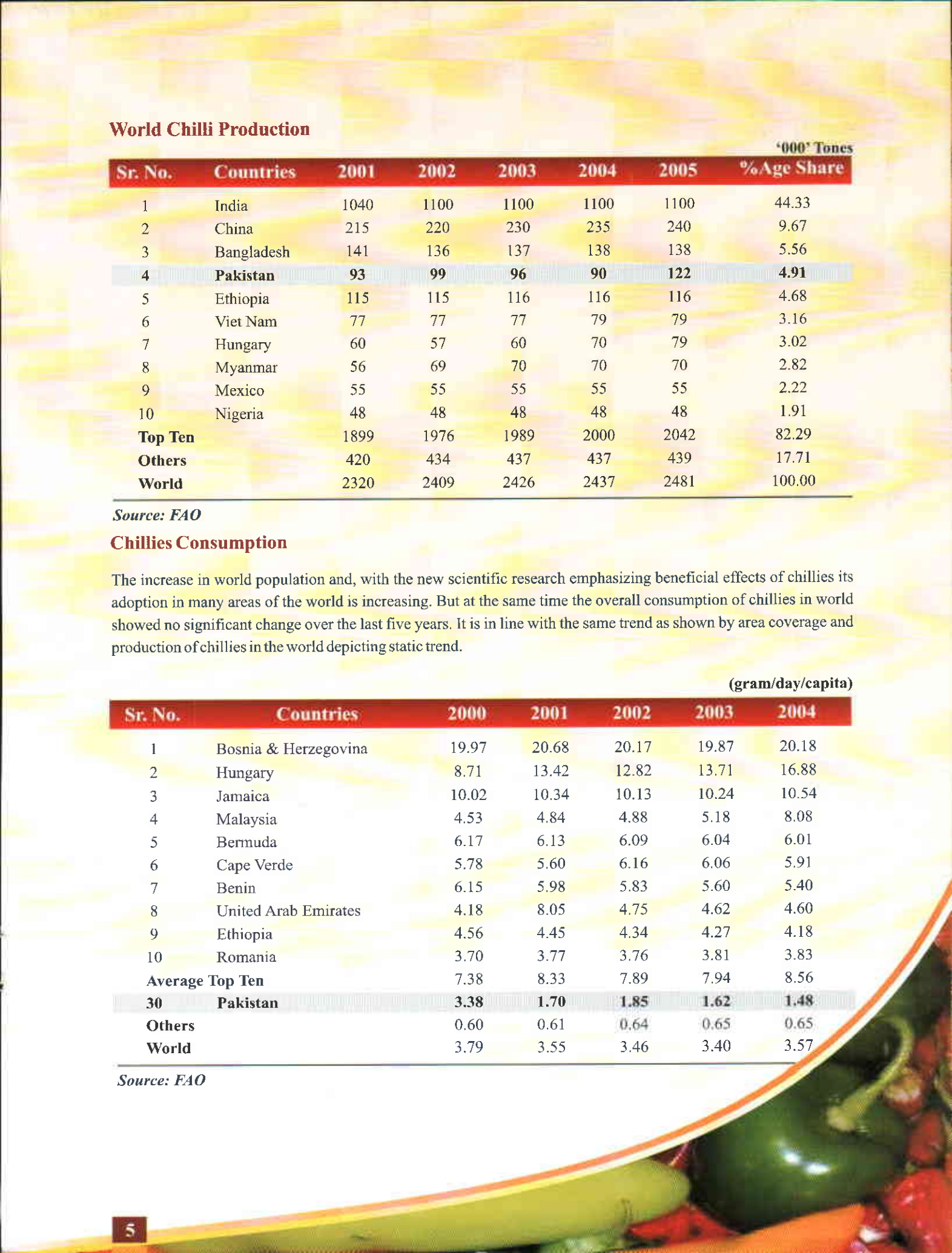
Chillies Consumption

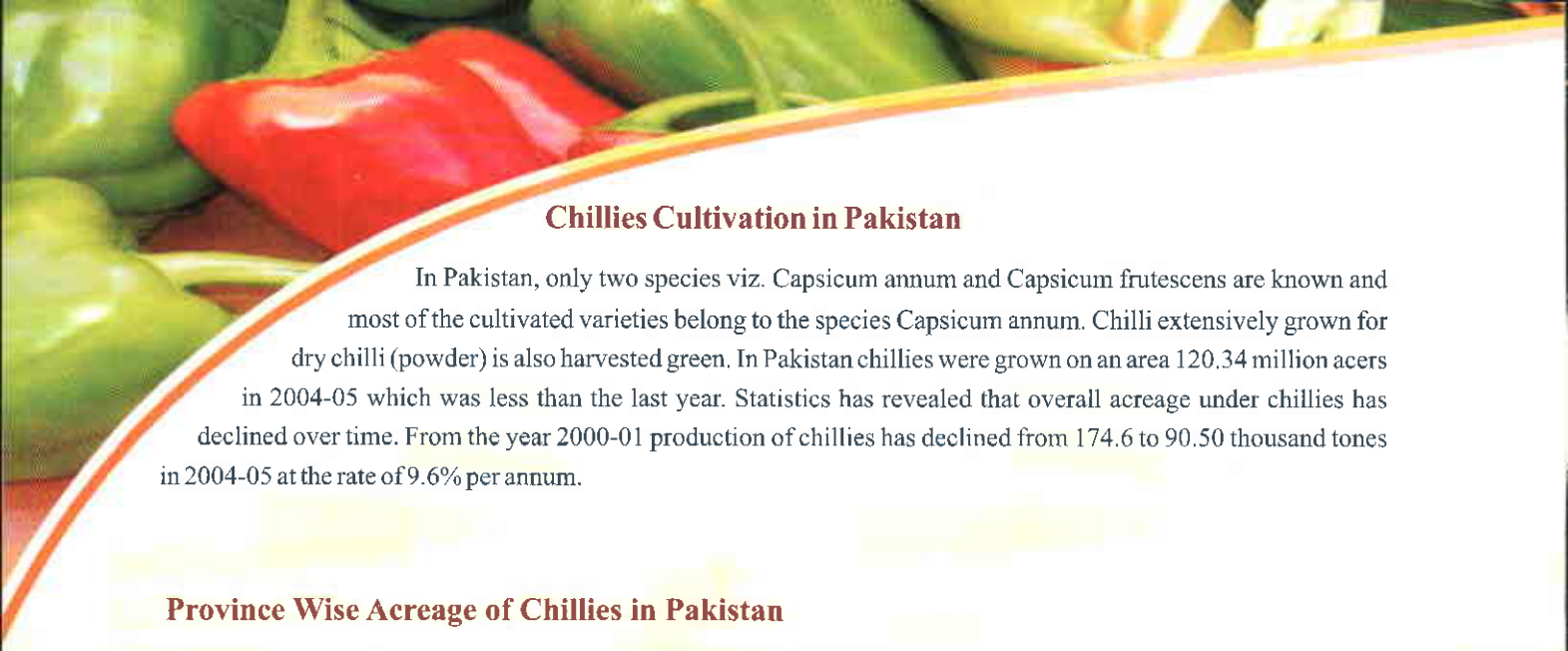
The increase in world population and, with the new scientific research emphasizing beneficial effects of chillies its adoption in many areas of the world is increasing. But at the same time the overall consumption of chillies in world showed no significant change over the last five years. It is in line with the same trend as shown by area coverage and production of chillies in the world depicting static trend.

(gram/day/capita)

Sr. No.	Countries	2000	2001	2002	2003	2004
1	Bosnia & Herzegovina	19.97	20.68	20.17	19.87	20.18
2	Hungary	8.71	13.42	12.82	13.71	16.88
3	Jamaica	10.02	10.34	10.13	10.24	10.54
4	Malaysia	4.53	4.84	4.88	5.18	8.08
5	Bermuda	6.17	6.13	6.09	6.04	6.01
6	Cape Verde	5.78	5.60	6.16	6.06	5.91
7	Benin	6.15	5.98	5.83	5.60	5.40
8	United Arab Emirates	4.18	8.05	4.75	4.62	4.60
9	Ethiopia	4.56	4.45	4.34	4.27	4.18
10	Romania	3.70	3.77	3.76	3.81	3.83
Average Top Ten		7.38	8.33	7.89	7.94	8.56
30	**Pakistan**	**3.38**	**1.70**	**1.85**	**1.62**	**1.48**
Others		0.60	0.61	0.64	0.65	0.65
World		3.79	3.55	3.46	3.40	3.57

Source: FAO





Chillies Cultivation in Pakistan

In Pakistan, only two species viz. Capsicum annum and Capsicum frutescens are known and most of the cultivated varieties belong to the species Capsicum annum. Chilli extensively grown for dry chilli (powder) is also harvested green. In Pakistan chillies were grown on an area 120.34 million acers in 2004-05 which was less than the last year. Statistics has revealed that overall acreage under chillies has declined over time. From the year 2000-01 production of chillies has declined from 174.6 to 90.50 thousand tones in 2004-05 at the rate of 9.6% per annum.

Province Wise Acreage of Chillies in Pakistan

Area In "000" Acers

Year	Punjab	Sindh	N.W.F.P.	Balochistan	Pakistan
2000-01	25.45	178.17	0.74	4.45	208.81
2001-02	19.52	95.38	0.74	4.70	120.34
2002-03	18.04	117.13	0.74	3.46	139.37
2003-04	15.82	115.89	0.99	5.19	137.89
2004-05	12.85	100.08	1.73	5.68	120.34

Source: Agriculture Statistics of Pakistan

Province Wise Production of Chillies in Pakistan

"000" tones

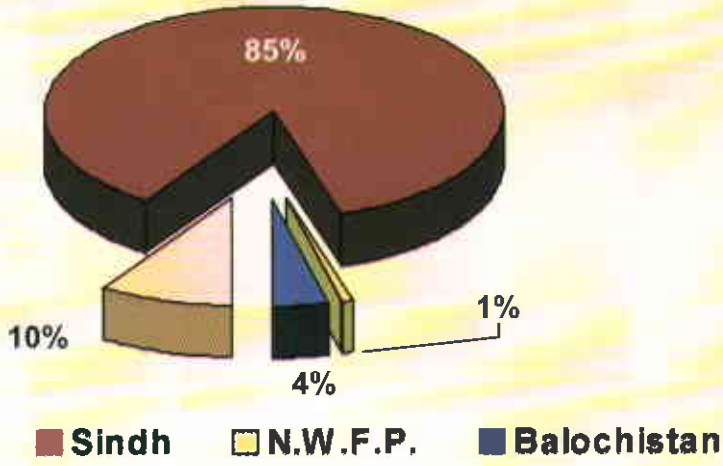
Year	Punjab	Sindh	N.W.F.P.	Balochistan	Pakistan
2000-01	18.60	153.00	0.40	2.60	174.60
2001-02	13.50	76.60	0.40	2.80	93.30
2002-03	12.00	84.50	0.40	2.00	98.90
2003-04	10.80	82.20	0.40	3.00	96.40
2004-05	8.60	77.70	0.80	3.40	90.50

Source: Agriculture Statistics of Pakistan

Province wise Production Share of Chillies Crop for Last 5 Years

Depending upon the diversity in sowing period of chillies crop in Pakistan the commodity supply remains available throughout the year from various ecological regions into various markets of the country. Sindh is the largest contributor in chillies production having a share of about 85 % followed by Punjab, Balochistan and NWFP with a share of 11, 3 and 1 percent respectively. Province-Wise Production Share of chillies are Presented in the Chart

Production Share of Chillies



District Wise Area & Production of Chilli in Punjab for 2005-06

Area in Acre
Production in "000' tones

Sr. No.	Countries	Irri		Un-Irri		Total		%age
		Area	Prod.	Area	Prod.	Area	Prod.	Share
1	Pakpattan	1424	1060	0	0	1424	1063	**11.38**
2	Kasur	1512	1016	0	0	1512	1016	**10.88**
3	Vehari	1300	898	1	0	1301	898	**9.61**
4	Multan	1000	720	13	3	1013	723	**7.74**
5	Khanewal	900	638	10	3	910	641	**6.86**
6	Sahiwal	910	577	0	0	910	577	**6.18**
7	Bahawalnagar	850	508	0	0	850	508	**5.44**
8	Okara	593	443	0	0	593	443	**4.74**
9	Sheikhupura	594	406	0	0	594	406	**4.35**
10	R. Y. Khan	600	381	1	0	601	381	**4.08**
Top Ten		9683	6650	25	6	9708	6656	**71.25**
Others 22 Distriets		4470	2673	48	13	4518	2686	**28.75**
Total Punjab		14153	9323	73	19	14226	9342	**100,00**

Source: Crop Reporting Service Punjab

World Yield of Chillies

Reunion (island) and caperverde are 52th and 50th respectively in chillies production at world level but in per acre yield both lead the world with more than 5.9 ton/arce, that is more than 3 times higher as compared to world average yield i.e. 1.7 ton/acre.

At the world scenario Pakistan has a prominent position in production and area coverage under chillies. But on the yield front Pakistan shows a gloomy picture as we are ranked at 21th position in the chillie producing countries. There is wide gap between chillies yield level in Pakistan and high yielding countries that is about 5 times more than ours.

Leading Countries in Chillies Yield

(Kg/acre)

Sr. No.	Countries	2001	2002	2003	2004	2005
1	Reúnion	5754	4603	6173	6276	5886
2	Cape Verde	5203	5396	5396	5396	5396
3	Hungary	3733	3839	4047	4358	4336
4	Morocco	4047	4047	4047	4047	4047
5	Senegal	3580	3580	3243	2225	3241
6	Bosnia & Herz.	3035	3035	3035	3035	3035
7	Martinique	2997	2997	3008	3008	3008
8	China	2486	2508	2585	2642	2661
9	Grenada	2361	2361	2361	2361	2361
10	Jamaica	2004	2004	2004	2004	2004
Average		3520	3437	3590	3535	3597
21	**Pakistan**	**774**	**709**	**699**	**953**	**830**
Others		596	598	617	594	594
World average		1630	1581	1635	1694	1674

Source: FAO

Pakistan Yield of Chilles is below the world average i.e. 0.8 tones per acre as compared to that of 1.6 for the world, whereas the highest yield received by Reunion is 5.8 tone per Acre. There is great scope of increasing production from the same area by increasing per acre yields. Most of the major producers are getting yield of more than 4.0 Tones per Acre. The yield has declined from 86.5 (1994-95) to 55.8 thousand tons (2003-04).This decline in yield is due to a number of factors including poor quality seed, mal-cultural practices and diseases like viruses, collar rot and phytophthora root rot.

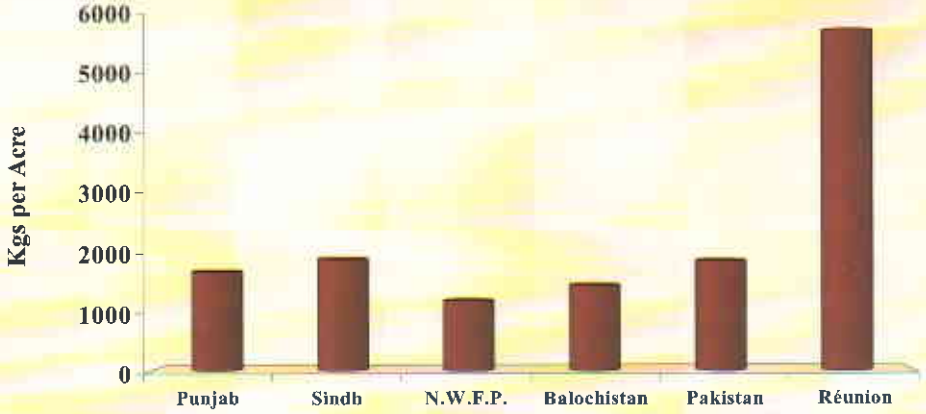
Chillies Yield Comparison

(Kgs/Acre)

Year	Punjab	Sindh	N.W.F.P.	Balochistan	Pakistan	Réunion
2000-01	731	859	539	584	836	5754
2001-02	665	721	540	578	775	4603
2002-03	683	709	405	578	710	7173
2003-04	669	776	462	598	699	6276
2004-05	669	776	462	598	752	5886
Average	684	768	482	587	754	5739

Source: FAO

Comparison of yield between Pakistan & World Yield leading country



The main reasons for the low yield of chillies are the non adoptability of the high yielding varieties coupled with poor farm management practices. The plant of chillies is very delicate and susceptible to extremes of weather. In addition whit fly attack causes virus infestations to the chilli plant and whole crop is damaged rapidly. Due to all these reasons Pakistan is lagging behind in the per acre yield of chilli that needs to be addressed to full fill the domestic market requirement. The yield position of Pakistan relative to the world average and the world highest is given:

Trade Cycle of Chillies

The agro-ecological diversity obtained in the country enables production of Chillies almost around the year. There are mainly two crops Rabi and Kharif in the Pakistan. In Punjab and Balochistan only Kharif crop is grown while in Sindh both Rabi and Kharif crops are cultivated. Chillies are consumed both as green fresh chillies and as red chilli powder. Therefore, chilli harvesting time varies depending upon the desired product. For the green chillies harvesting is done after one week interval but to get full ripened red chillies harvesting is made in the late period of the season. Due to limited shelf life, absence of suitable storage facilities in the country and lack of value addition these can not be held over an extended period and have to be disposed in the domestic market as fresh harvest.

Due to moderate ecological condition, the major production of chillies arrives from Sindh, .Sometimes price distortion is noted on account of poor crop due to natural factors and wide variation in price is experienced.

The availability of chillies from different zones/ provinces is as follows:

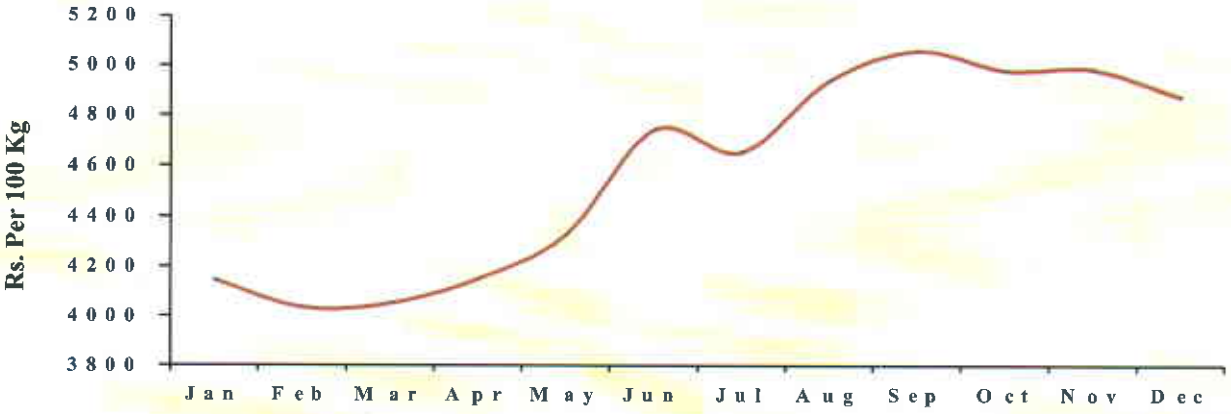
Province	Major Areas	MONTHS
Punjab	Faisalabad, Bahawalpur, Multan, Lahore, Kasur, Okara, Pakpattan, Sahiwal, Vehari, Multan, Sheikhupura, Khanewal, Bahawalnagar, R.Y.Khan	May to Aug
Balochistan	Loralai, Qila Saifullah, Musa Khail,	July to Oct.
Sindh	(Kharif Crop) Mirpur Khas, Hyderabad, Sukhar, Shikarpur, Khairpur, Nawab Shah, Kundri	Sept to Nov,
	(Rabi Crop) Mirpur Khas, Hyderabad, Sukhar, Larkana, Ghotki, Sanghar	Feb to April

Price Trends of Chillies

Seasonal Price Trend of Chillies

Seasonal price trend has been worked out for main markets of Punjab for last 5 years. It is observed that prices are lowest during April to May when Rabi crop of chillies is supplied from Sindh, while prices are highest from August to October. This is the time when chillies are supplied mainly from Punjab and Baluchistan. Due to their negligible share in total output this supply can not suffice the market demands and result in price hike. Prices become moderate when supply is started from Sindh (Kharif crop).

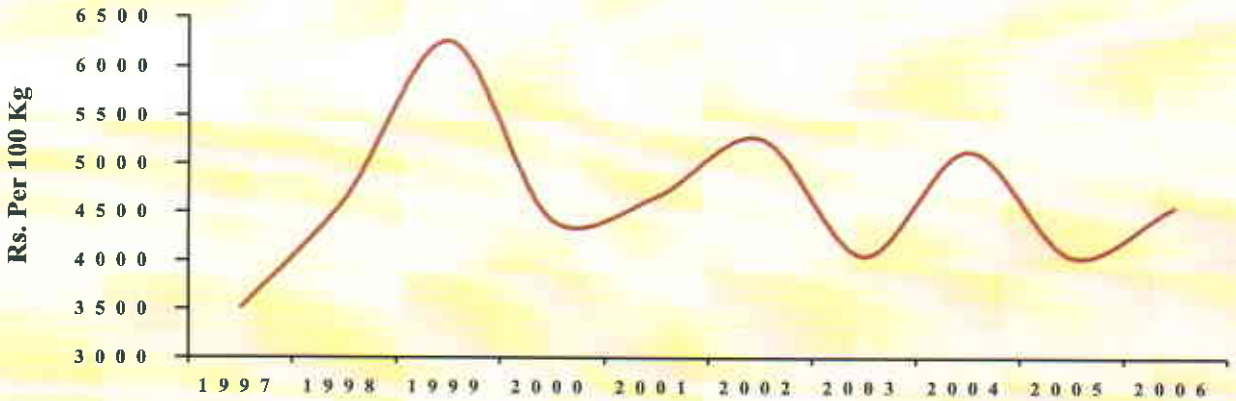
It shows that critical situation can be managed first by increasing the production of Punjab crop and secondly by enhancing the supply period from both Punjab and Sindh through introduction of early and late varieties. The following graph indicates the seasonal price fluctuations of chillies in main markets of the Punjab.



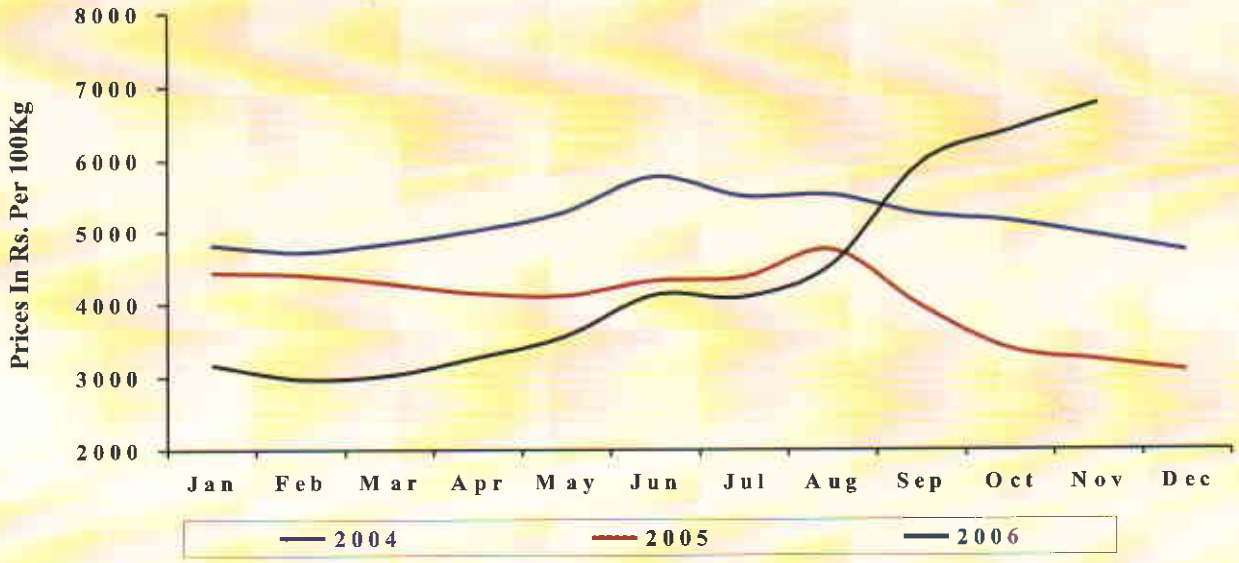
Long Term Price Trend of Red Chillies

Long term Price trend of Chillies is declining during the last decade with acute crises during the year 1998-99. The trend has been worked out on the average price of main markets in the Punjab province.

Since the Chillies is supplied from different provinces throughout the year, due to the nature of the crop cost of assembling and transportation are very high. Coupled with short shelf life and lack of proper storage facilities there is a great price fluctuation.



Three Years Price Trend of Chillies



Major Exporting Countries of Chillies, peppers and all Spices:

Vegetable and spice crops have great scope. Currently, only six per cent of the total cropped area is under horticultural crops, while vegetables are cultivated on about two per cent. Demand of horticultural products is increasing fast. Chilli is gaining importance because of its high cash value. However, it has not been given due attention to Chillies production

Pakistan earned Rs1.127 billion during 2003-2004 by exporting red chilli powder, whereas, export earnings from all fruits were Rs5.912 billion during the same period. This reveals the potential of this non-staple crop. Despite its importance the yield has declined from 86.5 (1994-95) to 55.8 thousand tons (2003-04) .This decline in yield is due to a number of factors including poor quality seed, mal-cultural practices and diseases like viruses, collar rot and phytophthora root rot.

Pakistan is a 16th country in the world exporting in chillies pepper and all spices. In this combination chillies share is very low. Pakistan mostly exports red chillies powder. Export of red dried chillies from Pakistan has declined, after European Union food authorities have detected the presence of aflatoxin. Due to low production and lack of any physical infrastructure available for efficient post-harvest management of Chillies, exports have not established a clear trend. There is need to concentrate on improving product quality, availability and post-harvest management in order to enlarge its exports.

The potential for increasing exports of whole, powder and crushed chillies in consumer packs is very high, provided we meet the stringent quality requirements of importing countries by preventing contamination from external sources during harvesting, post-harvest handling, processing and storage. This can be achieved only through an integrated approach with the collective efforts of farmers, processors and traders.

The following table indicates the share of major exporters in the world trade of Chillies:

World Leading Exporting Countries of Chillies, Peppers And Spices

Sr. No.	Countries	2002 Qty	2002 Value	2003 Qty	2003 Value	2004 Qty	2004 Value	%age Share
1	India	86.21	59.99	85.88	69.37	128.72	91.03	30.762
2	China	91.88	74.72	119.87	109.3	98.66	154.42	23.578
3	Malaysia	23.71	9.61	17.56	7.76	34.52	12.14	8.250
4	Spain	25.86	45.36	27.98	51.56	27.92	59.79	6.672
5	Peru	15.08	19.42	14.93	22.38	27.54	50.38	6.582
6	Mexico	12.42	20.87	14.24	17.95	9.95	12.73	2.378
7	Myanmar	3.43	1.79	7.4	3.23	8.56	3.8	2.046
8	Brazil	6.09	12.33	6.5	13.52	8.39	17.25	2.005
9	Zimbabwe	11.11	7.43	8.3	11.32	7.38	5.37	1.764
10	Chile	6.3	16.36	5.19	15.32	7.24	23.81	1.730
Top Ten		282.09	267.88	307.85	321.71	358.88	430.72	85.766
16	**Pakistan**	**1.28**	**1.7**	**3.59**	**3.52**	**3.77**	**3.77**	**0.901**
Others		54.44	111.18	57.71	126.6	55.79	138.54	13.333
World		337.81	380.76	369.15	451.83	418.44	473.03	100.000

Source: FAO

World Leading Importing Countries of Chillies, Peppers And Spices

Sr. No.	Countries	2002 Qty	2002 Value	2003 Qty	2003 Value	2004 Qty	2004 Value	%age Share
1	Malaysia	64.61	40.76	61.93	38.83	111.61	70.06	23.94
2	USA	85.2	117.62	85.49	123.23	88.32	139.3	18.95
3	Mexico	19.05	23.65	20.06	22.92	28.18	40.12	6.05
4	Thailand	14.71	9.03	19.04	11.09	25.99	15.32	5.58
5	Sri Lanka	25.32	17.56	27.72	22.54	24.39	16.71	5.23
6	Spain	25.49	33.64	21.98	35.02	22.8	41.85	4.89
7	Bangladesh	16.01	10.02	14.42	12.36	18.44	13.4	3.96
8	Germany	16.74	40.27	17.37	44.1	16.09	42.3	3.45
9	Korea	7.84	12.57	12.11	17.69	14.43	30.03	3.10
10	Japan	9.96	24.88	11.19	26.87	10.9	34.44	2.34
Top Ten		284.93	330	291.31	354.65	361.15	443.53	77.47
53	**Pakistan**	**5.64**	**3.58**	**0.21**	**0.11**	**0.36**	**0.24**	**0.08**
Others countries		83.52	136.2	94.27	159.14	104.65	187.76	22.45
World		374.09	469.78	385.79	513.9	466.16	631.53	100.00

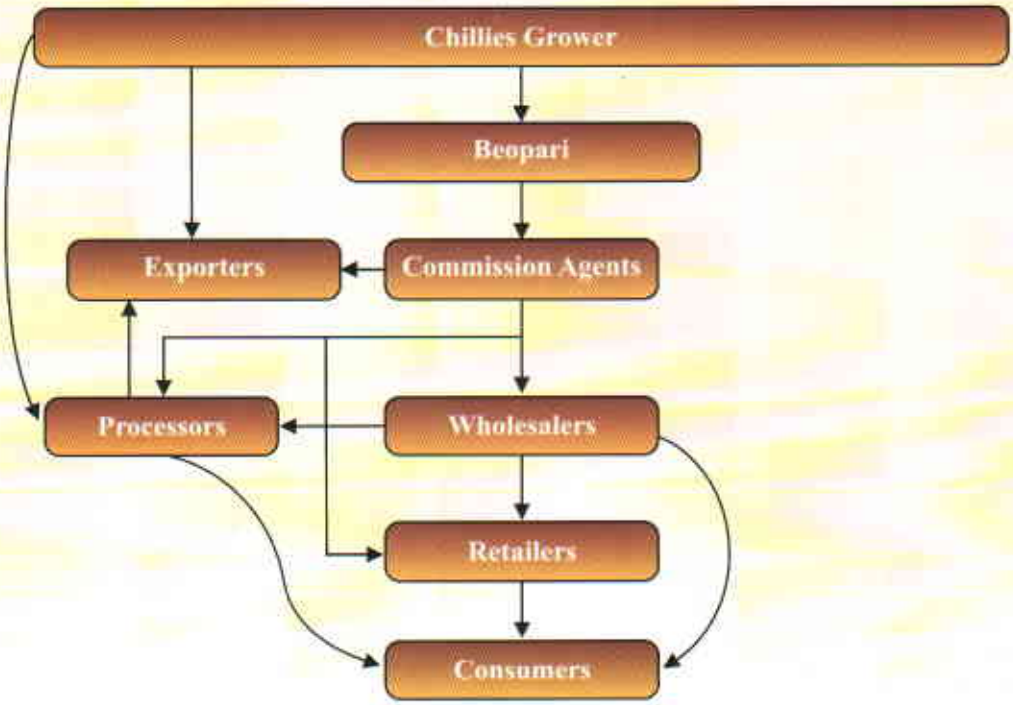
Source: FAO

Malaysia and USA are the world importers of chillies and peppers etc. They both make about 43% of world import. Thailand, Srilanka and Bangladesh are the large importers in present in neighbourhood of Pakistan. Major importers of chillies from Pakistan are Gulf States, the US, Canada, Sri Lanka, the UK, Singapore and Germany. It is exported in different forms: fresh chillies, stalk less chillies, green chillies, chilli powder and also as oleoresin.

Marketing of Chillies

From the field to end consumer Chillies pass through many intermediaries before it reaches the ultimate consumer. The Government's role is confined to physical infrastructure development especially wholesale markets & communication, market intelligence, market promotion and regulatory measures for smooth business operations. Flow chart of chillies for marketing channels prevailing in the present marketing system is given.

Marketing Channel For Chillies



Preparation For The Market And Grading

- Preparation of the produce for sale in the market is an important operation. After picking, the Important step is to dry them. Chillies are sparcely Spread on a levelled ground For drying.
- The producers normally grade the produce after drying.
- Some of the farmers sell the produce of different pickings seperately as and when harvested after performing drying and grading.
- Usually, they will separate out white discoloured and spoiled chillies during the Processing and drying.

Packing

- After completion of Sorting and grading the produce will be Packed in gunny bags.
- Usually, the farmers will store 15 to 20 kg of chillies in one gunny bag.
- But after packing most of the farmers will sell away the produce without storing.
- Some of them will store their produce anticipating a better price.

Assembling And Distribution

The village merchant is an important agency in the assembling of chillies. Village merchants assemble the produce immediately after harvest from cultivators who are indebted to them. In most of the cases they are the representatives of wholesale merchants. Almost all the producers market their produce in the village itself through the commission agent. Nearly 70 percent of the farmers sold their produce through commission agent in the villages .This is because of longer distance from the market center. They will get commission from the farmers. Wholesale merchants will finance them to assemble the produce and they will bear transportation cost also from assembling center to their godowns.

Wholesale merchant plays an important role in distribution also. Wholesale merchant export most of the produce provide storage facilities to the farmers those who want to store their produce. These wholesale merchants will store the produce for some time to create demand in other markets. After getting good price they will distribute the chillies.

Transport

Most of the produce is transported by motor vehicles from the villages to the market center. Some of them are also using bullock carts. Generally the commission agent will perform this function, but wholesale merchant will bear the cost. Some farmers bringing their produce in market also perform this function.

Quality Parameters For Chillies

Chile types usually are classified by fruit characteristics, i.e. pungency, color, shape, flavor, size, and their use. Spices are aromatic vegetable substances used for seasoning of foods. Chillies are known to stimulate the flow of saliva and simultaneously increase amylase activity thus increasing digestion of Carbohydrates. Pungency of chillies is felt deep in the throat rather than in the front edge of root of the tongue. Chillies are well known for their flavor and pungency and form important source of vitamin C.

In capsicum and chillies which are used in food preparations, quality is of much importance and is based on the following characters

Colour

Chillies with a bright red colour command high prices than those which are dull red or orange or yellow in colour and deep red fruits tend to retain their colour in storage longer than those which are of lighter shade. The principal colouring pigment of dried chillies is carotenoid capsanthin. This is accompanied by alpha and beta carotene, Zeaxanthin, cutein and few un identified xanthophylls. The total pigment content in capsicum is between 4 to 5 grams per kilogram of dried fruits. Fruits maturing during post rainy season have bright red colour while fruits maturing in rainy season have dull colour.

Size

Medium sized fruits are preferred to long pods, owing to the fact that in storage they remain intact better than longer pods, which tend to break at the distal ends

Pericarp

A fairly thin pericarp is preferred as drying is easily accomplished with a moderately thin pericarp, a smooth glossy surface, few seeds in the fruit with firm stalk

Pungency

Capsaicin (C18H27NO3 is active ingredient responsible for pungency. In case of pungent chillies which are used for the preparation of capsicum oleoresin, the appearance is of much less importance but a high capsaicin is essential. Soil type, manuring practice, management of pest and diseases. Only 25-30% of dry chilli is obtained from fresh ripe chilli fruits. The principal colouring pigment of dried chillies is carotenoid capsanthin. This is accompanied by alpha and beta carotene, Zeaxanthin, cutein and few un identified xanthophylls. The total pigment content in capsicum is between 4 to 5 grams per kilogram of dried fruits

The average Capsaicin in Indian chilli varieties is about 0.2 to 0.3 percent. Hence, most of the Pakistani varieties are not suited for commercial oleoresin extraction as they need about 1% Capsaicin. Small sized fruits with thin pericarp contain high concentration of Capsaicin while long fruits contain low concentration of Capsaicin .

Export Constraints

Aflatoxin and chemical residues are two major constraints in the export of chillies to Europe, Japan and the US as buyers expect a high degree of hygiene and sanitation in processing and preparing chillies for export.

Pesticides Residues On Chilli

Green chillies are consumed as a vegetable. various types of pesticides are used to control the disease and pests attack on chillies .If pesticides are sprayed just - before harvest, the chilli fruits may contain residues above the prescribed maximum residue limit (MRL) fixed by FAO/WHO.

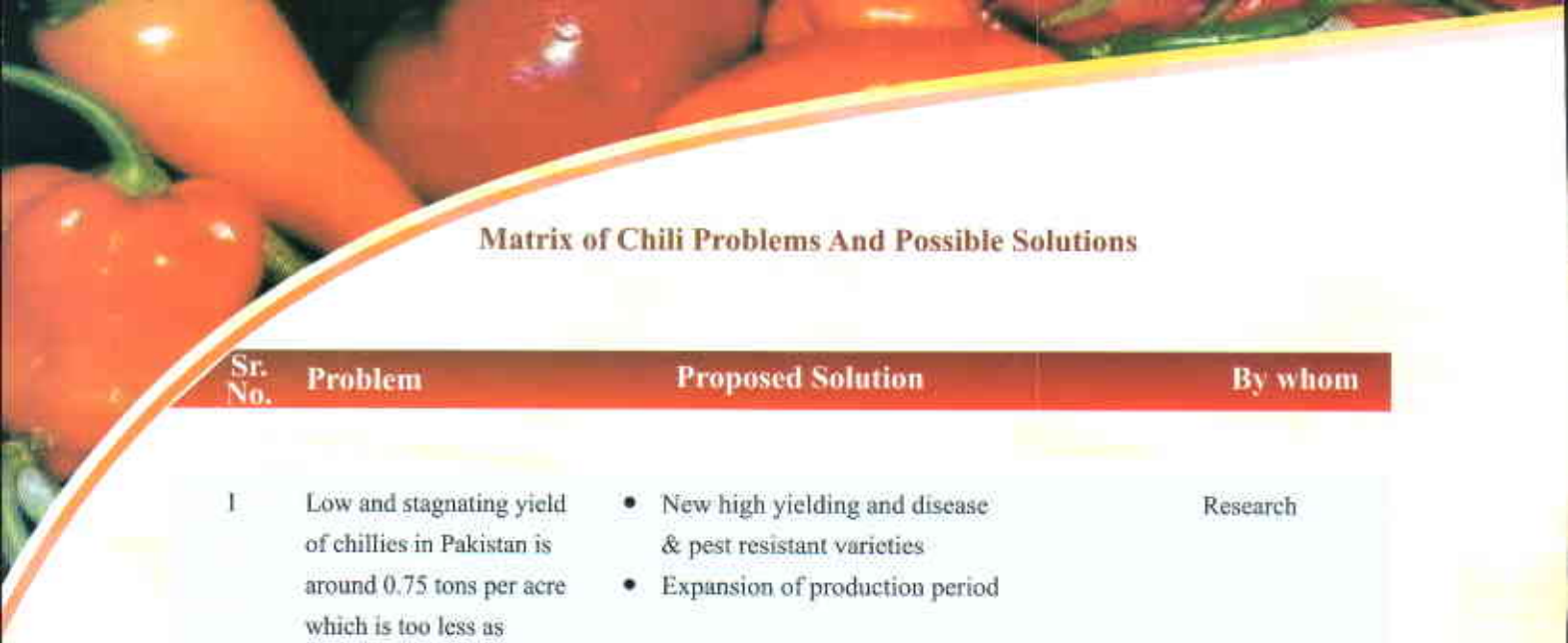
This may be hazardous to consumers and also pose export problems. Therefore safe waiting periods after spraying for harvest are to be followed. To decontaminate the residues keep chillies for 10-15 minutes in 2% salt solution and wash under tap water before use.

Affla-toxin Contamination In Chilli

Due to non availability of proper storage facilities Afflatoxin problem is caused in chillies that reduces the quality and value of the product. Species of Aspergillus cause spoilage of stored products, as a result the percentage germination of grains falls, and they are rendered unfit for food and contain toxins, which can cause health hazard. Aspergillus flavus, Aspergillus parasiticus and Pencillium puberulum produce afflatoxins. Aspergillus parasiticus is the most potent producer of aflatoxin. Africa, India and South East Asia are regarded as the "high-aflatoxin-risk areas". Aflatoxins are highly oxygenated heterocyclic compounds.

The eight characterized afflatoxins are B1, B2,G1 and G2 - named on the blue or green fluorescences in U.V light. M1,M2 - first detected in milk of cows fed on groundnut meal, B2,G2 - derivatives of B1,B2, G1 and G2 are more commonly encountered. They may occur together or independently.

To reduce afflatoxin contamination, some precautionary measures should be adopted. These include: picking and drying of fruit with pedicel (fruit stalk), avoid direct contact of fruit with soil, proper drying of fruit and storage of powder at low relative humidity and temperature. Furthermore, agronomic factors that may influence aflatoxin development like stresses, irrigation, cropping pattern, variety, date of planting, date of harvesting and storage conditions, should be studied in detail.



Matrix of Chili Problems And Possible Solutions

Sr. No.	Problem	Proposed Solution	By whom
1	Low and stagnating yield of chillies in Pakistan is around 0.75 tons per acre which is too less as compared to 23tons in Reunion.	• New high yielding and disease & pest resistant varieties • Expansion of production period	Research
		• Improvement in farm management practices leading to better quality and more yields.	Extension
2	Low Production in Punjab	• There is less acreage and production in Punjab. That may be increased.	Extension
		• High Yielding Verities suitable for Rabi cultivation in Punjab needs to evolved • Kharif Crop may be introduced	Research and Extension
3	Heavy price fluctuations	• Timely release of area and production estimation	Crop Reporting service
		• Collection and dissemination of marke information	Agriculture marketing
4	Lack of value addition	• Introduction of new advanced technique suitable for processing like dehydration, sauce formation etc.	Food Technology
		• Introduction of new cultivars based on targeted local and international market	Research

Health Benefits of Chilies

Over the years there have been many different views on the effects that regular chillie consumption can have on the human body. Here we try to pick through out the research to see if indeed the humble chillie is good for us.

Pain Relieving

The medicinal applications of capsaicinoids have brought innovative ideas for their use. Medicinal use of Capsicums has a long history dating back to the Mayas who used them to treat asthma, coughs, and sore throats. The pain caused by capsaicin stimulates the brain to produce endorphins, natural capsaicinoids which act as analgesics and produce a sense of well-being

The Aztecs used chile pungency to relieve toothaches. The pharmaceutical industry uses capsaicin as a counter-irritant balm for external application (Carmichael 1991).

It is the active ingredient in Heet and Sloan's Liniment, two rubdown liniments used for sore muscles. The capsaicin is being used to alleviate pain. Its mode of action is thought to be from nerve endings releasing a neurotransmitter called substance P. Substance P informs the brain that something painful is occurring. Capsaicin causes an increase in the amount of substance P released. Eventually, the substance P is depleted and further releases from the nerve ending are reduced. Creams containing capsaicin have reduced pain associated with post-operative pain for mastectomy patients and for amputees suffering from phantom limb pain. Prolonged use of the cream has also been found to help reduce the itching of dialysis patients, the pain from shingles (Herpes zoster), and cluster headaches. Further research has indicated that capsaicin cream reduces pain associated with arthritis. The repeated use of the cream apparently counters the production of substance P in the joint, hence less pain. Reducing substance P also helps by reducing long-term inflammation, which can cause cartilage break down.

Effects On Blood Sugar

Researchers at the University of Tasmania have recently completed a study (July 2006) that suggests the regular consumption of chillies can help your body control insulin levels after eating which could benefit the overweight or diabetics. To be more precise the chillie reduces the amount of insulin the body needs to lower blood sugar levels after a meal by up to about 60%.

Inflammation

Capsaicin, the substance that give chilies their heat is well known to contain a neuropeptide associated with the inflammatory process. Chilli related alterations in plasma proteins have been reported in patients with autoinflammatory diseases such as rheumatoid and arthritis.

Congestion

Now you don't have to be a scientist to work this one out. If you eat a dish loaded with hot chillies the heat from the capsaicin causes secretions, or in other words sweating and a runny nose, that help clear the nasal passage.

Prostate Cancer

A study published by Cancer Research in March 2006 concluded that capsaicin helped stop the spread of prostate cancer. The capsaicin triggered suicide in both primary types of prostate cancer cell lines. "It also dramatically slowed the development of prostate tumors formed by those human cell lines grown in mouse models.

Basic Chile Sauce

A simple way to make your chiles into a sauce. Fresh roasted chiles are ideal, although you may substitute frozen roasted chiles. Use green chiles for chicken and pork dishes and red chiles for beef. Chile sauce is great in enchiladas or over burritos for a "wet" burrito.

Ingredients:

2 lbs red or green chiles, roasted and skin removed

2-3 garlic cloves, peeled

1/2 teaspoon cumin

1 teaspoon salt

juice of 1/4 lime

2 tablespoons oil

1-2 jalapenos seeded (optional for spiciness)

2 cups drinking water

Preparation:

Blend chiles in food processor until chunky. Add in remaining ingredients and process until smooth. Use immediately or freeze for later use

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