Journal Homepage: -www.journalijar.com
INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)
Article DOI: 10.21474/IJAR01/8057
DOI URL: http://dx.doi.org/10.21474/IJAR01/8057

RESEARCH ARTICLE

PRODUCTIVITY, PRODUCTION AND EXPORT OF FOOD GRAINS:ODISHA'S CONTEXT TO INDIANSTRATEGIES.

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Manuscript Info

Manuscript History
Received: 09 September 2018
Final Accepted: 11 October 2018
Published: November 2018

Keywords:-
Food Grains, Commercial aspects, Consumption, Export,Organic Farming, Production, Productivity,

Abstract

The country has achieved self-sufficiency in food grains especially in rice, wheat, maize. Indian origin rice (both aromatic and non-aromatic) are exported to African, Middle East, South East and Far East countries and one of the major foreign exchange earner for the nation. Indian maize is also exported to overseas markets for feed and food use as the country has exportable surplus. The country has achieved tremendous growth in the field of pulses production and India has emerged as net exporter in the last few years. In this backdrop this study analyses the contribution of Odisha state in the field of food grain production and export. The agri economy of Odisha is yet to achieve its full potential due to various factors related to socio-cultural, economic, commercial, technological and infrastructure. But the state can utilize abundant natural resources to undertake commercial farming and capable of meeting the demand of overseas buyers in terms of quality and quantity. The state machinery and procurement agencies should ensure fair and remunerative prices to the farmers. There is urgent need to promote scientific farming techniques and adoption of advanced pre and post harvesting technologies to increase production and productivity. During study it was observed that rice and maize exported from Odisha play secondary or filler role as get mixed with other origins by the exporters. Promotion and adoption of Organic farminghas tremendous scope in the state and can provide livelihood to majority of small and medium farmers living on sustenance farming.

Introduction:-

As per Economic Survey 2017-18 Government of India the top three producer of total food grains in the country during 2016-17 are Uttar Pradesh (49.1 Million Tonnes) followed by Madhya Pradesh (33.00 Million Tonnes) and Punjab (28.00 Million Tonnes). In terms of rice production West Bengal occupies first place with 15.10 Million Tonnes followed by Uttar Pradesh with 13.90 Million Tonnes and 11.00 Million Tonnes respectively. Similarly in case of wheat production Uttar Pradesh,Madhya Pradesh and Punjab occupies 1st, 2nd& 3rd place with figure of 30.10

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Million Tonnes, 17.9 Million Tonnes and 16.40 Million Tonnes respectively. State of Madhya Pradesh with 6.3 Million Tonnes occupies first place followed by Maharashtra (3.8 Million Tonnes) and Rajasthan (3.1 Million Tonnes). But in case of maize production Maharashtra with 3.8 Million Tonnes is the leading producer followed by Karnataka and Madhya Pradesh with production figure of 3.3 and 3.2 Million Tonnes respectively.

As per Agriculture Statistics (2016-17) published by Ministry of Agriculture and Farmers Welfare, Government of India the state of Odisha occupies 12th position in food grain production (≈9.06 Million Tonnes) in the country in terms of percentage share of production.

Review of literature:-

Tripathy et al, 2014[1]reported that average yield of paddy was alleviated from 668 kg ha−1 in 1950-51 to 2131 kg ha^{-1} in 2006-07 whereas productivity was raised from 520 kg/ha−1 to1557 kg ha−1 in Odisha during the same years. The average rice production in Odisha was 1820Kg/ha^{-1} in an area of 4.18Mha with overall yield 7.613MMT in the year 2013-14. Economic Survey 2017-18, Govt. of Odisha (GOO)[2]reports Odisha has net cropped area constitutes about 35% of total geographical area of the state with food grain and cereals production cover about 93.26 %, oilseed about 2.95% and other crops about 1%. Rice is the principal crop covering about 60.55% of total cultivated area.The importance of agriculture in the state can be gauged from the fact that about 60% of workforce depends upon agriculture for sustenance and agro sector contribute about 20% of total GDP of the state Odisha. Multi-agro climatic zones (ten) of the state can take forward any agriculture venture leading to huge scope for agri-exports such as groundnuts, cashew nuts, onion, sweet potato, chili, okra, turmeric, tamarind, ginger and non-basmati rice (The Express News Service, 24th Feb. 2017). Edgeworth M., 2018[3]reported that the domestication of animals and plants were prompting atmosphere and climate as cattle pastoralism (by the Muni's and Rushi's) and were controlling the production in India but in pre and mid Holocene period.

As per the Revealed Competitive Advantage (RCA) done by the Federation of Indian Export Organizations (FIEO), four categories (iron, mineral metals, chemicals and marine products) but according to new export strategy, the state is stressing upon its exports of pharma-products, plastic, spices, cereals and organic farm items to have immediate impact on growth of of employment and livelihood opportunities, (PTI, 24th December 2017).

Directorate of Agriculture and Food Production (DAFP) Odisha, 2011, has reported that Odisha has favorable agro-climatic conditions, biodiversity, and horizontal scope for optimization of GW resources, vertical expansion in cash crops, rural connectivity, traditional and modern expertise for agriculture while chalking out strategic plan for Green Revolution. Whereas the weakness that deteriorates the growth of Odisha are subsistence farming, non-remunerative agriculture, lack of market orientation, lack of entrepreneurship, so called money order economy, absence of policy guidelines to include share croppers in availing investment subsidy, financial assistance. Sahoo S. R., 2015[4], has mentioned that rice among cereals and black gram, green gram, horse gram and pegionpea among pulses are the principal food grain of Odisha but their cultivated area is decreasing continuously which shall invite unstablity as well as for fixation of price policy. The Draft Export Policy Odisha-2017[5]has identified potential sectors for exports from Odisha are rubber, coconuts, vegetables, cereals, spices like turmeric, ginger, pepper and organic spices FIEO Website-2017[5].

India has emerged as one of the world's leading rice exporters after the removal of the export ban on coarse (non-Basmati) rice in 2011. It was predicted that rice exports from India in MY 2017-18 were low at @8.5 MMT (4.5 MMT coarse and 4.0 MMT scented Basmati rice) depending upon expected poor intercontinental demand and devaluation of INR and government restrictionsSingh S. K., USDA, 2017[6].Globally, maize is chosen as a staple food for 900 million poor from (120 -140 million farm families), and about 33.33% of malnourished childrenMurdiaet al, 2016[7].Mishra et al 2016[8], has mentioned that the soil and ground water quality of Odisha coast is favourable for growth of crops.It is observed that many districts of coastal Odisha have depicted better performance in agricultural sustainability in comparison to the district of Western Odisha as a whole.Sharma et. al., 2011[9]observed that the prevailing marketing system is grossly inefficient in Odisha where farmers are ignorant of access to market and are constrained to local tradings at abysmally low prices. The open auction method is non-existent due to lack of infrastructure and dedicated staff at market level and marketing transparency. Kannanet. al., 2011[10], and Pal et al., reported[11] that technological and institutional support for a few crops like Rice and Wheat brought significant changes in crop area only but not to other crops. Raghuramet. al., 2008[12], 2010[13] has observed that the promotion of Basmati and Non-basmati rice export in the global market require policy initiative like

induction of advanced technology, disease and pest free varieties, awareness on price and market rents and other policy initiatives at the grass roots level and on Govt. level to boost the exports which is lagging in Odisha.
Kumar and Srinivas et.al., 2013[14] reported that maize outlook and investment opportunities in India found that the demand for maize in livestock based products are increasing and the demand for maize as a food product is constantly declining in India. The market surplus of maize crop has increased and has suggested improved access to domestic and international market with economy of scale and value creation. Sharma and Kachroo et al., 2016[15]mentioned in their study on the growth and instability of Maize in Jammu and Kashmir and reported that the area, production and yield instability in maize is very prominent in J&K state. Das et. al., 2012[16],indicated that genetic and biotechnological interventions in maize can ensure food security and economic growth. Kumar and Srinivaset. al.,2014 [17]mentioned that with congenial policy environment India can participate in Maize export market in a big way in future.Bhatta et al., 2018[18]and Fact finding report on popularization of hybrid maize in Odisha, 2011[20], has noted that districts like Nawarangpur,Ganjam, Kalahandi, Koraput, Malkangiri, Kandhmal have highest areas under irrigated maize cultivation in Odisha. A special programme for popularization of hybrid maize has been taken up in twenty western and southern Odisha districts in PPP model.

Objective of the Study:-
To analyze the present status of food grain production and its export potential from the state of Odisha and suggest measures to increase the export activities.

Methodology of Data Collection:-
The present study is based on primary data collected through the open-ended interview method over phone and in person. The exporters, suppliers, buyers and service providers interviewed are directly connected with export activities from Odisha region. Statistics with regard to figure on production, consumption and trade is relied upon the Government sources and the specialized bodies associated the activities connected with export activities and promotion.

Assumptions & limitation in the Study:-
1. The export activity is primarily a commercial activity and the present study is aimed at finding out the "commercial aspect" of rice and maize export from Odisha. Hence the focus of the study is to bring out the factual details behind acceptability and viability of export of rice and maize from Odisha region in overseas market exported through custom borders.
2. The focus of study is on export of Non-basmati Rice as compared to Basmati Rice i.e. scented/fragrance Rice. The quality of rice defined as specifications laid down in the in export contract mutually agreed between exporter and importer as India exports many varieties of rice with different quality specifications. The quality parameters like length, broken percentage moisture, damaged and discolored, chalky grain, foreign matter, paddy percentage differ from contract to contract.
3. In case of maize exports the quality parameters like moisture and aflatoxincontent is mutually agreed between exporter and importer and the end use as "feed purposes" or "food purposes" is not differentiated in this study. The export from Odisha means Maize produced in different parts of Odisha only.
4. The export from Orissa means Rice produced/ milled in Orissa region and delivered to port areas for export purposes.It also does not include paddy transported or delivered from Odisha to neighboring States like Andhra Pradesh, Jharkhand and Chhattisgarh for milling purposes.
5. The export consignment of rice and maize require both backward and forward integration such as sourcing of bagged cargo from mills, transportation to the port, warehousing, engagement of CHA and stevedores for loading into vessel etc. Most of the millers cannot undertake these activities in an organized manner. Moreover, this kind of transactions involves financial and commercial risk. Hence traders/exporters undertake these activities and millers generally prefer to deliver the cargo to traders/exporters on ex-mill basis for export.
6. In the recent past Indian maize is out priced by South American origin and no major export activities with regard to maize except some parcels moving to neighboring country like Bangladesh, Malaysia, UAE and Yemen etc. Hence the response of the respondents is based on their experience not so recent one.
7. In this study logistics constraints imply bottle-necks in respect of transportation, go down and storage, port facilities, loading of vessels in both pre-shipment and post-shipment. The exporters prefer to maintain low inventory before shipment and try to coordinate movement of export cargo to port to synchronize with vessel loading operation. These approaches enable the exporter to cut down inventory, transportation and storage cost.

Expected Benefits of the Study:-

1. Chalking out plans to develop rice and maize farming on commercial scale.
2. Policy initiative to provide inputs like good quality seeds, pre and post harvesting technology and milling techniques.
3. Developing Odisha state as hub for sourcing organic rice, maize and pulses
4. Developing infrastructure facilities like go down and storage space in the producing areas or hinterland and emphasis on rail/road connectivity with hinterland to port areas..
5. Formulating the strategy for promotion and branding of Orissa Rice and maize.
6. There is urgent need to restructure and strengthening of Mandi system across the state for ensuring remunerative price to growers through Minimum Support Price (MSP).

Food grainsproduction in India:-

India is one of the largest producers of paddy (rice). The staple foods for ≈70% Indians are rice, especially by the east and south Indian. The consumption of rice in India was 93.6MMT in MY 2015-16, 97MMT in MY was 96MMT and was projrcted 99MMT in MY 2017-18 whereas the production were 104.32MMT, 106.5 and 106.00MMT in the corresponding year respectively indicating India is food sufficient in rice sectorMinistry of Agriculture, FCI MY 2017-18The most popular varieties are White (digestive), Brown (rich in Mn, P, Se, ≈As, Vit-B6, & fiber), Black (Manipur variety, anti-oxidant), Red (iron, anti-carcinogenic), Parboiled (K, Fe, Ca and Mg, anti-diabetic), PalakkadanMatta Rice (Kerala variety, Fe and Mg), Basmati or Jasmin Rice(aromatic) and sticky rice (For sweet dishes).The staple food of India, the rice has benefits from different varieties are better digestive, anti-diabetic, anti- oxidant, immunity stimulation, anti-carcinogenic, metabolic, good for skin and hair and alleviates heart problem. But depending upon the necessity, India urges for early variety, water resistant, drought resistant, wild variety, disease resistant and high yielding variety of paddy.

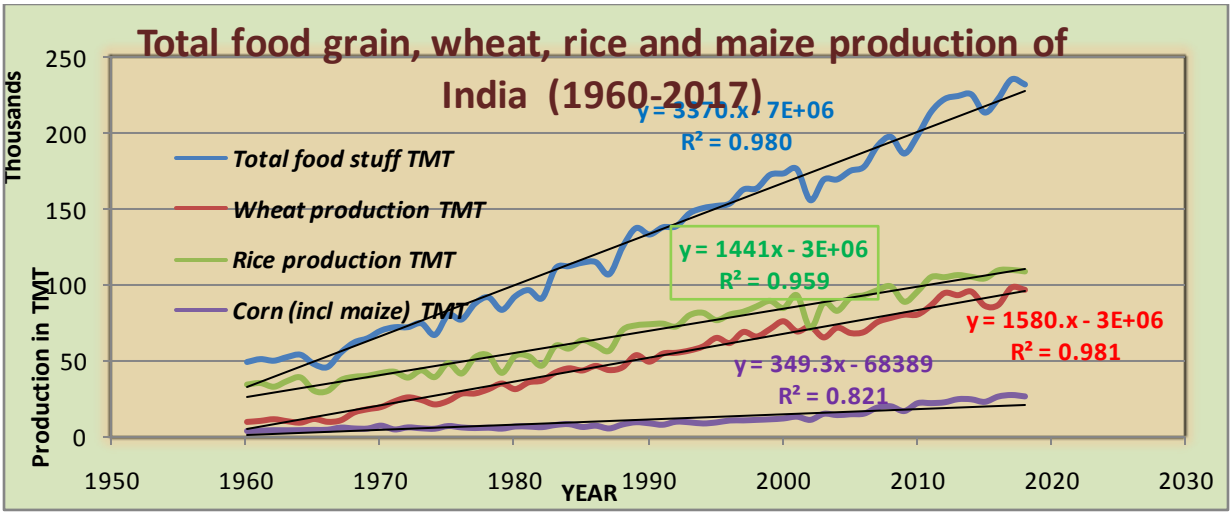

Fig 1:-The total food grain, wheat, rice, and maize production in India)(Source:http://www.indexmundi.com/india& United States Department of Agriculture (USDA)

The above production time series of production of total food grain wheat, rice and corn (incl. maize) in Indian indicate with the rising population the food grain production is also increasing from 1960.Production of rice is higher (in terms of tonnage) than the wheat as east, south and some parts of west coast are traditionally paddy cultivators as their staple food is rice. In comparison to rice and wheat the growth rate of maize production is less which may be due the cultivation corns take place generally in non-irrigated and tribal and hilly areas.

As far as theconsumption of total food grains (wheat, rice and corn including. maize) in Indian scenario, the rate of intake per year has increased keeping pace with the increasing population. The domestic consumption graph indicates the consumption of rice is higher than the wheat may be due to the fact that more consumers use rice as their daily food**Fig 1.**

As far as the consumption of production of total food grain wheat, rice and corn (incl. maize) in Indian scenario is concernedthe consumption of different food grains per year has increased keeping pace with the increasing

population. The domestic consumption graph indicates the consumers of rice are higher than the wheat due to more number of multiple end users

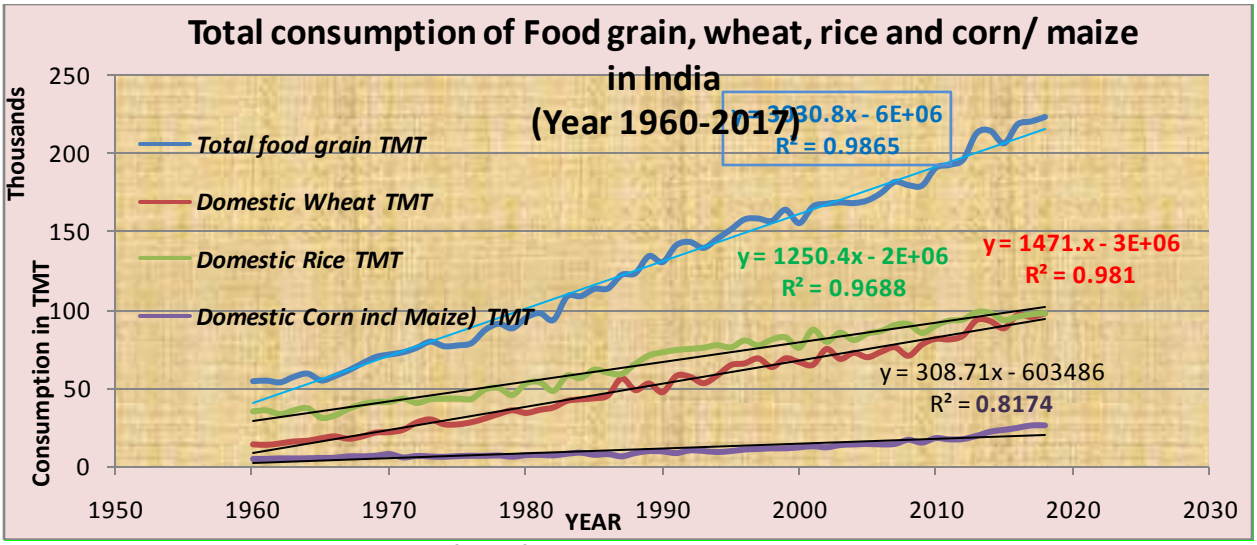

Fig2:-The consumption of total food grain, wheat, rice and corns in India**,**(Source: http://www.indexmundi.com/india& United States Department of Agriculture (USDA)).

Comparing the production vs. consumption figuresit can be concluded that India used to import food grain due to demand supply mismatch i.e.domestic consumption exceeding production till 1982. The period (1983 to 2002) witnessed growth in the production of food grains and India became less dependent on imports and resorting to imports on need based only. Post 2003 India registered impressive growth rate in production of food grains and achieved self-sufficiency meeting demand of domestic consumption and becoming net exporter of foods grain. (barring 2006-2008 when what was imported). India has ambitious plan of achieving food security by supplying subsidized food grains to targeted population through its network of public distribution system (PDS).

The Rice and maize scenario Odisha:-

Odisha is a small east coastal state in India where the staple food of massesis rice in plains and maize in hills.The state is having agrarian economy with advantageous agro-climatic and soil conditions to grow variety of cropsincluding commercial crops. The crops grown in the state are paddy, pulses, sugarcane, maize, jawar, oilseeds, turmeric, jute, cotton, coconut, rubber, tea, ground nuts, potato and onion. These crops depend heavily on rain and distribution of monsoons is a prime factor in deciding the output and yield. Paddy inOdishais cultivated usually under varying topographical settings from EGBHills of western Odisha to coastal tracts in eastand under variable climatic conditions. Rice crop needs humid to sub-humid regions under subtropical and temperate climate under r/f > 12 to 15cm even more. Odisha has some endemic varieties of paddy (in 20th century) are Asansodi, Baiananda, Ratanchudi, Pratiksya, Puja, Masuri, Jajati, Phalguna, Condomo, Para, Khandgiri, Ratnalu, Khandagiri, Pratika, Anura, Bhutia, Tulasiganthi, Haldigodi and widely shown Champa which are less in production at present.

Maize, a food and a fodder has the advantage of nutrition, appetizer, anti-dyschezial, antacid, and and reduces risk of Alzheimer's disease, diabetes, cancer, skin and heart diseases.Maizeneeds high humidity, prolonged sunshine and an assured supply of water. at a temperature of 21 to 37^0C. The local names for maize in India (except sweet corn) are Maka or Mokka (in almost all states), except Bhutta(Bengali), Makai(Gujarati,Kashmiri), Musikinujola(Kannada), Cholam(Malayalam), MakkaCholam(Tamil), Mokkajonnalu(Telugu).

Maize production India:-

The rate of growth of maize in the globe is @ CAGR 3.4% in the last decade from FY 716 MMT (2004-05) to 967MMT (2013-14) by the major maize producing countries US (37%), China (22%), Brazil & EU (7% each), India (2%) and rest 25% by other countries. Maize produced in India was augmented @CAGR 5.5% from 14MMT in 2004-05 to 23MMT in 2013-14 and dominating states are Karnataka (4.4MMT in 1.3Mha) and AP (4.0MMT in 0.7Mha).Theconstraints for low maize production are erratic and harassing climate, Giving

importance to Paddy and wheat, lack of hybrid technology and agri-methodology adaptation, old storage, harvesting and distribution methods and small farm holding's. Maize consumption has elevated @ CAGR 3.6% for the MY2007-08 to 2013-14 where the consumption in poultry sector was 50-60%, FICCI, The maize summit-2014[20].Hilly alluvium with red loams free but well drained soils are best fit for maize as it is nitrogen rich.

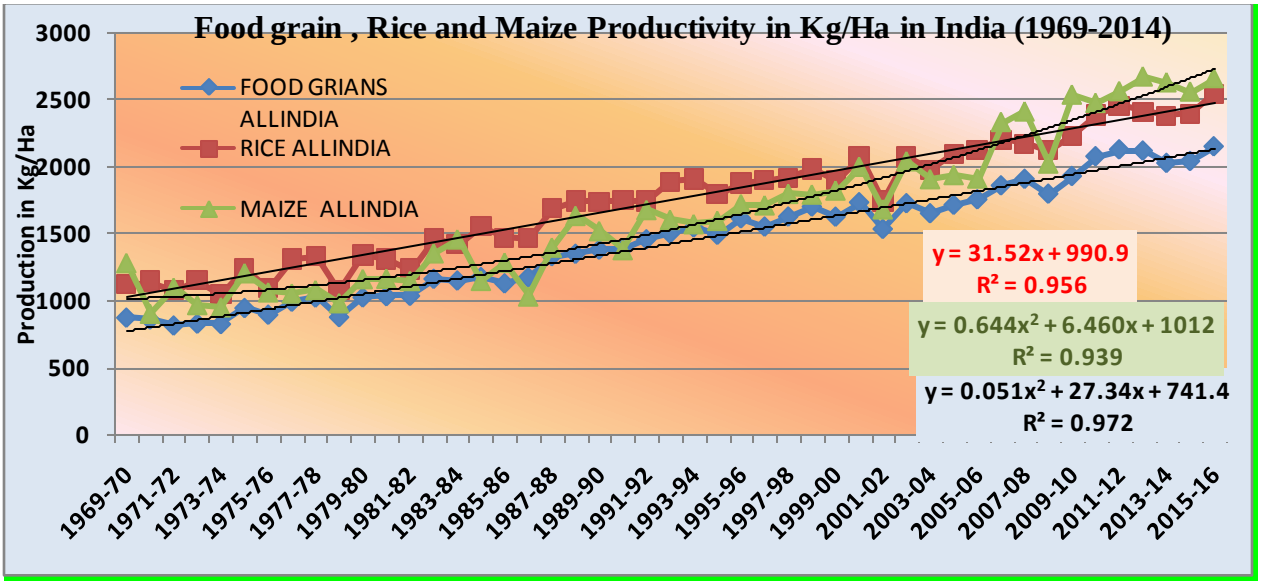

Fig 3:-The productivity of food grains, Rice and maize, India (1969-2014):Source : Agriculture Statistics published by Ministry of Agriculture and Farmers Welfare, Government of India & Economic Surve2017-18, GOI, Various issues of Economic Survey ,GOI

Since the productivity is synchronous with climate, meteorological extreme events, the comparison of yield in Kg/Ha is increasing and the trend is isochronous. The trend in productivity is rising for food grain, rice and maize. The total food grain is following linear trend whereas individually the productivity of rice and maize is following polynomial models with R2 values 0.956, 0.94 and 0.973 respectively **Fig -3.**

Rice production in Odisha:-

Odiya's are rice eaters due its soil, climate and terrain prospective and cultivation of wheat is not widespread in Odisha. A comparative study was between the crop yield rate between India and Odisha and it is observed that per hectare production of rice was almost equal between Odisha and India during 1970's but latter the initiatives taken by the farmers and the state government was slack and the yield rate had declined but during five years after 2010 it

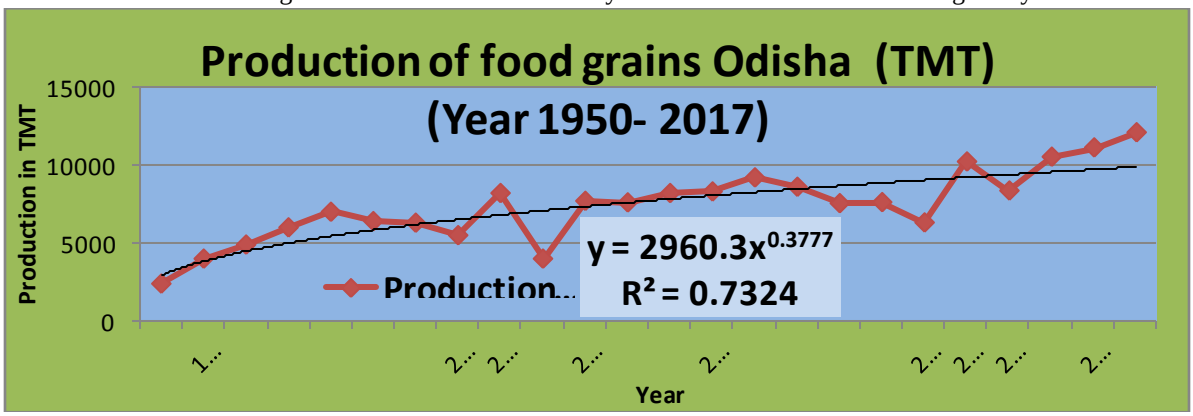

Fig 4:-Production of food grains in Odisha (Source: Odisha Agricultural statistics,Govt. of Odisha and various issues of Odisha Economic Survey)

isincreasing.On statistical study it is observed that the increase in yield rate is linear in Indian context whereas the yield rate is nonlinear on Odisha's context.

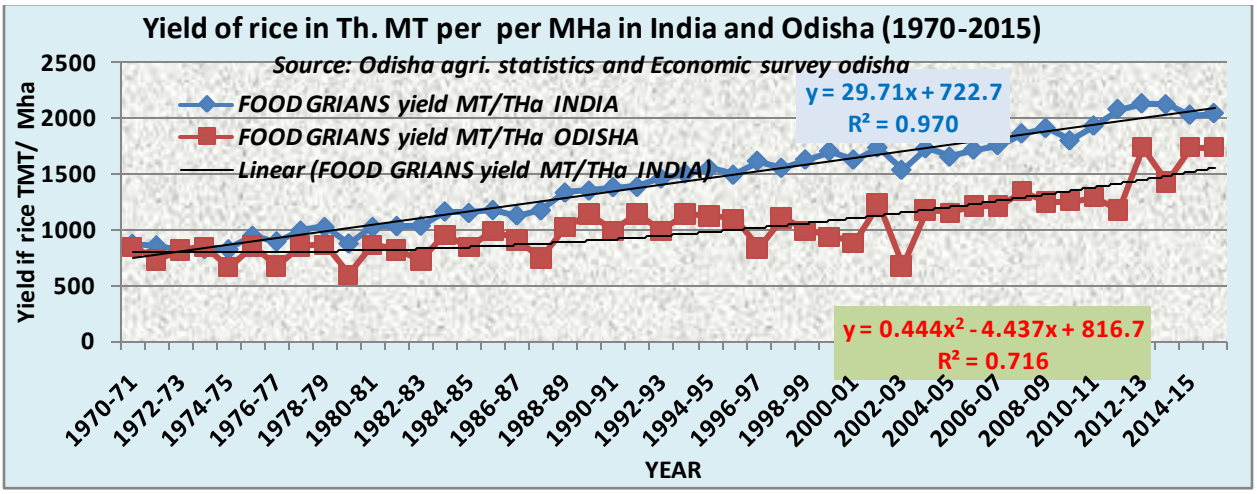

Fig 5:-The production of food grain India w.r.t Odisha compared from 1970 to 2015, Source: Odisha Agricultural Statistics and Odisha Economic Survey

During 1950s Odisha was leading producer of Rice and was contributing sizeable amount of Rice to Central Pool Stocks. But Rice area of the State has stagnated during the last 35 years which is about 4 million hectares (10%) of total Rice area in India. Rice is grown in Odisha over area of 4.4 million hectares accounting for 91% of area under cereals and contributes about 94% of total cereal production in the State., Das et al., 2011[21]**Fig -5.**

Productivity of Food grains (India):-

When the productivity of all the food grains cultivated in Odisha it is observed that the rice productivity was high till the MY – 2009-10 but afterwards the Maize yield in Kg/Ha have exceeded till 2016-17though food grain productivity is continuously increasing **Fig 6.**

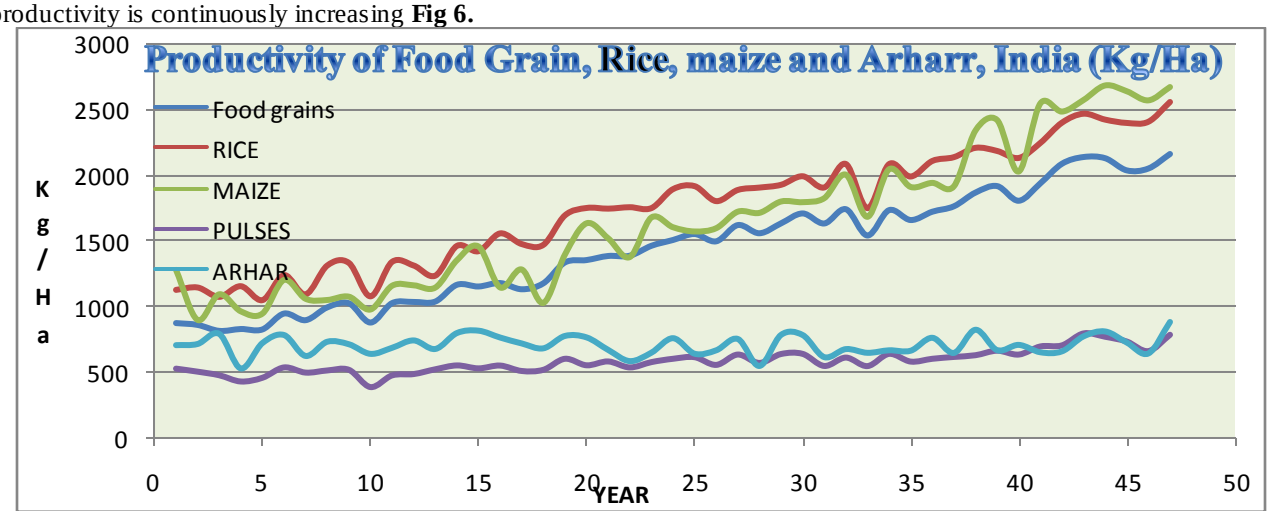

Fig 6 :-Productivity of food grains like rice, Maize, pulses and Arhar in India (MY-1970-2017), (source: Source : Agriculture Statistics published by Ministry of Agriculture and Farmers Welfare, Government of India & Various issues of Economic Survey ,GOI)

Productivity of Food grains (Odisha)

On analysis of productivity data such as total productivity of food grains, rice, maize, pulses and arhar is Odisha it is inferred that the productivity of maize has increased from year 2006-07 onwards.

Also it is seen that the productivity of Arahar has declined continuously 1980-81 onwards due to arhar was cultivated in tribal belts by traditional practices (Podu cultivation method) which is banned by the Govt of Odisha in 1980's, Das Balaram, 2006[22]**Fig 7.**

The key for increase of production and productivity is the adaption of new method of cultivation of paddy in Odisha called the system of rice Intensification (SRI) Method. Sometraditional community of Odisha were cultivating paddy, and even pulses of beans, pigeon pea, and mustard seeds with conventional methods. At present they have switched over to this new practice which uses younger seedling technique with less water, less seed but labour intensive, mechanized and hand weeded.SRI method is high yielding, and can be applied in the fields of marginal famers with application of organic manure, the technology has become popular which has augmented the productivity of food grains in Odisha.

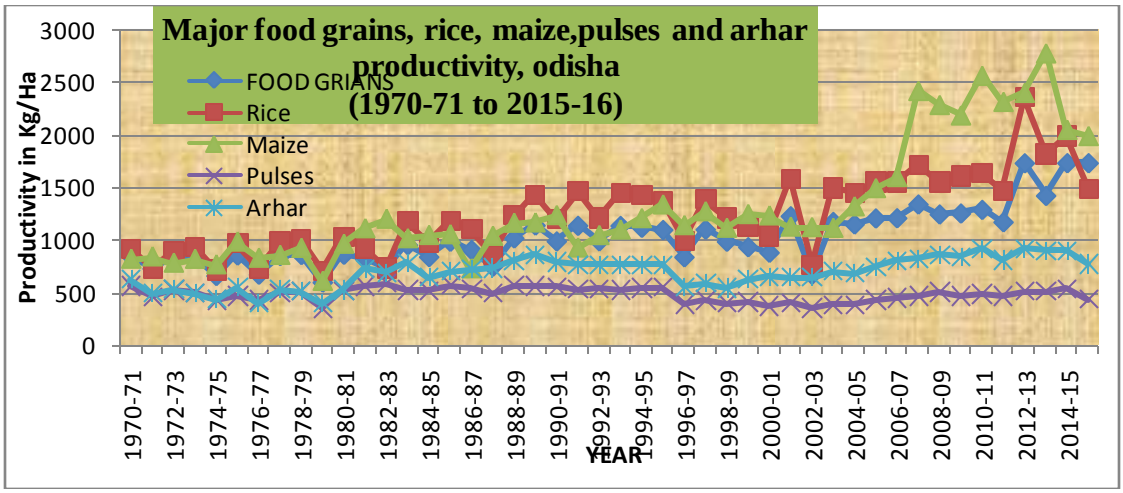

Fig7:-Comparision on productivity of different food grains, rice, maize, pulses and Arhar in Odisha, Source:*various issues Odisha Agricultural Statistics and Economic Survey, Government of Odisha*

Rice Production strategies in Odisha:-

Mishra et al., 2010[23]has mentioned about a serious decline in Odisha's agriculture due to highly concentrated in low productive and high water consuming paddy cultivation with little diversification toward pulses, oilseeds and other high value crops like sugar cane, fruits and vegetables etc. In spite of the available opportunities such as favorable Government policy, promoted network of support system, emphasis on PPP assured market, contract farming and infrastructural support Odisha is lagging in its progress. The emerging threats are changing food habits, recurrent naturalcalamites, low productivity; dominance of rain fed cropping practices, lack of application of advanced farm technology, disaster management and proper distribution/utilization of water resources. The growth rate/crop yield from agriculture in Odisha was much lower than average in India during the period (1991-2008) Reddy et al.,2013[24].

Maize production strategies Odisha:-

Maize is one of the major crops grown in Odisha apart from Paddy, Pulses and Sugarcane. From growers point of view Maize crop needs less input cost and provides more profit margin. It's a versatile crop that requires less water with wider adaptability to soil type, seasons and ecologies. Moreover it has varied and diversified use as food, feed and industrial ingredients and ready market for disposal. The different types of Maize are yellow/white grain, sweet corn, baby corn, popcorn, quality protein Maize, waxy corn, high oil corn, fodder meal. Maize is also used as Industrial raw material and used in variety of products directly and indirectly. The Maize production in India has been largely driven by growing demand by feed industry and various industrial use Kumar, &Srinivas et al., 2014[17]. Recently, advance countries like USA, Canada and Europe utilize maize crop as an important ingredient in bio fuel.

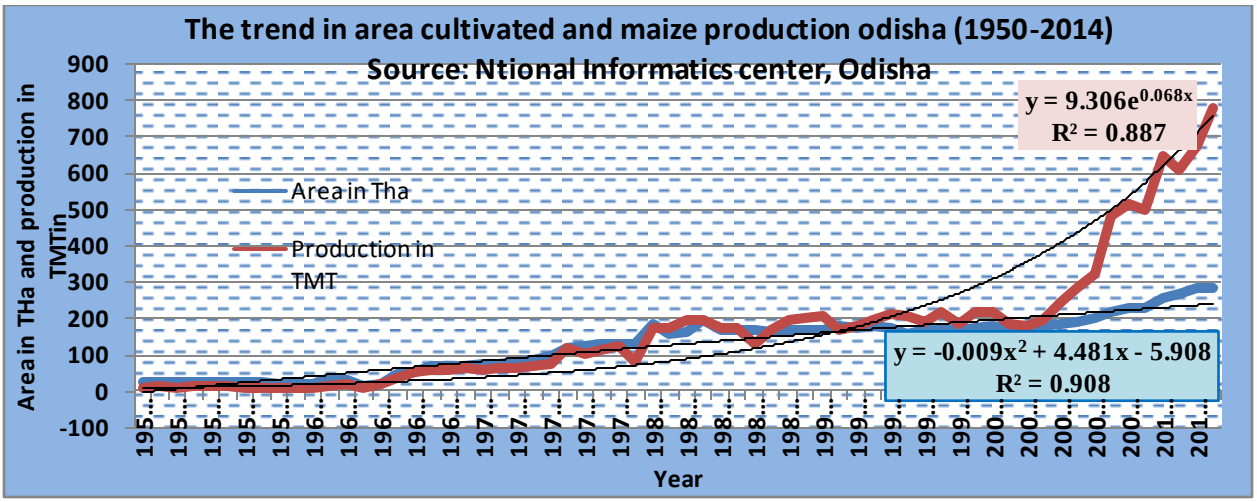

Fig 8-*The trend in area cultivated Vs. corresponding production of maize in Odisha(Source: NIC, Odisha)*

The trend in area cultivated vs. corresponding production of maize in Odisha (Source: NIC Odisha)is in Fig 8 and the graph indicate that, the maize cultivated area is increasing slowly whereas production has increased sharply from the 21st century. The increase in area follows a polynomial function whereas production agrees an exponential function

Maize consumption India:-

The consumption maize in different sectors are Poultry feeds (47%), direct consumption (20%) and bovine fodder (14%), starch 12% and other foods and beverages 7% according to KLEFMAN group.From the trend of productivity of all food grains, Rice and maize in Odisha it is found that the rice being the major food grain both the trends are parallel whereas the productivity of maize is less in comparison to rice. The best fit curve for the trend of productivity of food grains, rice and maize are polynomial models shown on the graphsMohantyet. al., 2014 **Fig-09.**

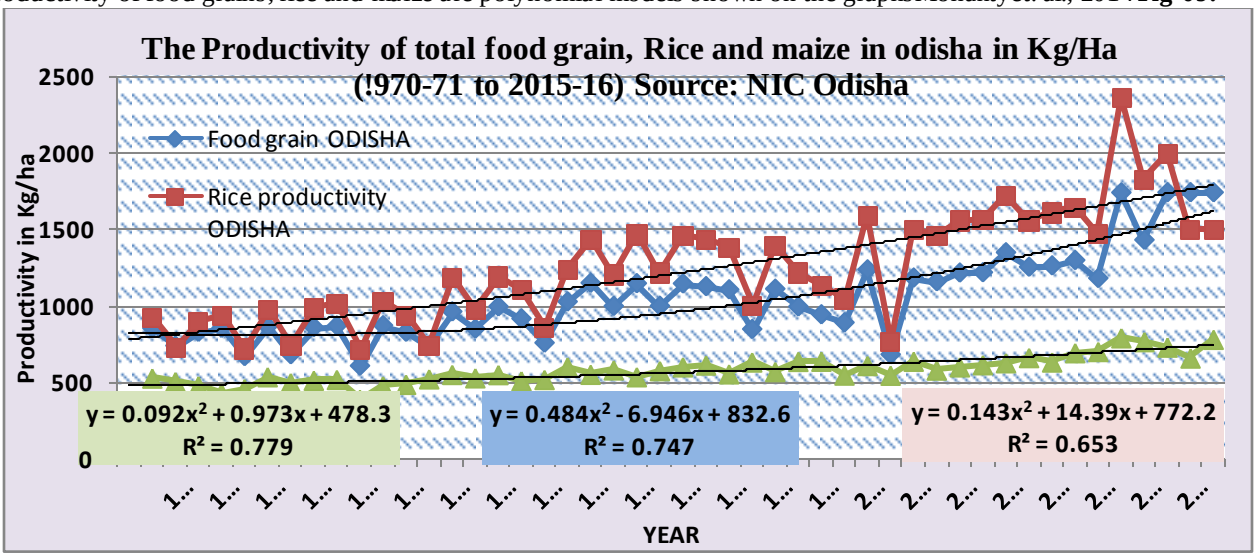

Fig 09:-The productivity of food grains, rice and maize of Odisha(1970-2016), Source: NIC,Odisha&: Odisha Agricultural Statistics various issues.

Rice production/export strategies, Odisha:-

All the respondents were interviewed and asked specific questions about their experience in respect of rice production and exports in general and from Odisha in particular their response is summarized below as under:

Majority of the respondents were of opinion that Odisha rice has ready acceptability in markets like Bangladesh and South Africa.Rice grown and milled in Orissa have short length and higher broken percentage. The traders and exporters source Odisha rice and mix with rice of West Bengal or Chhattisgarh to cater to the demand of Bangladesh market.
It was found out during survey that the paddy from Orissa crosses the bordering States milled there and then exported. The reason for transfer of Orissa paddy to neighboring region is absence of sufficient milling facility, distress sales by farmers, unscrupulous traders taking advantage of ruling lower price in the region. State Government to take immediate steps to protect the farmers and also measures to develop milling facilities on commercial scale.

The milling of paddy has not been undertaken in Odisha in commercial scale due to reasons like small holding of farmers, subsistence farming, lack of infrastructural facilities, natural calamities , lack of investment in agro sector and socio economic condition of the state etc. Since the capacity of Odisha millers are small say 2-3 MT per day the exporters find difficulty in aggregating the vessel load cargo of say 30,000 to 40,000 MT. Difficulty to "aggregate" the export cargo to meet both pre-shipment and post-shipment deadline was cited as one of the limiting factor for exporters to rely on Odisha for rice export.

The few respondents who were satisfied with quality and logistic factors from Orissa region were large exporters. During the discussions they pointed out that the export of Orissa Rice can be capitalized with patience and experience. Like short grain length Bihar Suvarna Rice Orissa can develop the Rice or Orissa belt in specific overseas markets. The reasons of inferior quality is the result of agro-climatic conditions and lack of poor milling technology in most of the mills. Hence there is an urgent need to adopt Rice cultivation and milling in a commercial scale and to adopt latest milling technology like installing sortex and grading machines.
The Rice trade in Punjab Haryana, Andhra Pradesh and Chhattisgarh is highly organized through the network of farmers, millers, trader's, brokers, agents and exporters. Orissa should facilitate the network by developing the infrastructural facilities in the region. The logistic factors such as storage of paddy in mill compound transportation of milled rice to the port areas and generating intermediate go-down and storage space would go in a long way in building confidence of exporters looking to volume exports.

There was unanimity among the respondents that the Rice from Orissa region rare exported from ports outside Orissa mainly Kakinada, Visakhapatnam and Haldia. There is urgent need to develop Paradeep port located in Orissa for Rice export. On positive aspect of the survey is that Orissa Rice can be placed in the overseas market as a niche product due to application of less fertilizer and more of organic product. For promoting Orissa Rice in the export market one integrated strategy is required with the involvement of all stake holders like millers, logistic agents and exporters.

Maize production/ export strategies:-

All the respondents were interviewed and asked specific questions about their experience in respect of maize exports in general and from Odisha and their response is summarized below as under:

The Maize corn needs rain during sowing and growing period and dry and sunshine weather during maturing and harvesting time. Increase in moisture, bad weather make the corn discolored mouldy, increase the aflatoxincontentandmakethe seeds germinate and sprout. The quality of maize produced in Karnataka and AP are of superior quality. The production and productivity of maize in Odisha is below all-India average.

As per the respondents maize from Odisha are being exported for the last few years to Bangladesh, Indonesia and Thailand from eastern coast ports namely Vizag. The shipment to Far East destination is by vessel and containers depending upon the contractual requirement. Mostly the shipment to Bangladesh is effected through rail/trucks by the exporters. Much of the cargo is sourced by the local traders and exporters in AP from Odisha and the cargos are mixed/blended with other origins and then get exported. All the respondents were unanimous in their opinion that maize from Odisha is not exported on "standalone basis" due to not so positive perception about Odisha maize.

The size of maize crop grown in Odisha is estimated to be about 5.5 Lakh MT to 6.0 Lakh MT as compared to total country production in the range of 22 to 23 Million Tones. There was divergent opinion among the

respondents about the quantum of maize exported during the last few years on average basis. About 60% of respondents felt 50,000 Mts of exportable surplus available and about 30% of the respondents put the figure about 1,00,000Mts and balance 10% of the respondents stated that abbot 1,25,000 to 1,50,000 Mts has been exported from Odisha on yearly basis during the last few years.

Majority of respondents felt quality of maize produced in Odisha is comparable to quality of maize produced in Bihar. Given a choice majority (96% of respondents) felt that supplier would not like to take maize from Odisha. Respondents overwhelmingly opined that exporters look for exporting Odisha maize in case other origins are not easily available especially from Bihar or exporters meeting low priced contract or urgent need to meet loading deadline and failure to deliver the cargo would land exporters in trouble. Respondents also stated that Maize grown in Odisha was earlier used in the starch industry due to inferior quality however 75% of the respondents felt Odisha has started growing quality maize recently and catering to the demand of feed industry.

Almost 80% of the respondent responded that presence of "high moisture" and 'aflatoxin content" are primary reasons for them to keep away from exporting Odisha maize. As per the majority of the respondents the moisture content in Karnataka and Andhra origin maize is between 12-13% as compared to Odisha maize around 15% on average. The size of maize produced in Odisha is smaller as compared to Karnataka and Andhra maize. Hence the Odisha maize is used as "blending" for export consignment.
Maize growers of Odisha use the traditional method of separating kernels from ear head is to dry under sun shine and put on the road and ply the roller on it to separate. In contrast the mechanized method of drying through machine by sucking moisture and putting on the thresher to separate kernel from the ear head. The export operation of maize needs adequate care before it gets shipped in containers or in bulk vessels. In a closed space corn generates heat and tends to become mouldy and began to sprout if there is excess moisture in the cargo. In the port premises when other cargo are stored, insects are bound to be there and they attack the corn as it is sweet commodity. 92% of the respondents were in favor of farmers and traders in Odisha to use modern technology for harvesting, drying and storage of corns enabling to meet export standards.

All of the respondents were in favour of transparent mandi system in place so that farmers receive remunerative price for their produce. Majority of respondents (96%) were of view that Government should intervene for enforcement of Minimum Support Price to the maize growers. About 88% of the respondents attributed lack of commercial farming and basic infrastructural facilities as cause for Odisha lacking in export front.

Most of the respondents have expressed that there is immediate need to build enough storage space with modern facilities to facilitate export activities in maize. The present storage space available in maize growing region are generally in smaller in size capacity 1,000 Mt to 2,000 Mts only. An exporter shipping in vessel load need minimum 4,000 Mt to 5,000 Mt capacity to build up and aggregate the cargo. 20% of the respondent stated that there is element of VAT on storage of maize and their concern need to be addressed.

Discussion on Export scenario:-

1. Buyers in markets like Bangladesh and South Africa prefer parboiled short length variety typically confirming to Odisha origin. . The farmers in Odisha adopt traditional farming technique and apply less fertilizer as compared to their counterpart in Punjab, AP and Haryana. The Odisha rice can be promoted in overseas markets like Middle East as healthy and organic rice.
2. The millers should be provided adequate incentives to install advanced milling technology (like sortex and grading) to meet the stringent quality parameters of the overseas buyers. The end product of milled rice containing uniform length and consistent colour and less broken percentage would gain greater acceptability in the overseas markets.The mechanical handling of food items like rice during milling, packing, grading, storage, transportation and loading reduce contamination to be promoted extensively.
3. The improvement in logistic facilities like storage, transportation, rail connectivity, intermediate go down space, loading and documentation facilities would attract exporters and traders to depend upon Odisha as regular and dependable supplier of rice. There is unanimity among the respondents that the facilities in port like Paradeep and Gopalpur in Odisha to be upgraded to handle dry bulk cargo like rice with minimal risk of contamination.
4. Majority of the respondents stressed upon building Odisha rice as 'standalone brand' just like Swarna rice of Bihar in the overseas market. The promotion has to be undertaken by the all stake holders like millers, traders, exporters and policy makers.

5. The present study focused mainly on commercial aspect of rice export from Odisha. Most of the respondents' are optimistic about the potential Odisha rice in the overseas market. However issue of rice export is linked with lot of associated factors like climatic conditions, government support, business environment, viability of export etc. Further study is needed to identify these factors and all stake holders working towards the goal of placing Odisha in the global rice export map.
6. The problems in export of maize are primarily related to quality and specifications like higher moisture and aflatoxin content, storage space constraints, unfavorable tax structure for storage of cargo etc. Apart from agro-climatic conditions the other influencing factors are poor economic conditions, small size holdings, absence of commercial farming, lack of knowledge about the market, low productivity, non-application of advanced technology and lack of other infrastructural facilities supporting export activities. Respondents have expressed their disappointment that most of the farming community still employ traditional sun drying technology before marketing their produce. Despite these unfavorable factors respondents have overwhelmingly supported the fact that Odisha has all the potential to become major maize growing state like neighboring state Bihar. The positive sign that the quality of maize produced recently in Odisha has improved due to introduction of hybrid maize seeds in some pockets and advanced technology in farming.
7. Majority of respondents have strongly suggested that Odisha can market their maize as organic and for food use in export markets.

Conclusion:-

The growth story of primarily agri-economy of Odisha is replete with regular yearly occurrence of natural calamities like flood, cyclone, drought, flash flood, lightning strike. These calamities adversely affect the production and productivity to large extent depriving farmer's decent livelihood the backbone of sustenance farming. Predominance of small and medium scale agricultural units without adequate agricultural inputs like funds, irrigation, quality certified seeds, equipment, fertilizer, pre and post harvesting infrastructure are major road blocks to undertake agriculture on commercial scale. Underdeveloped and undeveloped market infrastructure in major part of the state especially in remote, forest, hilly and tribal areas deprive the producers fair and remunerative prices for their produce. The state machinery implementing various scheme including presence of state and central procurement agencies have brought welcome changes in certain parts of the state.The issue of low production and productivity of the state be addressed by taking integrated and holistic approach to the problem areas. The major steps towards commercial farming are to incentivize the farmers and ensuring remunerative price for the produce. The state can play a leading role and can be placed in the forefront of the agricultural map of the country by promoting organic revolution not only in case of rice, maize and pulses but also in case of spices and vegetable. The producers in tribal and hilly districts of western Odisha use less chemical fertilizers and depend mainly on organic manure for their produce like rice, ragi, pulses, chilly, turmeric, coffee, garlic, ginger, vegetable like cabbage, potato, onion, brinjal, bitter gourd, pumpkins, ridge gourd, arum etc. The state can contribute to the export basket by carving out niche place by branding ,promoting and exporting food grains under GI/brand products. The authors are quite optimistic of Odisha achieving the status of major contributor to the export basket of the nation in the field of major food grains (rice and maize).

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