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Exploring the Global Competitiveness of chickpea from India: Insights from Andhra Pradesh

¹Meghana J, ²KN Ravi Kumar, ³KB Vedamurthy, ⁴K Uma Devi and ⁵Srinivasa Rao

^{1, 2}Department of Agricultural Economics, Agriculture College, Bapatla, ANGRAU, Andhra Pradesh, India

³Department of Dairy Economics, Dairy Science College, Hebbal, KVAFSU, Bangalore, Karnataka, India

⁴Department of Agricultural Economics, Lam, ANGRAU, Andhra Pradesh, India

⁵Department Statistics and Computer Application, Agriculture College, Bapatla. ANGRAU, Andhra Pradesh, India

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Corresponding Author: Meghana J

Abstract

Export of agricultural commodities is an important source of foreign exchange and helps in boosting the economy of the country. This study on “Exploring the Global Competitiveness of chickpea from India - Insights from Andhra Pradesh” was undertaken to study the growth pattern of exports and imports, trade direction, comparative advantage and export competitiveness of chickpea from Andhra Pradesh. Primary data were gathered from various stakeholders involved in the chickpea market from Andhra Pradesh. The secondary data on area, production, productivity, export and import value of chickpea from India and world was collected from 1995 to 2020 by using various sources like Food and Agricultural Organization (FAO), Directorate of Economics and Statistics and Ministry of Farmers and welfare, Government of India. During the overall reference period (1995-2021), production of chickpea showed positive and significant growth rate (0.34%) and this was mainly due to increased productivity (1.54%) followed by significant increase in area (1.86%). There was increased export (43.68%) and import (11.93%) of chickpea at the same period. Trade direction of chickpea for the period of 2011-2021 showed Pakistan was the most stable importer of Indian chickpea, as it retained its original share of around 70 per cent followed by Iraq (52%) and Turkiye (48%). Libya, Algeria, Spain were the unstable importer of chickpea from India. Export growth to major destination was found to be contributed by SE (35.65%), CE (16.34), and SOE (47.99). This signifies that the increase in exports to traditional markets was mainly due to India's increased market share. Overall exports to the world and other countries decreased due to decreased demand, as indicated by SE (-225.81 and -77.62 respectively). PAM of chickpea indicated that the values of NPC (0.92), EPC (0.71) and DRC (0.50) were less than one, suggesting its competitiveness in the international market.

Keywords: Trade direction, market share, private cost, social cost, export competitiveness

1. Introduction

India is the largest pulse producing country in the world with 28 M.ha pulses cultivation area, it ranks first in area and production with 31 per cent and 28 per cent of world cultivating area and production respectively. Chickpea occupies 65 per cent of area and contributes to 70 per cent of total Rabi pulse production. It was cultivated in about 9.9 M.ha with production and productivity of 10.7 Mt and 1086 kg/ha respectively, in 2021-22. About 97 per cent of gram production of the country is contributed by 10 states such as Madhya Pradesh, Maharashtra, Rajasthan, Karnataka, Uttar Pradesh, Andhra Pradesh, Gujarat, Chhattisgarh and Jharkhand. The country has exported 410,375.89 Mt of pulses to the world worth of USD 379.74 million during the year 2021-22, in which, chickpea contributed about 9403 Mt worth of USD 89.101 million in the same period. Algeria, Pakistan, Turkiye, Sri Lanka, Saudi Arabia, Egypt and Tunisia are the major importers of chickpea from India. (India at a glance, 2021. FAO) ^[1].

However, there is some evidence available in respect of export trends but, they are confined mainly to few crops and

few countries. So, a detailed analysis pertaining to trade direction, comparative advantage, export competitiveness and source of export competitiveness of chickpea from India with special reference to Andhra Pradesh is essential because trade policies have opened up new opportunities and challenges for Indian agricultural exports in the present era of liberalization. The state has 10.1 M.ha of cultivated area, constituting 37 per cent of the total geographical area of the state and stand seventh position in agriculture production. Paddy, Cotton, chilli, maize, groundnut, sorghum, chickpea, tobacco, jowar are some of the major cultivating crops in the state. It is also noticeable that chickpea, groundnut and cotton occupied the top ten positions in gross cropped area of India with 0.46, 1.03 and 0.60 M.ha respectively. Andhra Pradesh contributed to about 5.8 per cent of the total export of the country in 2020-21. The state occupies fifth place in the country, in terms of the value of exported goods. The desi chickpea export accounts for 0.000011 Mt valued at USD 0.01 million. (Agricultural Statistics at a Glance - Andhra Pradesh 2020-21). Therefore expansion of the export sector would fetch

remunerative returns to the farmers and helps to earn foreign exchange. This will further indirectly contribute to increased investments, technological advances, improved productivity and efficiency which boost both domestic and export competitiveness of selected agricultural commodity in the context of agricultural transformation, food security and economic development of the country.

2. Materials and Methods

For the present study, data are collected through a combination of primary and secondary sources to analyze the competitiveness of chickpea cultivation in Andhra Pradesh, specifically focusing on the year 2021 (Post-WTO regime). Primary data on free on board (FOB) prices, cost insurance freight (CIF) prices, and domestic wholesale prices of chickpea were collected from farmers, exporters, local traders and other market players in Andhra Pradesh through a pre-tested schedule. The sample comprised 100 purposively selected chickpea-cultivating farmers from the Kurnool district, which holds the highest area and production of chickpea in the state. Furthermore, secondary data related to various aspects of chickpea cultivation, including area, production, productivity, export quantity, export value, Minimum Support Prices (MSP), domestic market (wholesale) prices, and international prices, were collected from significant sources such as the Food and Agricultural Organization (FAO), Directorate of Economics and Statistics, Ministry of Commerce and Industry, Government of India, Agricultural and Processed Food Products Export Development Authority (APEDA), India Agristat, and International Trade Centre (International trade statistics). The data spanned from 1995 to 2021, encompassing the post-WTO regime.

2.1 Compound Annual Growth Rate Analysis

To examine the trends in area, production, productivity and export-import value of chickpea at all India level, Compound Annual Growth Rates (CAGR) was worked out by using log-linear model.

$$\ln Y_t = \alpha_t + \beta_t + u_t$$

Where,

Y_t = Area / Production / Productivity / export value/ import value in year t

t = Time element which takes the value 1, 2 n for various years.

α_t = Intercept

β_t = Regression coefficient

u_t = Error term

CAGR per cent = $[(\text{Antilog of } \beta_t - 1)] \times 100$ (Chaitra and Sonnad *et al.* 2019) [3].

2.2 Markov Chain Analysis

The trade directions of chickpea exports were analyzed by using the first order Markov Chain Analysis. It involves the construction of the Transitional Probability Matrix (TPM) 'P' whose constituents (P_{ij}) depicts the temporal observation of switching of probability of exports from country 'i' to country 'j'. The diagonal element P_{ij} where $i=j$, measures the chance of a country retaining its market share or in other words, the loyalty of an importing country towards the

exporter(s) (Bhavani *et al.* 2016) [4]. Annual export data for period 2011 to 2021 was used to analyze the direction of trade and changing pattern of chickpea exports. In this context eleven major importing countries (including all other countries grouped under 'others') were considered. The average exports to a particular country was considered to be a random variable which depended only on its past exports to that country and which was denoted algebraically by the following equation:

$$E_{jt} = \sum_{i=1}^n [E_{it-1}]P_{ij} + e_j$$

Where,

E_{jt} = Exports from India to the j^{th} country in the year t

E_{it-1} = Exports of i^{th} country during the previous year t-1

P_{ij} = probability that exports shift from i^{th} country to j^{th} Country

e_{jt} = Statistically independent error term of E_{it-1}

n = No. of importing countries

The transitional probabilities P_{ij} , can be arranged in a (c x n) matrix, with the following properties:

$$0 \leq P_{ij} \leq 1$$

$$\sum_{i=1}^n P_{ij} = 1 \text{ for all importing countries}$$

The transitional probability P_{ij} indicates the possibility that trade will switch over from the market 'i' to other market 'j' with the passage of time. The probabilities P_{ij} for $i \neq j$ indicates the gain or losses in trade of each of the importing market. The probability P_{ij} for $i=j$ (diagonal probabilities) indicates probability of retention of an importing market.

2.3 Constant Market Share Analysis

Constant Market Share Approach (CMSA) was used to find out the sources of change in market shares and resulting competitiveness of chickpea in the world market.

With the pioneering work of Tyszynski 1951 [5], CMS analysis became popular in applied international economics for export analysis (Ahmadi 1994, Klasra and Fidan 2005, Edith 2009, Amzul 2010) [6, 7, 8, 9] at the international level. At the national level, it was used by Fathima *et al.* 2006 [10], Singh and Dey 2011 [11], Rani *et al.* 2013 [12]. The CMS approach uses a country's market share in a market as a measure of competitiveness (Bowen and Pelzman 1984, Fagerberg and Sollie 1987, Chen *et al.* 2000) [13, 14, 15]. The larger the market share that a country controls, the greater its competitiveness would be in that market. The CMS handles export growth as a co-impact of four factors, viz., Global market growth effect, commodity composition effect, market share effect and change in competitiveness. Though the CMS model is a commonly accepted procedure of accounting for the sources of a country's export growth, there are some problems associated with the application of the traditional CMS model (Chai and Riethmuller 1999) [16]. To overcome these problems, a modified version of the CMS model was used. Following Chen *et al.* (2000) [15], the change in exports of country k to destination j of selected agricultural commodity i was decomposed into structural, competitive and second order effects as given in the following equation.

$$\Delta q = skij \times \Delta Qkij + Qkij \times \Delta skij + \Delta skij \Delta Qkij \dots \dots \dots (1)$$

$skij \times \Delta Q_{kij}$ = Structural effect (SE)
 $Q_{kij} \times \Delta skij$ = Competitive effect (CE)
 $\Delta skij \Delta Q_{kij}$ = Second order effect (SOE)

where, Δ - change over period, Q - value of chickpea exports, S - share of exports in quantity terms, k is India, j is the export destinations ($j=1, m$) of Indian selected agricultural commodity, i is selected agricultural commodity.

Equation 2 gives the complete picture of main components and their sub components in the second stage decomposition (Chen *et al.* 2000) ^[15]. The first term on the right side of the equation refers to the growth of the world.

$$\Delta q = so \Delta Q + (\sum_i \sum_j s_{ij} \Delta Q_{ij} - \sum_i s_{io} \Delta Q_i) + (\sum_i \sum_j s_{ij} \Delta Q_{ij} - \sum_j s_{jo} \Delta Q_j) +$$

$$[(\sum_i s_{io} - so) \Delta Q] - (\sum_i \sum_j s_{ij} \Delta Q_{ij} - \sum_j s_{jo} \Delta Q_j)] + \Delta sqo + (\sum_i \sum_j s_{ij} \Delta Q_{ij} - \Delta sqo) + (Q^1/Q_0 - 1) \sum_i \sum_j \Delta s_{ij} Q_{ij} + [\sum_i \sum_j \Delta s_{ij} \Delta Q_{ij} - (Q^1/Q_0 - 1) \sum_i \sum_j \Delta s_{ij} Q_{ij}] \dots \dots \dots (2)$$

in which,

1. $so \Delta Q$ = Growth effect (GE)
2. $\sum_i \sum_j s_{ij} \Delta Q_{ij} - \sum_i s_{io} \Delta Q_i$ = Market effect (ME)
3. $\sum_i \sum_j s_{ij} \Delta Q_{ij} - \sum_j s_{jo} \Delta Q_j$ = Commodity effect (CoE)
4. $(\sum_i \sum_j s_{ij} \Delta Q_{ij} - so \Delta Q) - (\sum_i \sum_j s_{ij} \Delta Q_{ij} - \sum_j s_{jo} \Delta Q_j)$ = Structural interaction effect (SIE)
5. Δsqo = General competitive effect (GCE)
6. $\sum_i \sum_j s_{ij} \Delta Q_{ij} - \Delta sqo$ = Specific competitive effect (SCE)
7. $(Q^1/Q_0 - 1) \sum_i \sum_j \Delta s_{ij} Q_{ij}$ = Pure second order effect (PSOE)
8. $[\sum_i \sum_j \Delta s_{ij} \Delta Q_{ij} - (Q^1/Q_0 - 1) \sum_i \sum_j \Delta s_{ij} Q_{ij}]$ = Dynamic structural residual effect (DSRE)

The second term captures the effect of the market. The third item shows effect of commodity composition. The next term, structural interaction effect, captures the changes in exports due to interaction of specific commodity and market effects. The competitiveness effect is derived as residuals in the equation; Δ in exports of country, 'k' of selected agricultural commodity 'i' to country, 'j' due to a change in competitiveness of country, 'k' for total selected agricultural commodity exports to the world is called as general competitive effect. Δ in exports of country, 'k' of selected agricultural commodity, 'i' to country, 'j' due to a change in competitiveness of country, 'k' in export of selected agricultural commodity, 'i' to destination, 'j' is called as specific competitive effect. The positive or negative sign implies improvement or deterioration in exports competitiveness. Δ in exports of country, 'k' of selected agricultural commodity, 'i' to country, 'j' due to interaction of specific competitive effect and structural effect is called as pure second order effect. Δ in exports of country 'k' of selected agricultural commodity, 'i' to country, 'j' due to interaction of specific competitive effect and market effect is called as dynamic structural residual effect. Since it is one product approach, commodity effect will be zero in this case.

2.4 Policy Analysis Matrix

Policy Analysis Matrix (PAM) was introduced by Monke

and Pearson (1989) ^[17] to measure impacts of policies on agricultural production. The effects of policies are analyzed by observing farm income changes. The PAM essentially is a double-accounting technique that summarizes budgetary information for on-farm and post-farm activities. The basic steps in using the PAM method are, identifying the commodity system, assembling representative budgets for each activity in the system, calculating social values, aggregating the budgetary data into a matrix, analysing the matrix and simulating policy changes (Rani *et al.* 2014) ^[18]. PAM compares the private and social prices for inputs and goods produced. Private prices are prices observed in a current situation, while social prices/ efficiency prices /shadow prices refer to the situation without any intervention of the Government or market distortions. Social or efficiency prices represent the opportunity costs. PAM contains a table which includes revenues, costs and profits measured in private and social prices. The costs are separated as tradable inputs costs and non-tradable/domestic input costs. Tradable-inputs are goods that can be traded internationally. In the current study seeds, fertilizers and pesticides were considered as tradable-inputs. Domestic factor components are those which are not traded internationally. Labour, land and irrigation were considered under non-tradable inputs in the study. Private values/market/financial prices are prices at which goods and services are exchanged and those used in the budgets like the price of crop, the cost of seeds, fertilizers, farm yard manures, pesticides and the wage rate. Social values are the prices that would prevail in the absence of any policy distortions (such as taxes or subsidies) or market failures (monopolies). They reflect the value to society, rather than to private individuals and are the values used in economic analysis when the objective is to maximize national income. Determining social values is important task because these values offer the best indication of optimizing income and social welfare. For internationally traded goods world prices are used [Free on Board (FOB) for export and Cost Insurance and Freight (CIF) for imports. Private value of tradable inputs used in chickpea cultivation with their prices i was obtained from details on item-wise cost of cultivation for Andhra Pradesh. In case of domestic factors, which are not traded in the international markets (like labour, land and irrigation), figuring out social prices was difficult. For these goods, the social costs were calculated using Value of Marginal Product approach suggested by Rani *et al.* (2014) ^[18]. It uses factor shares (S_i) of various inputs (X_i) together with the mean values of inputs and outputs (Y) and price (P_y). The computation of social cost of inputs is as follows:

$$P_{xi} = [(S_i/X_i) * Y] P_y$$

Once all private values have been matched with their social equivalents, we arrive at two identities:

Private profit = Private revenue – Private cost of tradable inputs – Private cost of domestic factors

Social profit = Social revenue – Social cost of tradable inputs – Social cost of domestic factors

Table 1: Policy Analysis Matrix

Particulars	Value of output (Revenues)	Value of input (Costs)		Profit
		Tradable inputs	Non-tradable input	
Private prices	A	B	C	D=A-B-C
Social prices	E	F	G	H=E-F-G
Effects of divergence	I=A-E	J=B-F	K=C-G	L=D-H=I-J-K

Source: Monke and Pearson (1989) ^[17]

D = Private profits

J = Input transfers

H = Social profits

K = Factor transfers

I = Output transfers

L = Net transfers

For a given commodity system, the costs and profits represent as aggregates for all activities from the farm to wholesale. For revenues A is the wholesale price prevailing in domestic market and E is the world price of comparable product in the comparable location. The first row provides a measure of private profitability (D) defined as the difference between private revenue (A) and private costs (B+C). Private profit demonstrates the competitiveness of the agricultural system, given current technology, prices for inputs, outputs and policies. The second row of the matrix calculates the social profit that reflects social opportunity costs. The third row of the matrix analyses the difference between the first and second rows. The difference between private and social values of revenues, costs, and profits can be explained by policy interventions. One of the main advantages of this approach is that it allows for varying degrees of disaggregation. It also provides a straight forward analysis of policy induced effects.

2.4.1 Competitiveness indices

There are several measures to examine the global competitiveness of agricultural commodities. The most vital traditional international competitiveness indices include Nominal Protection Coefficient (NPC), Effective Protection Coefficient (EPC), Domestic Resource Cost (DRC), Profitability Coefficient (PC) and Private Cost Ratio (PCR) are commonly used in the computation of the trade competitiveness.

2.4.1.1 Nominal Protection Coefficient (NPC)

Nominal Protection Coefficient is the ratio between the domestic price to the international price of a comparable grade of commodity, adjusted for all the transfer costs such as freight, insurance, handling costs, margins, losses etc. NPC less than one, signifies that the commodity is competitive (under importable hypothesis it is considered a good import substitute and under exportable hypothesis, it is worth exporting). If NPC is greater than one, the commodity is not competitive (not a good import substitute or not worth exporting).

$$NPC = A / E$$

2.4.1.2 Effective Protection Coefficient (EPC)

The EPC is the ratio of the difference between revenues and tradable input costs in private prices to that in social prices. It's given as

$$EPC = (A-B) / (E-F)$$

The numerator (A-B) indicates the value added in private

prices and the denominator (E-F) is value added in world prices. EPC can be >1, <1 or =1. An EPC greater than one means, negative incentive effects (Tax on producers). The value added at domestic prices is greater than border prices. Therefore, output is protected domestically through domestic output and input price policies. EPC <1 implies that domestic producers are not protected through policy intervention. EPC value of one signifies output is neither taxed nor subsidized. Hence value added at domestic price equals value added at border prices.

2.4.1.3 Domestic Resource Cost (DRC) ratio

Domestic Resource Cost (DRC) ratio measures the efficiency of domestic production in terms of global cost competitiveness. It is the ratio of factor cost in social prices (G) and the value added in social prices (E-F). A DRC ratio of less than one indicates that the country has international competitiveness in producing that commodity in long run and domestic resources are efficiently used. The country is globally competitive because opportunity cost of spent domestic resources is lesser than the net foreign exchange gained in export or saved by substituting for imports. It's vice-versa when DRC ratio is greater than one.

$$DRC = \frac{G}{(E-F)}$$

2.4.1.4 Private Cost Ratio (PCR)

The PCR explains the ratio of domestic factor costs (C) to value added in private prices (A-B). This ratio demonstrates the ability of the production system to cover the cost of domestic factors and continue to be competitive. It is almost identical to DRC ratio. The difference is that for PCR the values in private prices are used. In PAM notion.

$$PCR = \frac{C}{(A-B)}$$

2.4.1.5 Profitability Coefficient (PC)

The Profitability Coefficient (PC), defined as PC=D/H, it measures the degree to which net transfers have caused private profits to exceed social profits. It is a complete measure of incentives effects of all policies affecting production of selected products. The PC can be used as a proxy for the net policy transfer.

The coefficients of PAM were worked out under two scenarios namely, importable hypothesis and the exportable hypothesis scenario. Under exportable hypothesis, commodity is regarded to compete with internationally produced commodity at foreign port. Hence, the domestic commodity must be extra efficient to the tune of international transportation cost at least, in order be

internationally competitive. Under importable hypothesis scenario, competition is assumed to take place at domestic port. The selected agricultural commodity is assumed as import substitute. When the commodity is imported, it competes in domestic market with domestically produced commodity.

Therefore, transfer cost *i.e.* international and domestic transportation cost act as a natural protection to the commodity. In the current study, the competition was between domestic production and imports from Australia as it is one of the major producer and exporter to the world in respective crop under importable hypothesis. The international reference price was worked as given in the Table 2 and the price acted as social prices for the commodity.

Table 2: Importable hypothesis

S. No.	Particulars	Particulars
1	Price of selected agricultural commodity at international market.	\$/q
2	Freight from selected international port to India	\$/q
3	Plus, insurance @1% price	\$/q
4	Plus, custom duty 5%	\$/q
5	Equals CIF price (1+2+3+4)	\$/q
6	Exchange rate (\$/q)	1\$ = Rs
7	Equals CIF price (Rs/q) (5*6)	Rs/q
8	Import duty	Rs/q
9	Transportation cost	Rs/q
10	C & F handling charges	Rs/q
11	Wharfage charges (Rs/q)	Rs/q
12	Service Charges	Rs/q
13	Reference price (8+9+10+11+12)	Rs/q

Table 3: Trends in Area, Production, Productivity, Exports and Imports of Chickpea from India

Particulars	Area (Million Hectares)	Production (Million Tonnes)	Productivity (Kg/Hectare)	Export (1000 USD)	Import (1000 USD)
Period I (1995-1996 to 2010 -2011)	1.28 ^{NS}	2.23*	2.61*	83.37**	9.71 ^{NS}
Period II (2011-2012 to 2020-2021)	1.91*	4.57*	0.93*	- 6.34 ^{NS}	0.66 ^{NS}
Overall Period (1995-1996 to 2020-2021)	1.86**	0.34**	1.54**	43.68 **	11.93**

Note: ** significant at 1% level; * significant at 5% level; NS – Non significant

Source: Agriculture at glance, 2021

3.2 TPM of Chickpea Exports from India

The dynamics of changes in the export trade of chickpea from India were studied through the estimation of a Markov Chain Analysis. The diagonal elements in the TPM for selected exports provide the information on the probability of retention of the trade, while row elements indicate the probability of loss in trade on account of competing countries. The column elements indicate the probability of gain in trade from the competing countries.

Table 4 showed Algeria, Pakistan, Türkiye, Sri Lanka, Saudi Arabia, Egypt, Tunisia, Iraq, Spain and Libya were the major chickpea importing countries taken for the analysis for the period 2011 to 2021 and along with the remaining importing countries grouped under 'others'. That

3. Results and Discussion

3.1 Trends in Area, Production, Productivity, Exports and Imports of Chickpea from India

To examine the growth dynamics and trade performance of chickpea, the compound annual growth rates of area, production, productivity, export and import values were worked for overall period from 1995 to 2021. In order to have better understanding, the study period was divided into period I (1995-96 to 2010- 11) and period II (2011-12 to 2020-21).

The trends in chickpea area is presented in the Table 3. In the period I, there was no significant growth in chickpea arable area but there was significant increase in production at 2.23 per cent at five per cent level of significance contributed by increased productivity (2.61%). However, in the period II, with drastic increase in area and productivity, the production of chickpea showed significant positive growth rate (4.57%). That is, the productivity of chickpea registered positive and significant growth rates during both the sub periods and this was due to adoption of improved niche specific cultivars and several schemes taken by Government to escalate the pulse production in India. Even during the overall reference period, production of chickpea showed positive and significant growth rate (0.34%) and this was mainly due to increased productivity (1.54%) followed by significant increase in area (1.86%). It can be observed that there was significant growth in export of chickpea in period I and overall period at 83.37 and 43.68 per cent respectively but negative trend in export of pulses in the period II due to increased demand for consumption at national level. Even though there was significant growth in import of chickpea during over all period (11.93), the increased production of chickpea in both the period I and period II made its imports non-significant during the same period (Table 3). The results were in conformity with the findings of Khinea *et al.* (2022) ^[19].

is, ten major countries importing chickpea from India in large quantity and rest of countries are pooled under 'others' category. TPM of chickpea exports revealed that Pakistan was the most stable importer of Indian chickpea, as it retained its original share of around 70 per cent, which was highest among the importing countries. It lost its remaining share of 30 per cent to Algeria, Türkiye, Tunisia and Spain. Iraq was also found to be stable with 52 per cent of retention of its shares, while lost major share of 48 per cent to Algeria and Tunisia. Türkiye was also found to be stable with 48 per cent of retention of its shares, while lost 52 per cent of its shares to Algeria, Pakistan, Sri Lanka, Libya, Iraq and Spain. Sri Lanka was stable with 25 per cent of retention of its shares, while lost 76 per cent of its shares to Algeria,

Türkiye, Egypt and 'other' countries. Tunisia and 'Other' countries were also found to be stable with 24 and 83 per cent of retention of their previous shares respectively, and lost remaining shares to Sri Lanka, Saudi Arabia, Egypt and Algeria. From the analysis, it was clear that even though Algeria is the largest importer of Indian chickpea, Pakistan

and other countries retained maximum of its previous share of 70 and 83 per cent respectively, followed by Iraq, Türkiye and Sri Lanka. This might be due to the high domestic demand in their respective countries (Table 4). The findings of Siddeshwar *et al.* (2017) ^[20], were in agreement with the present findings of the study.

Table 4: TPM of ChickPea Exports from India (2011–2021)

Chickpea	Algeria	Pakistan	Türkiye	Sri Lanka	Saudi Arabia	Egypt	Tunisia	Iraq	Spain	Libya	others
Algeria	0.00	0.00	0.00	0.15	0.00	0.10	0.01	0.00	0.00	0.04	0.71
Pakistan	0.08	0.70	0.10	0.00	0.00	0.00	0.08	0.00	0.04	0.00	0.00
Türkiye	0.10	0.25	0.48	0.03	0.00	0.00	0.00	0.02	0.06	0.06	0.00
Sri Lanka	0.31	0.00	0.35	0.25	0.00	0.05	0.00	0.00	0.00	0.00	0.03
Saudi Arabia	0.41	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.12	0.45
Egypt	0.20	0.00	0.00	0.00	0.26	0.09	0.00	0.00	0.00	0.00	0.44
Tunisia	0.00	0.00	0.00	0.03	0.34	0.00	0.24	0.39	0.00	0.00	0.00
Iraq	0.46	0.00	0.00	0.00	0.00	0.00	0.02	0.52	0.00	0.00	0.00
Spain	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Libya	0.00	0.00	0.00	0.56	0.33	0.00	0.00	0.11	0.00	0.00	0.00
others	0.09	0.00	0.00	0.02	0.05	0.01	0.00	0.00	0.00	0.00	0.83

Raw Data Source: www.fao.org

3.3 Export Competitiveness (CMSA) of ChickPea from India

CMSA was used to analyze the source of export growth of selected agricultural commodities from India to top fifteen export destinations for the period of 21 years i.e., overall period (2001–2021) with two sub periods, period I (2001–2010) and period II (2011–2021).

Chickpea export to world was increased only in period I to USD 366040 million attributed by SE, CE and SOC with 59.26, 27.60 and 13.12 per cent respectively. There was decreased export in period II and overall period eventhough SOE and CE were having positive values as SE out-weighed with -51.44 and -225.81 per cent respectively. In case of major importing countries, chickpea exports changed by USD 174593 and 68648 million in period I and overall

period respectively. This change in exports was mainly due to SOE with 54.44 per cent (period I) and 47.99 per cent (over all period). The decreased export was due to reduced demand indicated by SE with -58.36 per cent in the second period. Again there was decreased exports to other countries in the overall period to the extent of USD -435993 million resulted by the negative SE with -77.62 per cent whose effect dominated the effect of CE (101.19%) and SOC (76.43%). It can be concluded that in the overall period the export growth of major destinations was contributed by SE, CE and SOE but SOE had a major share in influencing the growth in major destinations. Hence, exports to traditional countries increased only due to increased market share. Overall exports to the world and other countries decreased due to decreased demand as indicated by SE. (Table.5).

Table 5: Export Competitiveness (CMSA) of ChickPea from India

Main Component	World			Total (Major) Importing Countries			Other countries		
	Period I	Period II	Over all	Period I	Period II	Over all	Period I	Period II	Over all
1 Structural effect (SE) (%)	59.26	-51.44	-225.81	6.69	-58.36	35.65	-94.50	-72.63	-77.62
a. Growth effect (GE)(%)	59.26	-51.44	-225.81						
b. Market effect (ME)(%)	-30.29	-149.91	-315.37						
c. Commodity effect (CoE)(%)	0	0	0						
d. Structural interaction effect (SIE) (%)	30.29	149.91	315.37						
2. Competitive effect (CE) (%)	27.60	103.24	115.64	38.86	115.27	16.34	326.22	100.68	101.19
a. General competitive effect (GCE) (%)	0	0	0						
b. Specific competitive effect (SCE)(%)	100	100	100						
3. Second order effect (SOE) (%)	13.12	48.20	210.16	54.44	43.08	47.99	-131.71	71.95	76.43
a. Pure second order effect (PSOE) (%)	47.52	46.69	181.73						
b. Dynamic structural residual effect (DSRE)(%)	52.47	53.30	-81.73						
Total (%)	100	100	100	100	100	100	100	100	100
Change in export value (USD million)	366040	-874723	-367345	174593	-137091	68648	191447	-737632	-435993

Raw Data Source: www.fao.org

Figure 1 depicts the source of export change of chickpea from India to major 15 importing countries from 2001 to 2021. The increased export to Sri Lanka, UAE, Saudi Arabia, Egypt, Kuwait and USA was due to increased market share by India in these countries as indicated by

SOE. The increased export to Algeria, Spain, Malaysia and Portugal was due to CE. There was unstable import over the years by Pakistan, Türkiye and Tunisia due to negative SE and positive CE and SOE.

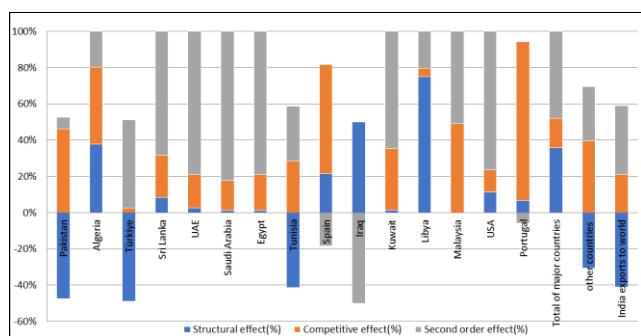


Fig 1: CMSA of India's major destination of chickpea (2001-2021)

3.4 PAM of Chickpea from Andhra Pradesh

PAM is a tool used to measure the comparative advantage, efficiency of production system and divergences in private and social prices. Hence, the matrix was used to measure the export competitiveness of chickpea from Andhra Pradesh and various ratios viz., NPC, EPC, DRC, PCR and PC were worked out for the year 2021 (Table 6). If the values of these coefficients are less than unity it is inferred that the commodity was export competitive. While, value more than unity indicates the absence of export competitiveness for the commodity.

NPC estimated was below one for chickpea showed that the market price of the output does not exceed the social price and hence, inferred that the chickpea was price competitive in the State and good import substitute. The NPC value more than one indicated Government protection and vice versa. Thus, the NPC value below one inferred that the chickpea was not protected in the State. The results were similar with the results obtained by Kumar and Gummagolmath (2021) ^[21].

EPC is the ratio of value added at domestic prices to the value added at border prices. EPC greater than one showed lack of competitiveness. In the study, EPC of chickpea was 0.71. Hence, the producers were not protected through Government policy interventions. Meena *et al.* (2018) ^[22] also found the same result.

The value of DRC of chickpea was less than one. Hence, the farmers in the State spent less than one rupee to earn rupee equivalent of foreign exchange. Thus, DRC clearly inferred that substitution of imports by producing domestically was socially desirable for chickpea. Further, the State had competitiveness in producing selected commodity in long run and domestic resources were efficiently used. Kanaka and Chinnadurai (2015) ^[23] results were in line with the above results.

The PCR and PC ratio were 0.67 and 0.47 respectively, indicated the positive private profit for selected crops. Hence, production of this crop was competitive given the actual prices in factor and product markets. The results were in accordance with the Rani *et al.* (2014) ^[18].

Table 6: Results of PAM of chickpea from Andhra Pradesh for the year 2021

NPC	EPC	DRC	PCR	PC
0.92	0.71	0.50	0.67	0.47

4. Conclusion

The CAGR analysis revealed that there was a significant

growth trend in the area of chickpea cultivation during overall reference period. However, significant growth in chickpea production was observed, which was primarily attributed to increased productivity over time as a result of several government schemes trying hard to make India self sufficient in pulse production. Moreover, the study also found a significant increase in both chickpea exports and imports during the entire study period showed that there is wide opportunity to grab the world market of chickpea along with sustaining the nation's consumption level.

The analysis of trade direction using TPM for chickpea exports indicated a decreasing stability in imports from India. Only a few major importing countries showed stability in their imports from India, while the majority of countries could not retain their previous share of chickpea imports from India. This highlights the competitive nature of the global chickpea market and the need for continuous efforts to strengthen India's position as a chickpea exporter. The source of market share for export growth was found to be contributed by SE, CE, and SOE. Among these, SOE had a major share in influencing the growth in major destination countries. This signifies that the increase in exports to traditional markets was mainly due to India's increased market share. Overall exports to the world and other countries decreased due to decreased demand, as indicated by SE. Lastly, the Export Competitiveness calculated using the PAM revealed that the values of NPC, EPC, DRC, PC, and PCR were all less than one. This signifies that Indian chickpea is competitive in the international market, acts as a good import substitute, and is not heavily protected through government policy interventions. This competitiveness in the global market is a positive indicator for chickpea sector in India, as it opens up opportunities for increased exports, foreign exchange earnings, and overall economic development. In conclusion, the study provides valuable insights into the growth dynamics and trade performance of chickpea from Andhra Pradesh and India as a whole. The findings highlight the significance of increased productivity in chickpea production, the chickpea trade, and the importance of focusing on enhancing competitiveness in the global market. These insights can guide policymakers and stakeholders to formulate strategies to further boost chickpea exports and strengthen India's position as a major player in the global chickpea market.

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