

**A REPORT  
ON  
OPPORTUNITIES IN THE RYNAXYPYR GRANULES  
SEGMENT IN RICE AND MARKET SIZING OF ODISHA**

**BY  
BIDYUTPRAVA SAHU**



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**Department of Agri-Business Management**

**Centre for Post Graduate Studies**

**Orissa University of Agriculture and Technology**

**Bhubaneswar-751003, Odisha**

**2013**

# **Opportunities in the Rynaxypyr Granules Segment in Rice And Market Sizing Of Odisha**

**SUMMER INTERNSHIP PROGRAM at**

**E.I.DuPont India Pvt.Ltd**

**Industry Guide**

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E.I.DuPont India Pvt.Ltd

**Institutional Guide**

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By

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# **“Opportunities In The Rynaxypyr Granules Segment In Rice And Market Sizing Of Odisha.”**

**DISSERTATION SUBMITTED TO  
ORISSA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY  
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS  
FOR AWARD OF THE DEGREE OF**

**MASTER OF BUSINESS ADMINISTRATION  
(AGRIBUSINESS MANAGEMENT)**

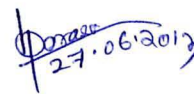
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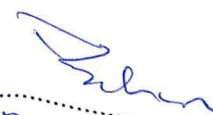
  
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## DECLARATION

I do hereby declare that dissertation entitled "**OPPORTUNITIES IN THE RYNAXYPYR GRANULES SEGMENT IN RICE AND MARKET SIZING OF ODISHA**" being submitted by me in partial fulfilment of the requirements for the degree of **Master of Business Administration in Agribusiness Management** of Orissa University of Agriculture and Technology (O.U.A.T), Bhubaneswar under the guidance of Sri Alok Ranjan Biswal, E.I.DuPont India Pvt.Ltd. I further declare that the contents of the report are authentic and have not been published or presented earlier.

**Date** 27.06.13

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**Bidyutprava Sahu**





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**CERTIFICATE BY**

**HEAD OF THE DEPARTMENT**

This is to certify that the project report entitled **"Opportunities in the Rynaxypyr Granules segment in Rice and Market Sizing of Odisha."** Clients in Bhadrak,Balasore,Bargarh,Sambalpur and Sonepur district is a bonafide record work done by Ms.BidyutPrava Sahu and submitted in the partial fulfilment of the requirement of the degree of MBA (Agri-Business Management) , Department of Agri-Business Management, Center of Post Graduate Studies, Orissa University of Agriculture and Technology, Bhubaneswar.

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*Bidyutprava Sahu*  
**Bidyutprava Sahu**

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## **CHAPTER-1**

### **INTRODUCTION**

India is mainly an agricultural country, where agriculture contributes to about 14.6 percent in gross domestic product (GDP) and support over 58 percent of nation's population for livelihood (GOI, 2010). Agriculture is the main source of income for families in India. Farms cover over half the land and almost three-quarters of that land is used to grow the two major grains: rice and wheat. India is the second leading producer of rice in the entire world, preceded only by China. India's annual rice production is around 85-90 million tons. Annual consumption is around 85 million tonnes. In India, Rice is cultivated in both seasons - winter and summer. West Bengal, Uttar Pradesh, Andhra Pradesh, Punjab, Tamil Nadu, Bihar, Orissa, Assam, Karnataka and Haryana are the major producing states. Food Corporation of India purchases around 20 to 25% of the total rice production in the country. More than 4000 varieties of rice are grown in India. India is the world's largest exporter of Basmati rice to Saudi Arabia and other Middle East Countries, Europe, and the United States. The global positioning of the country is known as ranking 1<sup>st</sup> in area in the world, 2<sup>nd</sup> in production in the world next to China and ranks 13<sup>th</sup> position in productivity in the world.

A study carried out by Rock feller foundation (Herdt, 1991) reveals that seven out of 20 major challenges in rice production are insect pest and diseases. Among the biotic stresses insect pests cause about 10-15% yield losses. The average yield losses in rice have been estimated to vary between 21-51 per cent. Yellow stem borer, brown plant hopper and gall midge were the key pests in rice causing 25-30%, 10-70% and 15-60% yield losses, respectively. At National level, stem borers accounted for 30% of the losses while plant hoppers (20%), gall midge (15%), leaf folder (10%) and other pests (25%).

Depending upon the crop age, the incidence of insect pests and resultant yield losses vary. During the first 30 days after transplanting significant yield losses are reported due to stem borer and gall midge only in 10-15% of the locations tested under AICRIP. The crop growth period between 30-60 days after transplanting was most vulnerable resulting in major yield losses (20-68%) mainly due to stem borer, gall midge, leaf folder and brown plant hopper. Beyond sixty days after transplanting, the crop damage is inflicted by stem borer and leaf folder causing 10 to 48% damage.

Odisha is an agrarian state with Agriculture and Animal Husbandry sector contributing 21.11% to Net State Domestic Product (NSDP) in 2007-08. The

share of Gross State Domestic Product (GSDP) from Agriculture and Animal Husbandry during 2007-08(Q) at constant price (1999-2000) is 19.51%. Evidently, Agriculture plays a critical role in the economy of the state and livelihood of majority of its populace. Odisha has cultivated area 61.80 lakh ha. The coverage under paddy during kharif is about 41.24 lakh ha and during rabi 3.31 lakh ha.

Rice covers about 69 per cent of cultivated area and is the major crop covering about 63 per cent of total area under food grains. It is the staple food of almost entire population of Orissa; therefore, the state economy is directly linked with the improvement in production and productivity of rice in the state. During the last 35 years rice area of the state has stagnated around 4 million hectares i.e about 10 per cent of the total rice area of the country. Orissa's share in country's rice production was more than 11 per cent in the pre-HYV period, which gradually declined to 7.93 percent in 2008-09. Presently rice in Orissa is grown over an area of 4.4 million hectares, which accounts for 91 per cent of the area under cereals and contributes about 94 per cent of total cereal production in the state.

To increase production and productivity of Rice a Centrally Sponsored Programme "Work Plan - Rice Development" is in operation in the State since 2001-02. Under this scheme Farmers Field School, exposure visit of farmers (outside and inside state), supply of certified seeds, farm implements, power tillers, tractors at a subsidized rates etc. are being taken up. Besides, from 2007-08 such developmental activities for enhancement of rice production and productivity is being taken up under the National Food Security Mission - Rice in 15 low productivity districts in a mission mode.

The problems/constraints in rice production vary from area to area. The major rice growing areas are concentrated in Eastern and western region and this region is generally experiences high rainfall and severe flood almost every year. The loss to the rice crop is considerably very high due to insect and pest attack. Besides, in upland areas the crop gets setback either from high rainfall or drought condition. It has also been observed that certain category of soils do not give the desired yield response to the balanced application of N.P.K. fertilizers. All these problems/constraints are affecting the productivity of the rice crops in different growing zones. In certain area, the availability of suitable high yielding

varieties and quality seeds are also a problem. These problems/constraints are discussed below:-

1. Continuous use of traditional varieties due to the non-availability of seeds and farmers lack of awareness about high yielding varieties (Upland, rainfed lowland and deep water areas).
2. Low and imbalanced use of fertilizers, low use efficiency of applied fertilizers particularly in the North-Eastern and Western States.
3. Heavy infestation of weeds and insects/pests such as blast and brown spot and poor attention for their timely control (upland and rain fed lowland).
4. Poor crop plant population in case of broadcast sowing method resulting in uneven germination (upland and direct seeded lowlands). Delay in monsoon onset often results in delayed and prolong transplanting and sub-optimum plant population (Mostly in rain fed lowlands).
5. Poor adoption of improved crop production technology due to economic backwardness of the farmers (upland and lowlands).

Among all the problems discuss above insects/pests attack on rice is the major problem in Odisha.

Rice in Odisha is predominantly attacked by major insect pests like stem borer, gall midge, leaf folder, brown plant hopper(BHP),white blacked plant hopper,(WBPH),swarming caterpillar and gundi bug during its tillering , vegetative and reproductive stage.

#### **a. Stem Borers**

Rice stem borers from order Lepidoptera and families Pyralidae and Noctuidae form major group of tissue borers.Among five species, the yellow stem borer is most dominant and destructive in tillering and reproductive stages in kharif and rabi rice in Odisha.

Stem borer damage may be initiated even in nursery stage, particularly during *rabi*. The feeding by stem borer larvae leads to death of the tiller described as dead heart at vegetative stage (central leaf whorl does not unfold, turns brownish and dries out) and white ear head at reproductive phase. The affected tillers are unproductive and result in yield losses. Both dead heart and



white ear head can be easily pulled out, which distinguishes the symptom from other similar damages.

#### **b. Leaf Folder**

Out of three species of leaf folders, *canphalocrocis medinalis* is most injurious causing insect pest in kharif and rabi paddy. Use of high level of nitrogen and cloudy weather with low sunlight favours pest buildup. The larvae in young stage feed on succulent leaves by scrapping the chlorophyll from the leaf surface and from second instars onwards fold the leaves and feed inside causing longitudinal white streaks on the leaf surface.

#### **c. Gall midge**

Rice gall midge is a dipteran belonging to family *Cecidomyiidae* and a key pest of irrigated and rainfed shallow land rice. In some regions like Sambalpur in Orissa, endemic to this pest, where moderate to severe yield losses are reported.

The adult fly looks like a mosquito with pink body and lays about 100-150 eggs on leaf blade/leaf sheath. After hatching the maggot crawls down the space between leaf sheath and apical meristem, and due to feeding meristem forms a gall chamber surrounding the maggot. The modified leaf sheath elongates as a gall and often called as silver shoots. Due to formation of gall tiller becomes sterile and does not bear panicle, resulting in yield loss. Pest attack is usually restricted to vegetative stage. Occasionally, during reproductive stage spikelets in the panicles are turned into tiny galls. Humid cloudy weather with continuous rains favours the pest buildup.

**Plant protection** is the science and practice of managing invertebrate pests and vertebrate pests, plant diseases, weeds and other pest organisms that damage agricultural crops and forestry. It encompasses:

- Pesticide-based approaches such as herbicides, insecticides and fungicides
- Biological pest control approaches such as cover crops, trap crops and beetle banks
- Barrier-based approaches such as agrotextiles and bird netting
- Animal psychology-based approaches such as bird scarers
- Biotechnology-based approaches such as plant breeding and genetic modification

An **insecticide** is a pesticide used against insects. They include ovicides and larvicides used against the eggs and larvae of insects respectively. Insecticides are used in agriculture, medicine, industry, and general home use. The use of insecticides is believed to be one of the major factors behind the increase in agricultural productivity in the 21st century. Nearly all insecticides have the potential to significantly alter ecosystems; many are toxic to humans; and others are concentrated in the food chain.

### **PEST CONTROL IN RICE**

- *Systemic* insecticides are incorporated by treated plants. Insects ingest the insecticide while feeding on the plants.
- *Contact* insecticides are toxic to insects brought into direct contact. Efficacy is often related to the quality of pesticide application, with small droplets (such as aerosols) often improving performance.
- *Natural* insecticides, such as nicotine, pyrethrum and neem extracts are made by plants as defenses against insects. Nicotine-based insecticides are still being widely used in the US and Canada though they are barred in the EU.
- *Inorganic* insecticides are manufactured with metals and include arsenates, copper compounds and fluorine compounds, which are now seldom used, and sulfur, which is commonly used.
- *Organic* insecticides are synthetic chemicals which comprise the largest numbers of pesticides available for use today.

India is the fourth largest producer of agrochemicals globally, after United States, Japan and China. The agrochemicals industry is a significant industry for the Indian economy. The Indian agrochemicals market grew at a rate of 11% from USD 1.22 billion in FY08 to an estimated USD 1.36 billion in FY09. In India, paddy accounts for the maximum share of pesticide consumption, around 28%, followed by cotton (20%). Indian population is increasing and the per capita size of land decreasing, the use of pesticides in India has to improve further. Besides increasing in domestic consumption, the exports by the Indian Agrochemicals Industry can be doubled in the next four years if proper strategies and sophisticated technologies are adopted by the industry.

In India, there are about 125 technical grade manufacturers (10 multinationals), 800 formulators, over 145,000 distributors. 60 technical grade pesticides are being manufactured indigenously. Technical grade manufacturers sell high purity chemicals in bulk (generally in drums of 200-250 Kg) to formulators. Formulators, in turn, prepare formulations by adding inert

carriers, solvents, surface active agents, deodorants etc. These formulations are packed for retail sale and bought by the farmers.

The Indian agrochemicals market is highly fragmented in nature with over 800 formulators. The competition is fierce with large number of organized sector players and significant share of spurious pesticides. The market has been witnessing mergers and acquisitions with large players buying out small manufacturers.

Key market participants include United Phosphorus Ltd(UPL), Bayer Crop science Ltd, Rallis India Ltd, Gharda Chemicals Ltd, Syngenta India Ltd, BASF India Ltd, Dhanuka AgroTech Ltd, E.I. DuPont India Pvt Ltd, Cheminova etc. Top ten companies control almost 80% of the market share. The market share of large players depends primarily on product portfolio and introduction of new molecules. Strategic alliances with competitors are common to reduce risks and serve a wider customer base.

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# ORGANIZATIONAL PROFILE

## ABOUT E.I. DUPONT:-

DuPont is a science-based products and services company. Founded in 1802, DuPont puts science to work by creating sustainable solutions essential to a better, safer, healthier life for people everywhere. Operating in more than 70 countries, DuPont offers a wide range of innovative products and services for markets including agriculture and food; building and construction; communications; and transportation.

## About E.I DUPONT India:-

DuPont India is a subsidiary of E. I. du Pont de Nemours and Company. The DuPont association with India extends back more than 200 years, since the first shipment of raw materials for black powder for explosives was imported from India into the USA in 1802. Today, DuPont India, with more than 1000 employees, markets a wide range of products in various market segments. The company has six production facilities in India in three locations for DuPont Crop Protection, DuPont Engineering Polymers, DuPont Refinish, and Pioneer<sup>®</sup> hybrid seeds.

### **DuPont Core Values, Sustainability, and Productivity**

Throughout its history, DuPont has been guided by a well-defined set of core values that have remained constant as the company grew from its origins as an explosives company to the global science company it is today. Safety and health, environmental stewardship, high ethical behaviours and respect for people remain our values. They are practiced everywhere the company does business. All our operations around the world are held to the same standards.

### **DuPont Core Values**

- **Safety & Health**
- **Environmental Stewardship**
- **Highest Ethical Behaviour**
- **Respect for People**

## **Sustainable Growth**

The DuPont mission is sustainable growth which is define as creating shareholder and societal value while decreasing the environmental impact along the value chains. DuPont is continuing to reduce its footprint, tackle new challenges in the marketplace, champion key environmental legislation, and invest its research and development dollars in development of sustainable products that protect people and the environment.

## **Productivity**

DuPont is committed to ongoing productivity. Its strategy is being executed through disciplined processes to ensure that its productivity initiatives are focused, effective and measured. This combination has enabled significant productivity gains over the past three years. These initiatives include DuPont Integrated Business Management (DIBM) and DuPont Production Systems (DPS), both enabled by Six Sigma. Productivity is further accelerated by investments to simplify, standardize, and digitize planning and transactional business processes.

## **The Vision of DuPont**

Its vision is to be the world's most dynamic science company, creating sustainable solutions essential to a better, safer, healthier life for people everywhere.

## **The Mission of DuPont**

### **SUSTAINABLE GROWTH**

The creation of shareholder and societal value while it reduces the environmental footprint along the value chains in which it operate.

## **DuPont Agriculture:-**

DuPont Agriculture expects to grow aggressively through innovative products and services that help the world increase the quantity and sustainability of its food supply. It leverages its strengths in biology, chemistry and biotechnology along with its knowledge of the food value chain. Its businesses own a broad portfolio of brands, including Pioneer® seeds, as well as recognized brand insecticides, fungicides, and high-value, low-use-rate herbicides. It is improving grower productivity to address the increasing needs of a growing population.

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## **DuPont Crop Protection Solutions for Paddy Cultivation**

Heavy infestation of insects, weeds and diseases in the paddy crop is a widespread crisis faced by Indian farmers, resulting in major setbacks in the yields, quality and sustainability of their farming operations.

DuPont Crop Protection in India works closely with farmers and community leaders involved in paddy cultivation to pass on highly advanced and innovative solutions to deliver a healthy and abundant rice crop.

The well-researched, easy-to-use and economical range of products include fungicide, herbicide and insecticide to enable farmers to protect their valued paddy crops and contribute to the ever-increasing appetite of the global food system.

Its range of products is focused on protecting the paddy crop from the heavy infestation of disease, weeds and insects at different stages of paddy cultivation. The DuPont research division continually works towards formulating rice pest management techniques which are environmentally sustainable. That means, It is committed to providing solutions that reduce threats to future crop production, allowing farmers and their crops to flourish.

### **DuPont™ Rynaxypyr™ insect control**

DuPont™ Rynaxypyr™ insect control compound is the first insecticide from a new class of chemistry, the anthracitic diamides, controlling almost all economically important Lepidoptera and selected other species. When used early in the pest life cycle, Rynaxypyr™ prevents the build-up of pest populations, maximizing yield potential. The high larvicidal potency and long-lasting activity of Rynaxypyr™ provide excellent crop protection, even when circumstances prevent optimal application timing. The rapid cessation of feeding, strong residual activity and excellent rain fast properties of Rynaxypyr™ deliver nearly-immediate and long-lasting plant protection under a range of growing conditions. Rynaxypyr™ has a new mode of action, controlling pests resistant to other insecticides, while its selectivity to non-target arthropods conserves natural parasitoids, predators and pollinators. These attributes make Rynaxypyr™ an excellent addition to Integrated Pest Management (IPM) programs and provide growers greater flexibility in field operations aimed at delivering high-quality produce that meets the demands of food retailers and consumers. Rynaxypyr™ has remarkably low toxicity to mammals, fish and birds and high insecticidal potency, setting a new standard for insecticides. Due to its



favourable toxicological profile and recommended low use rates, Rynaxypyr™ is a sound choice for growers, farm workers and the environment.

## **PROFILE OF RYNAXYPYR INSECT CONTROL**

### **SUPERIOR CROP PROTECTION**

- Rapid feeding cessation
- Long-lasting control
- Excellent crop safety

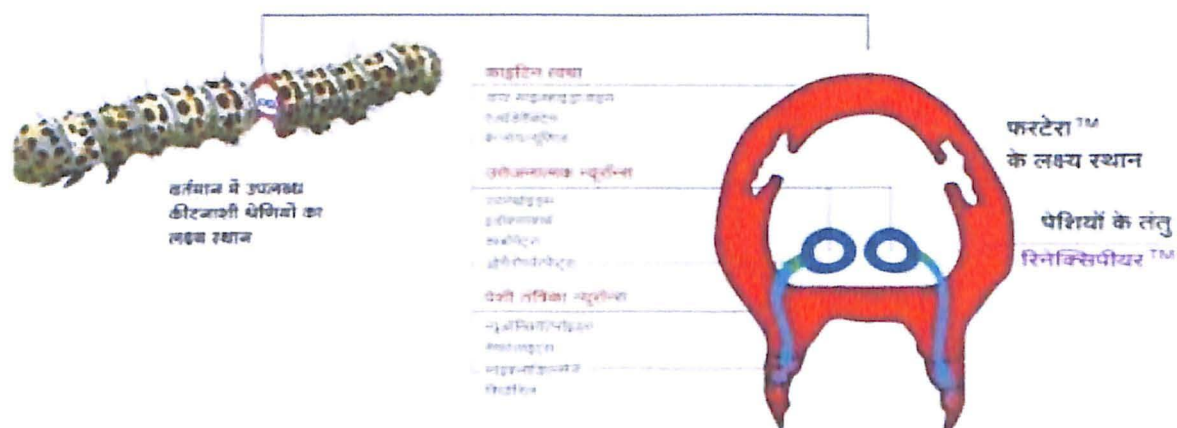
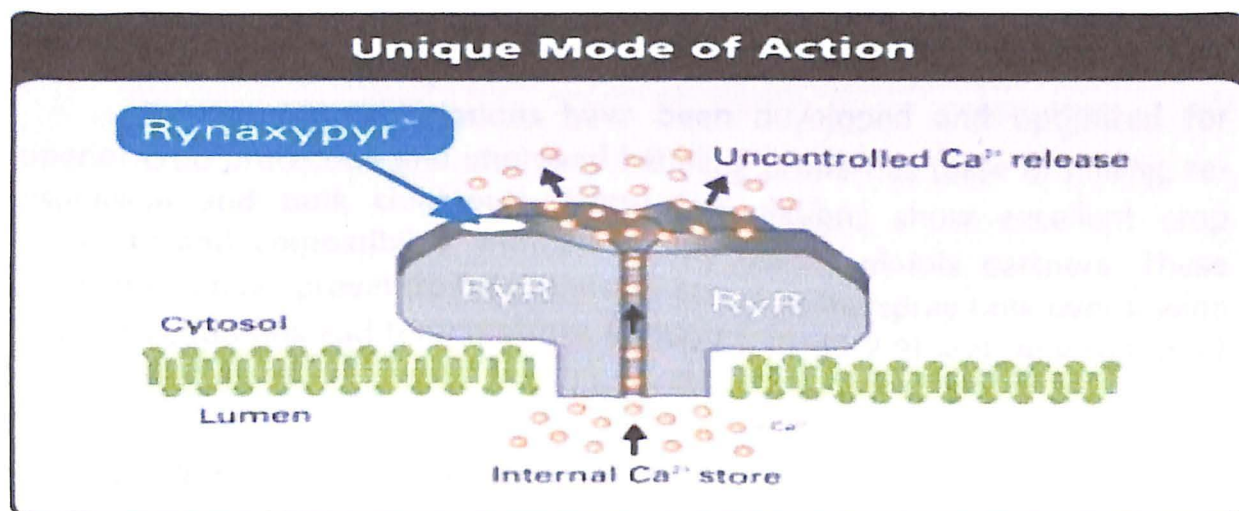
### **LOW IMPACT ON MAMMALS AND THE ENVIRONMENT**

- Favourable mammalian toxicological profile
- Short Re-Entry Intervals & Pre-Harvest Intervals
- Low impact on fish and birds

## **NEW MODE OF ACTION**

Rynaxypyr™ controls insect pests through a new mode of action, activation of insect ryanodine receptors (RyRs). These receptors play a critical role in muscle function. Contraction of muscle cells requires a regulated release of calcium from internal stores into the cell cytoplasm. Ryanodine receptors act as selective ion channels, modulating the release of calcium. Rynaxypyr™ binds to the RyR, causing uncontrolled release and depletion of internal calcium, preventing further muscle contraction. Insects treated with Rynaxypyr™ exhibit rapid cessation of feeding, lethargy, regurgitation and muscle paralysis, ultimately leading to death. Due to its unique chemical structure and novel mode of action, Rynaxypyr™ shows excellent control of pest populations resistant to other insecticidal products.

Rynaxypyr™ binds to insect ryanodine receptors in muscle cells causing the channel to open and release calcium ions (Ca<sup>2+</sup>) from internal stores into the cytoplasm. Depletion of Ca<sup>2+</sup> stores results in paralysis and death.



## LONG-LASTING CROP PROTECTION

Rynaxypyr™ moves into leaf tissue where it is protected from wash-off while remaining available to chewing insects feeding on either surface of the leaf. This translaminar activity, rain fastness, insecticidal potency and resistance to photo-degradation are the bases for the long-lasting crop protection observed with Rynaxypyr™.

## EXCELLENT FIT WITH IPM & IRM PROGRAMS

- New Chemical Class and Mode of Action
- Highly Efficacious at Low Use Rates
- Selective to Beneficial Arthropods
- Excellent Environmental Profile
- Low Impact on Fish, Birds and Mammals

## FORMULATION IN INDIA

Rynaxypyr™ formulations have been developed and optimized for superior crop protection and improved handling properties (ease of mixing, re-suspension and tank clean-out). These formulations show excellent crop selectivity and compatibility with commonly used tank-mix partners. These formulations have proven to be chemically stable in the spray tank over a wide range of conditions and temperatures (4-40o C), pH (5-7-9) and time (up to 72 hours).

**Coragen™** 200 g ai/L (sc) (Liquid).

**Ferterra™** 0.4 g ai/kg granules .

### **Rynaxypyr™ Ferterra™ (Granules)**

This is a granular insect control product which is effective on almost all lepidopteron and other species. Its different mode of action ensures effective control of those insect which have developed resistance to currently available insecticides. This means it controls tough to insect too like rice stem borer.



DuPont™ Ferterra® (chlorantraniliprole 0.4% GR) insecticide, is an insect control compound for rice pest management from a new class of chemistry, the Anthralinic Diamides. When used early in the pest life cycle, Ferterra® prevents the buildup of pest population and maximizes the crop yield potential.

Ferterra® insecticide is powered by active ingredient Rynaxypyr®, which has a unique mode of action, controlling pests resistant to other



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**Ferterra™** 0.4 g ai/kg granules .

### Rynaxypyr™ Ferterra™ (Granules)

This is a granular insect control product which is effective on almost all lepidopteron and other species. Its different mode of action ensures effective control of those insect which have developed resistance to currently available insecticides. This means it controls tough to insect too like rice stem borer.



DuPont™ Ferterra® (chlorantraniliprole 0.4% GR) insecticide, is an insect control compound for rice pest management from a new class of chemistry, the Anthralinic Diamides. When used early in the pest life cycle, Ferterra® prevents the buildup of pest population and maximizes the crop yield potential.

Ferterra® insecticide is powered by active ingredient Rynaxypyr®, which has a unique mode of action, controlling pests resistant to other

## FORMULATION IN INDIA

Rynaxypyr™ formulations have been developed and optimized for superior crop protection and improved handling properties (ease of mixing, re-suspension and tank clean-out). These formulations show excellent crop selectivity and compatibility with commonly used tank-mix partners. These formulations have proven to be chemically stable in the spray tank over a wide range of conditions and temperatures (4-40o C), pH (5-7-9) and time (up to 72 hours).

**Coragen™** 200 g ai/L (sc) (Liquid).

**Ferterra™** 0.4 g ai/kg granules .

### Rynaxypyr™ Ferterra™ (Granules)

This is a granular insect control product which is effective on almost all lepidopteron and other species. Its different mode of action ensures effective control of those insect which have developed resistance to currently available insecticides. This means it controls tough to insect too like rice stem borer.



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Ferterra® insecticide is powered by active ingredient Rynaxypyr®, which has a unique mode of action, controlling pests resistant to other

insecticides while its selectivity to non-target arthropods and conserves natural parasitoids, predators and pollinators. These attributes make Ferterra® an excellent solution for rice pest management and enable farmers to achieve higher yields and productivity.

Ferterra® insecticide is recommended in rice and sugarcane crops. Ferterra® offers remarkably low toxicity to mammals and raises the benchmark for insect control solutions due to its toxicological profile and low use rates

### **Benefits of Rynaxypyr Ferterra**

- 1- Relatively safe to natural enemies of pests
- 2- Green chemistry which is relatively safe to the environment
- 3- Save money and time by giving long duration of control
- 4- Ferterra gives better tillering which helps optimize crop yield
- 5- Ferterra keep your hands clean and stain free
- 6- Ferterra has an unique granular composition which leads to ease of application
- 7- Lower use rate
- 8- Protect from stem borer in rice
- 9- Better root growth and tillering
- 10- Peace of mind

## **OBJECTIVE OF THE STUDY**

As per the above estimation, total value of crops lost due to major insects and pests. Pesticides play a significant role in enhancing agricultural productivity. They help reduce crop losses and thereby increase food safety and revenues for farmers.

So there are huge marketing opportunities for Pesticides Companies. Dupont India , formulated one of the best granular pesticide for paddy leaf folder and steam borer. Therefore my project report on "Opportunities in the Rynaxypyr granules segment in rice and market sizing of Odisha "is based on the following objectives...

- a) To study the social and educational profile of the distributor in study area
- b) To list out different company operating in the study area and to assimilation their performance in use of different granular pesticides.
- c) To assess the total market size of DuPont's Rynaxypyr™ Granules.

## **CHAPTER-2**

### **LITERATURE REVIEW**

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## **CHAPTER-III**

### **RESEARCH METHODOLOGY**

**Research Methodology followed by the following sub-points**

- ❖ Research design
- ❖ Description of study area
- ❖ Research Sample
- ❖ Identification of parameters for study
- ❖ Variables and their categorization
- ❖ Tools of data collection

Before going to these sub-points let us discuss about how to analyse a market opportunity and how to measure market size.

### **Market Opportunity**

#### **Analyzing a market opportunity**

Often, an entrepreneur begins with a product idea or a technology and asks "What is the market potential for this product?" They then try to find reports or other sources of data that allow them to compute a "market opportunity." Entrepreneurs have sometimes succeeded by starting this way, but this is (undeserved) luck.

A market opportunity is the existence of a need that is not being met or a desire that is not being fulfilled. This is the beginning of every business opportunity. Here I want to find out the market opportunities of DuPont's Rynaxypyr granules product.

#### **Finding a need:**

We can think of a need in two ways: it is either a **problem** not currently solved or it is a **potential for a change in consumption**. A problem may or may not be understood by the potential customer. It may be observable (or at least

inferable) from how the potential customer does certain things. A potential for a change in consumption may be due to changing demographics, tastes, hopes, fears, etc. It may also be due to changes or new developments in knowledge, technology, laws or patterns of behaviour (in business or in other spheres).

Therefore there is no easy or straight path to identifying a market opportunity. It is rarely the case that you can ask a potential customer a simple question and gets the answer you are looking for. It takes a great deal of thought and care to devise an approach to finding a real market opportunity. The process will involve careful interviews at least with prospective consumers and probably with others involved in some process or some value chain. These interviews should allow you to understand, as deeply as possible, the environment in which the need exists. You should try to discover what it is about this consumer or this environment that gives this need its importance (or lack of importance). You should try to understand what would have to change if the consumer were to adopt a solution to this need. Ultimately, you should come away from some of these conversations with a conviction, based on solid evidence, that this consumer would pay a reasonable amount of money and invest a reasonable amount of energy for a solution to the need you have identified.

### **Quantifying the opportunity:**

Quantifying a market opportunity is simply a matter of estimating the number of distributors who have the need that I have identified and also estimating the adoption through time of the distributors in question. My revenue projections are simply the share of this opportunity you can reasonably expect to capture over some planning horizon. Although the problem can be described simply but this is an extraordinarily difficult task.

Although there is a strong tendency to start with reports and large numbers, you should resist this temptation until your primary market research has become sufficiently robust that you actually know what numbers might be relevant.

I should keep in mind that the market sizing is a process of counting potential distributors. I should start with one, and then proceed to a few and so

on. As I understand my prospective distributors, I form a hypothesis about what it is about them that would make them invest in a solution to the need. I should test my hypothesis on other distributors who share these attributes. This is the process of developing a distributor profile. Once I have a reasonably good hypothesis, then I can look to reports and other sources of data to extrapolate from my customer profile to an actual market potential.

Even if I did this work very carefully and very diligently, it is still unreliable data. It is often very useful to think of the market opportunity as a range. This will be very useful in being prepared both for the up-side and for the down-side potential of my opportunity.

### **Inhibitors & obstacles:**

Even if you have found a need, you may not always have a market opportunity that can be exploited. There may be alternatives available to potential customers that have advantages over any solution that you may offer. And even if there are not alternatives, there may be other issues that would prevent a customer from buying a solution that you propose. There may be prejudices that get in the way, there may be others whose opinions will thwart your efforts, the decision process may be unmanageable, etc., etc. These are issues that should never be far from your mind as you conduct your market research.

### **Market Size**

Market size is a measurement of the total volume of a given market. When determining market size, it is very important to define the measurement as precisely as possible. Here the market size of DuPont's Rynaxypyr Granular product is to be determined.

### **How to Measure Market Size**

There are three ways to measure market size, two of which are based on competition and one of which is based on customers.

- Competitive sales (bottom-up approach)
- Competitive sales (top-down approach)

- End-user purchases

Of the top-down and bottom-up methods, the bottom-up approach is far more time-consuming but is more accurate. In essence, it uses a series of interviews with all suppliers to determine quantities sold by each company in the period. These are added together to give the total market size.

The top-down approach, which is used most often by research firms, is based on a series of competitive interviews where each competitor is asked for an estimate of the market size. These estimates are sometimes weighted and then averaged for the market size calculation.

The last way of calculating market size is based on end-user purchases during the period. If there are few end-users, this is an accurate measurement. However, as the end-user base increases, the cost rises and the accuracy of the measurement falls. A smaller sample will have to be taken and extrapolated to approximate the entire user population.

### **What Does Market Size Really Tell You?**

Market size is one of the fundamental measurements that must be taken on the market. It is the standard measurement ruler against which all of a company's activities should be measured.

For example, expenses for an R&D project should be related to market size. The same is true for sales force and marketing expenses. On one hand, you do not want to over-invest based on market size. On the other hand, you do not want to under-invest in large, fast-moving markets.

## RESEARCH DESIGN

The research design will give a clear cut idea of the procedure to be followed for the completion of the project. The research has been carried out with certain focused objectives which need to fulfill after the completion of the study.

### *Purpose of the Study*

The purpose of this study is identifying viable market opportunities in pesticide sector and to know its market size in Odisha.

### *Description of Study Area*

(figure-1)



Odisha is an agrarian state, agriculture play an important role in the economy and livelihood of Odisha people. The state has been divided into two regions for rice cultivation i.e the plateau region and the coastal region. The

plateau region contains 62% of the total rice area of state mostly the western Odisha comes under this region. And the coastal region contains 38% of the total rice area, northern Odisha comes under this region. Bargarh, Sambalpur and Sonepore comes under west-central table land and their rice Productivity is Bargarh (1,655 kg/ha), Sonepore (1,563 kg/ha), Sambalpur (1,329 kg/ha) respectively. The coastal region districts like Bhadrak (1,193 kg/ha), Balasore (1,117 kg/ha) comes under north-eastern coastal plain land. We choose these five districts for our project work because these area are high rice productivity area of state and rice is serious damage by yellow stem borer and leaf folder in these areas. So there is a huge market and opportunities for our granular pesticides products

## ***Research Sample***

In this project the sample size is 20. They all are distributors and they know the product of different pesticide companies, availability of market for pesticides companies and they judge better the overall performance of the product in market in terms of price, availability, productivity and services provided by the different pesticides manufacturer companies. The sample size is mixed of low, medium and high grade distributors. District wise market place and correspondent number (distributor) are given bellow:-

### **3.1In Balasore district**

<b>MARKET PLACE</b>	<b>DISTRIBUTORS</b>
Naya Bazar	2
Remuna	2
Sahadev Khunta	1

### **3.2In Bhadrak district**

<b>PLACE</b>	<b>DISTRIBUTORS</b>
Charampa	2
Tahasil Rode	1
Kacheri Bazar	2

### **3.3In Sambalpur district**

PLACE	DISTRIBUTORS
Sason	1
Sindurpank	1
Dhanupali	1

### 3.4In Bargarh district

PLACE	DISTRIBUTORS
Rangali Camp	1
Godbhaga	1
Canal Avenue	1
Rangali Camp	1

### 3.5In Sonepore district

PLACE	DISTRIBUTORS
Binka	3

## **Methods of data collection**

The methods use for data collection for this study is done by secondary data collection methods and primary data collection methods. The secondary data was collected from the sources such as institute library, national news paper and internet along with some meetings with some Agri experts. The primary data was collected directly from the distributors in the study area. The survey was done with the help of a questionnaire having MCQs for fact based on responses and open ended questions for opinion based responses.

## **Tools of data collection**

The data collection is done using statistical tools and techniques like frequency (f) and percentage (%) and ranking method.



## Interaction with distributors:-





**Interaction with Distributors in Balasore District**



**Interaction with Distributors in Sambalpur District**



## CHAPTER-IV

### RESULTS AND DISCUSSION

The findings are reported with the help of suitable graphs and tables where ever required. The comparative analytical findings are reported for most aspects of the objectives.

### PRIMARY DATA ANALYSIS

#### Independent Variable

##### **4.1)Age :-**

Age is a social factor has been subject to many researchers in many situations relating to research. Age is a significant, in terms of experience, maturity of judgement, decision making and power of understanding. Hence is an inevitable variable in any social study. Information regard this is presented in table-1.

n=20

Age	Frequency(F)	Percentage (%)
30-35	4	20
35-40	5	25
40-45	1	5
45-50	5	25
50<	5	25

**(Table-1)**

As regard to the age, it is observed from the table-1 that most of the distributors we have contacted are among 35 to above 50 years old people; the percentage is 25 in average while the youngsters have only 20%.

##### **4.2)Educational Level:-**

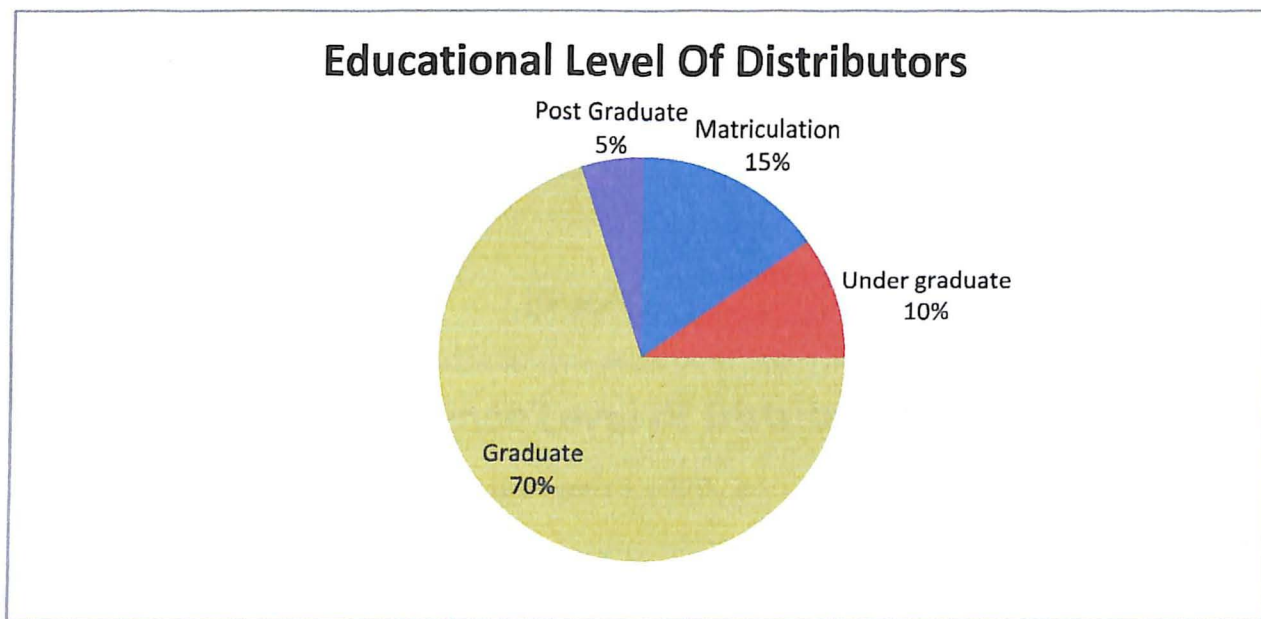
Education is a process of bringing desirable change in the behaviour of human being. Education always linked with mental and psychological ability of

an individual to understand, decide and accept new ideas and practices into action. Table-2 represented the educational level of respondents.

(Table-2)

Educational Level	Frequency(f)	Percentage (%)
10 <sup>th</sup>	3	15
+2	2	10
Graduation	14	70
Post Graduate	1	5

(Graph-1.1)



Most of the distributors are well educated about 70% are graduated and 5% are post graduate. Some of them are agri graduate from the state Agriculture University. Those who are under graduate are above 50 years old aged people but they are experience holder about insect pest of crops, there control and also about the pesticide companies. The above graph-1.1 represented the percentage value of education level of respondents.



### 4.3) Experience Distribution

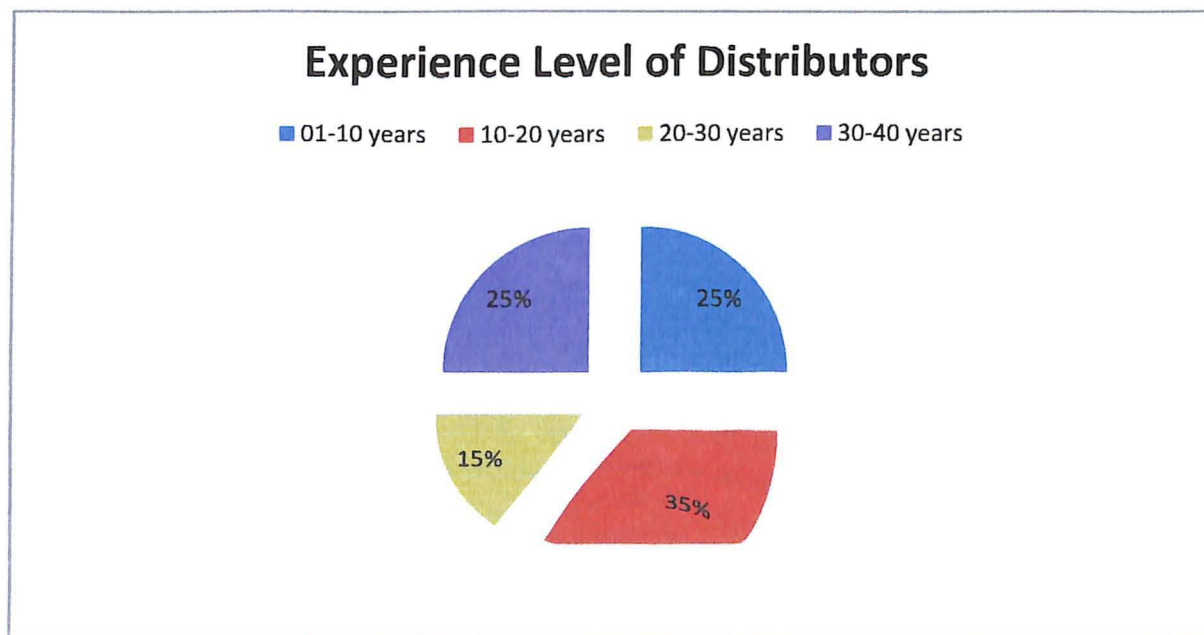
Experience is the most powerful asset for an individual to pursue his professional career in positive direction. Interestingly the respondent distributors are not the new comers who do have some experiences of different duration as shown in Table-3.

Experience In Years	Frequency(F)	Percentage (%)
1-10	5	25
10-20	7	35
20-30	3	15
30-40	5	25

(Table-3)

During the survey I met various distributors; their experience level gives a mixed result. 35% of all distributors have the experience of 10-20 years, 15% have 20-30 years experience and 25% have 30-40 year experience about pesticides and its leading companies.

(Graph-1.2)



The above graph-1.2 represented the percentage value of experience level of respondents.

## DEPENDENT VARIABLE

### 4.4)Top Three Pesticides Company (According to distributors view)

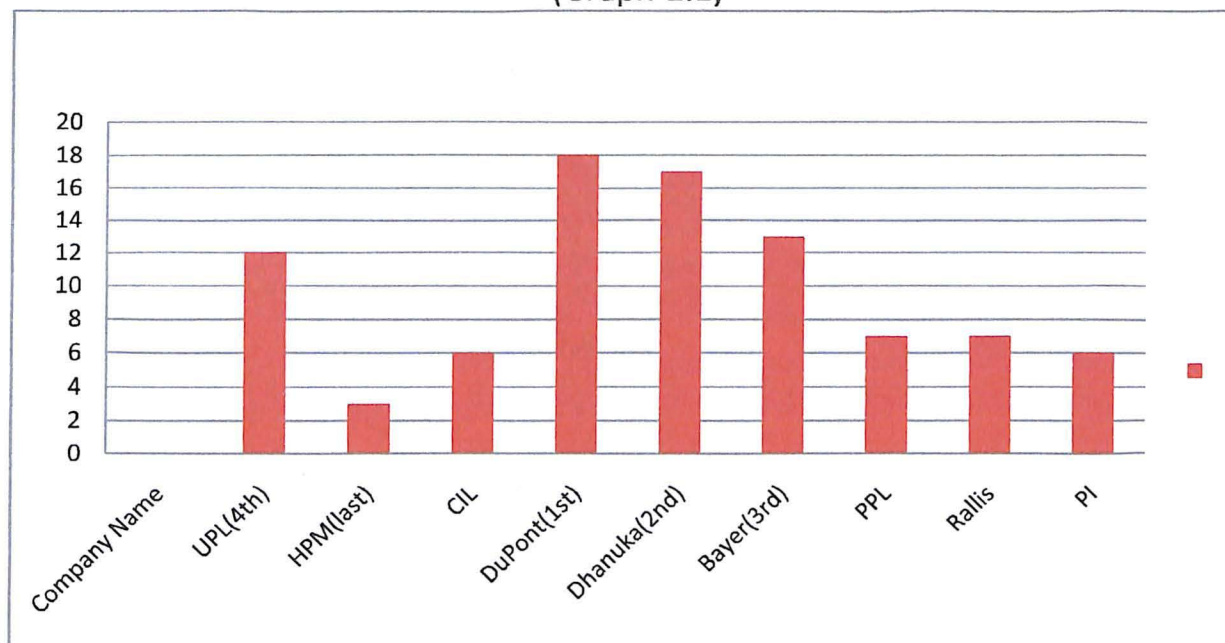
In this era ,lots many players are seen in the business of pesticides and agro-chemicals. Accordingly in the study area a good number of companies are doing pesticides business, but all are not satisfied by their potential customers. In order to ground reality efforts were made collect information according to respondents are shown in the Table-4.

Company Name	First Preference*3	Second Preference*2	Third Preference*1	Total score	Position
UPL	3	1	1	12	4 <sup>th</sup>
HPM	---	---	3	3	last
CIL	1	1	1	6	6 <sup>th</sup>
DuPont	5	1	1	18	1 <sup>st</sup>
Dhanuka	3	4	---	17	2 <sup>nd</sup>
Bayer	1	5	---	13	3 <sup>rd</sup>
PPL	1	2	---	7	5 <sup>th</sup>
Rallis	---	2	3	7	5 <sup>th</sup>
PI	1	1	1	6	6 <sup>th</sup>

(Table-4)

We ask the distributors name the top 3 company that comes to their mind for granular pesticides. According to their data we conclude that DuPont India positioned first among other companies. The region behind the 1<sup>st</sup> rank is its product (Rynaxypyr Ferterra) has very effective for pests. The HPM has last position among 9 companies because its product is less effective in pest control and there is lake of awareness. Dhanuka Agritech Ltd and Bayer crop science hold 2<sup>nd</sup> and 3<sup>rd</sup> position respectively. These three companies are the effective competitor in all five districts.

(Graph-2.1)



Position of pesticide companies in five districts according to distributors view are represented in Graph-2.1.

#### 4.5) Direct business for Pesticides Company (according to distributors)

Direct business is that when we purchase products from the manufacturer directly and not by any sub channel members. Here we consider the distributors for pesticides business, they purchase pesticides from the company directly and sell. But a retailer is a sub channel member who purchases pesticides from the distributors. He is not a direct businessman. Here we collect data from 20 distributors in five districts, they do direct business for many pesticide companies. The Table-5 given below shows the frequency and percentage of the various companies in different selected districts.

n=20

Sl.No	Company Name	Frequency(F)	%
1	Bayer crop science	10	50
2	Dhanuka Agri Tech Ltd	7	35
3	Pesticides India Ltd	7	35
4	E.I.DuPont India Pvt Ltd	7	35
5	United Phosphorous Ltd	9	45

<b>6</b>	<b>Rallis India Ltd</b>	<b>8</b>	<b>40</b>
<b>7</b>	<b>Paradeep Phosphate Ltd</b>	<b>5</b>	<b>25</b>
<b>8</b>	<b>Coromandel International Ltd</b>	<b>7</b>	<b>35</b>
<b>9</b>	<b>Cheminova</b>	<b>3</b>	<b>15</b>
<b>10</b>	<b>Tropical Agro Industry Ltd</b>	<b>3</b>	<b>15</b>
<b>11</b>	<b>Excel Crop Care Ltd</b>	<b>3</b>	<b>15</b>

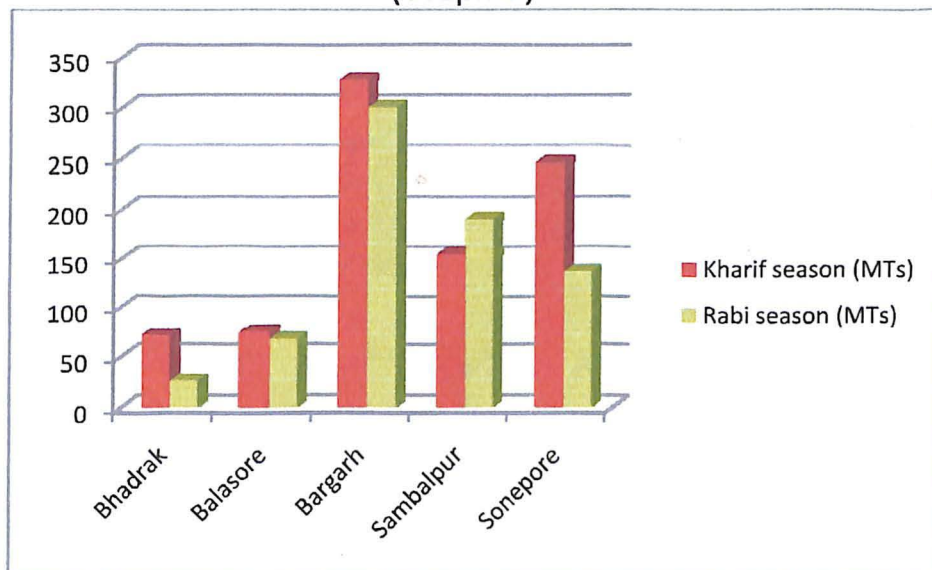
(Table-5)

Here we ask the distributors for which pesticides company they do direct business, according to their data we formed a table showing above.50% of them doing business for Bayer crop science Pvt Ltd., next to it is UPL (45%) and Rallis India (40%). It is clear that Bayer has large market in all the five districts. The other companies like Dhanuka Agritech, DuPont India, Pesticide India, and Coromandel International Ltd has 35% market in all districts. These companies are growing in all districts as per the distributors view. Most of all DuPont is the growing company because its one year in Odisha has much growth in every districts.



## PESTICIDES DISTRIBUTION FOR STEM BORER IN DIFFERENT DISTRICTS:-

(Graph-3)



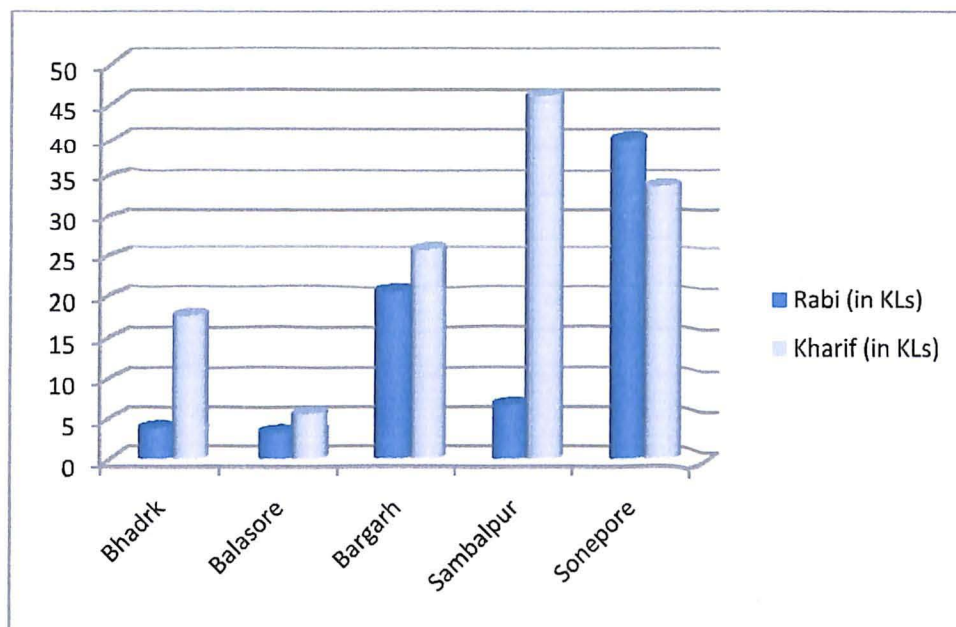
From the above graph we found that in Bargarh district the pesticide distribution for stem borer is high that is approximately 300MTs only in Rabi season and 327 MTs in Kharif season. Among all five districts in Sambalpur pest attacks on paddy is high during Rabi season then kharif season while other districts has reverse result that is in Sonopore and Bhadrak districts pest attack is high during kharif season.

## PESTICIDES DISTRIBUTION FOR LEAF FOLDER IN DIFFERENT DISTRICTS:-

For leaf folder there is no granular pesticides are used in these five districts which we have chosen for research works. There are various companies which have liquid pesticides for pest control. The graph given bellow gives the data about how much pesticides are used for leaf folder in those five different districts.



(Graph-4)



From the above graph we found that pesticides are used in large quantities for leaf folder in kharif season. But in Sonepore district paddy is attacked by leaf folder more in Rabi season then kharif season, while Sambalpur district shows different result because paddy is affected by leaf folder insect in kharif mostly in this area.

## **Sales Acquired by different granular pesticides companies in different districts:-**

### **6.1)In Bhadrak District:-**

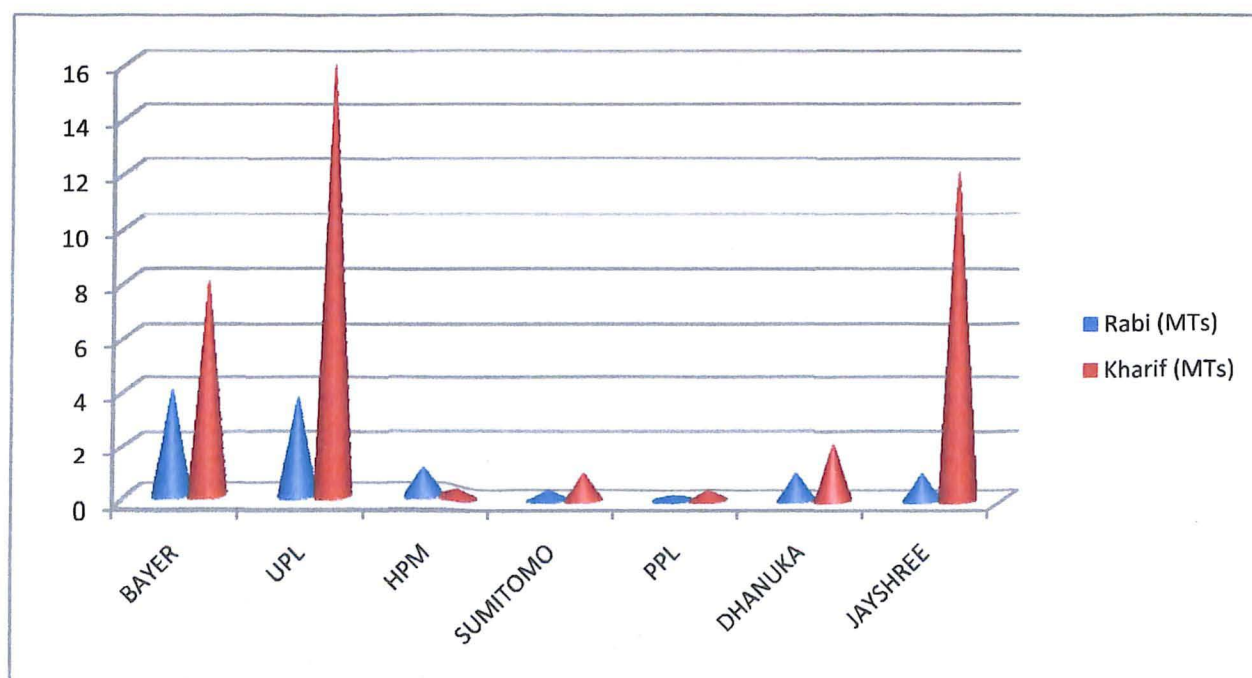
Bhadrak district comes under North-eastern coastal region of Odisha, the climate is moist and moist sub humid. Rice is attacked by pest in both the season (Rabi & Kharif). Different granular pesticides companies are there in Bhadrak district for pest control. Among various pesticides company Bayer crop science, UPL, Dhanuka, Jayshree, HPM, PPL, Sumitomo are the key player in Bhadrak district. The Table-6.1 given below shown sales acquired by different company in Rabi and Kharif Season in Bhadrak district .

(Table-6.1)

Company Name	Rabi Season(inMTs)	Kharif Season(inMTs)
BAYER	4	8
HPM	1	0.3
UPL	3.7	16
SUMITOMO	0.4	1
PPL	0.2	0.4
DHANUKA	1	2
JAYSHREE	1	12

From the above table it is conclude that Bayer, UPL and Jayshree have the major market in Bhadrak district. The Graph given below indicated it clearly.

(Graph-4.1)



## 6.2)In Balasore District:-

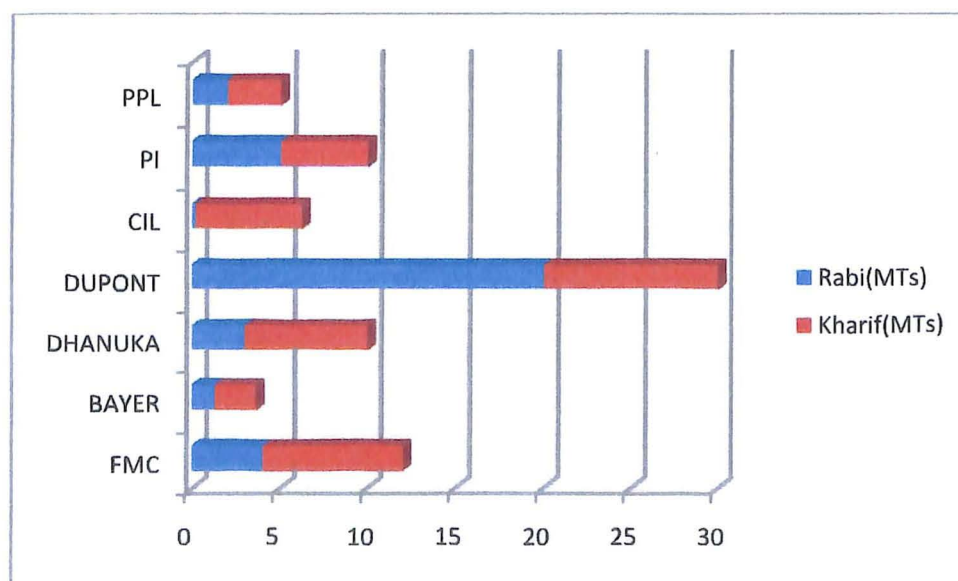
Crop damaged by leaf folder and steam borer mainly in kharif season in Balasore district. In Rabi season the pest attack is quite less than as compare to Kharif paddy. The major key pesticides companies are FMC, Bayer, Dhanuka, DuPont, CIL (Coromendel International Ltd),Pesticide India(PI) and Paraeep Phosphate Ltd(PPL)etc.. Among the above companies DuPont, Dhanuka, Pesticide India and FMC have the major market in Balasore district. The table given bellow show the value.

(Table-6.2)

Company Name	Rabi Season(inMTs)	Kharif Season(inMTs)
FMC	4	8
BAYER	1.3	2.3
DHANUKA	3	7
DUPONT	20	10
CIL	0.2	6
PI	5	5
PPL	2	3

From the above table we found that DuPont, FMC, Dhanuka and PI has the major market in Balasore District.

(Graph-4.2)



(Sales acquired by different company in Balasore district)

From the above graph it is cleared that DuPont has a very good market in Balasore district, it is due to the product Ferterra (GR) has effective control in pest on paddy. Next to DuPont, FMC also has a good market in this place.

### **6.3)In Bargarh District:-**

As we know Bargarh district is a high rice productivity area in Odisha. About 80% of total land is cultivated by paddy in this district in both the season. Paddy is affected or damage by yellow stem borer and leaf folder mostly in kharif season than rabi season. Pesticides companies have great opportunities to sale their products in this area and create a position in the market place. The major key pesticides company are Bayer, DuPont, UPL, FMC, INDOFIL, Dhanuka etc. A graph given below indicated that Dupont and UPL are the market leader of this district.

Company Name	Rabi Season(inMTs)	Kharif Season(inMTs)
DHANUKA	45	30
UPL	30	70
DUPONT	70	30
BAYER	30	35
HPM	20	30
INDOFIL	21	10
FMC	23	7

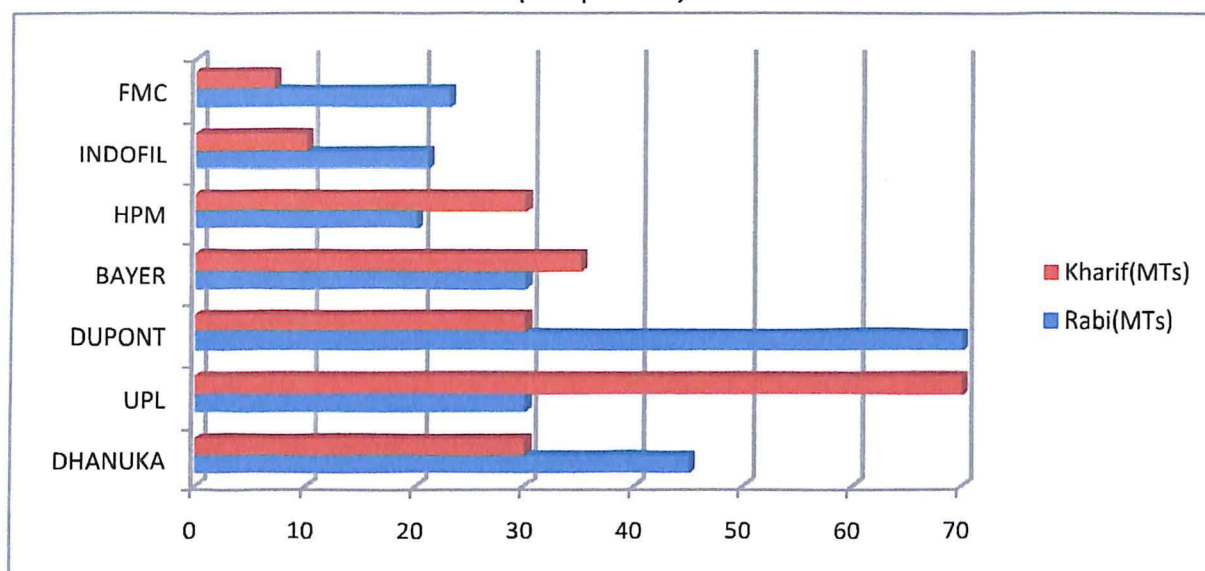
(Table-6.3)

From the above table we found that Pesticides companies have great opportunities to sale their products in this area and create a position in the market place. The major key pesticides company are Bayer, DuPont, UPL, FMC, INDOFIL, Dhanuka etc. A graph given below indicated that Dupont and UPL are the market leader of Bargarh district.

The graph-4.3 given bellow gives the data of Bargarh district clearly.



(Graph-4.3)



## 6.4)In Sambalpur District:-

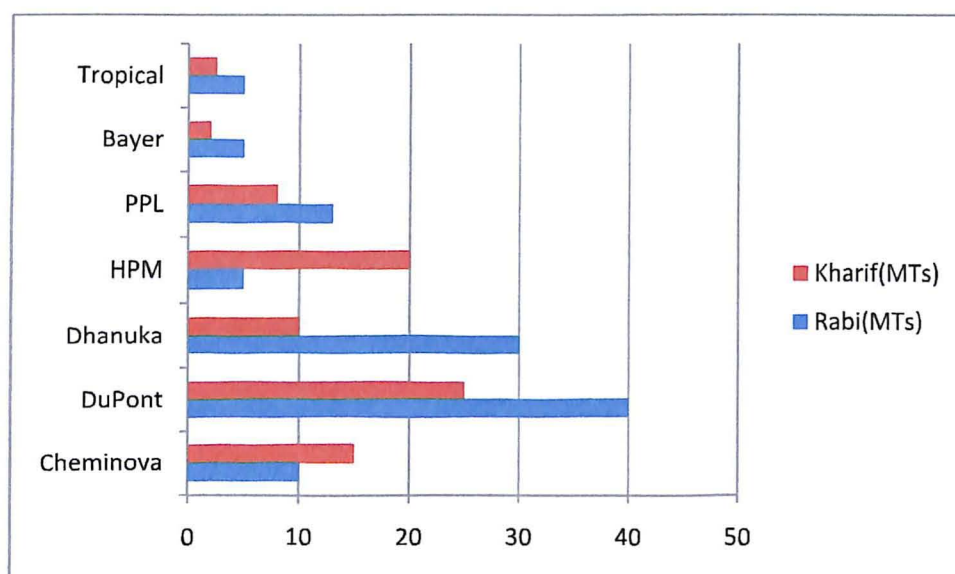
Sambalpur district is a major rice yield area in Odisha. So it has also a pesticide market. There are various key pesticide company in Sambalpur district which have a major market in this district. The Table-4.4 gives the sales acquired by the various pesticide company in both the season of paddy cultivation.

Company Name	Rabi Season(inMTs)	Kharif Season(inMTs)
CHEMINOVA	10	15
DUPONT	40	25
HPM	5	10
DHANUKA	30	20
PPL	13	8
BAYER	5	2
TROPICAL	5	2.5

(Table-6.4)

From the above table it is shown that DuPont, Cheminova and Dhanuka are the key player in this district. Among them DuPont have highest sales in both seasons. It is due to its effective granular pesticide (Ferterra) on paddy. The graph-4.4 given below shown the value of different companies.

(Graph-4.4)



### 6.5)In Sonepore District:-

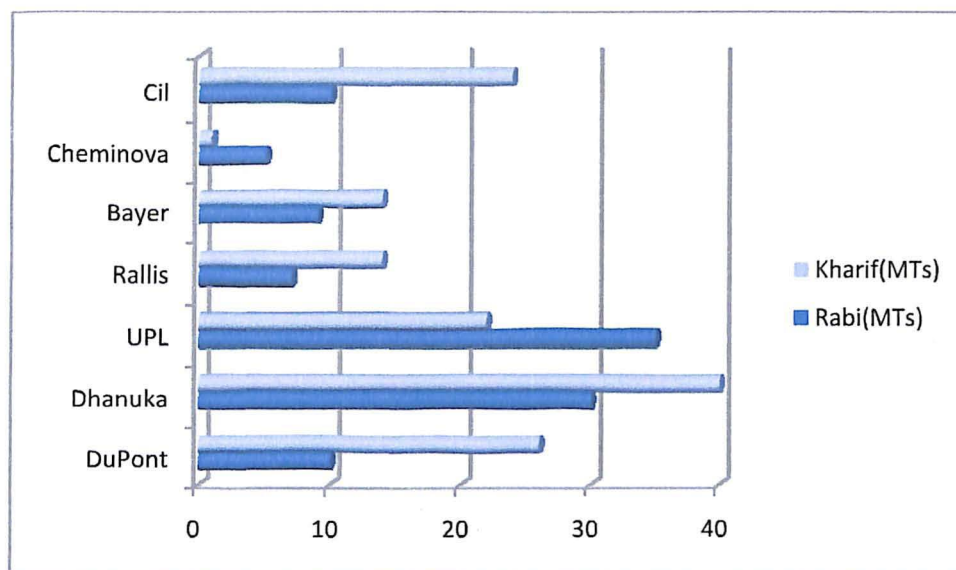
\_\_\_\_\_Sonepore district is comes under the medium-low productivity of rice in India. And it has a special position in rice production in Odisha. The pest control is done by various pesticide companies. The sales of different granular company are given in the Table-6.5.

Company Name	Rabi Season(inMTs)	Kharif Season(inMTs)
DUPONT	10.2	26
DHANUKA	30.3	40.6
UPL	35	22
RALLIS	7	14
BAYER	9	14
CHEMINOVA	5	12
CIL	10	24

(Table-6.5)

From the table we concluded that Dhanuka acquired first position, next to it UPL and DuPont and CIL has also majority in Sonepore District. The graph-4.5 given bellow indicate the values.

(Graph-4.5)



## **Analysis of Market Size of DuPont's Rynaxypyr Granular Pesticides(Ferterra)in the Selected Area:-**

We selected five different districts for this study, which are different in position, climate, and also in production and productivity of paddy. We select three western Odisha districts (Sambalpur, Bargarh and Sonepore) and two Northern Odisha districts (Bhadrak and Balasore). Pest attacks on paddy also differ from season to season. The leading granular pesticides companies have a different market size in every district. DuPont India formulated a granular pesticide with brand name Rynaxypyr "Ferterra", which have major impact on rice stem borer and leaf folder insect. The analysis of market size of Rynaxypyr granules is done as per the data given by the respondents.

The market size of DuPont granular pesticides (in MTs), in different district are given bellow in tabular form:-

<b>District Name</b>	<b>Rabi Season(in MTs)</b>	<b>Kharif Season(in MTs)</b>
BHADRAK	15	40
BALASORE	85	50
BARGARH	125	200
SAMBALPUR	80	60
SONEPORE	35	50

(Table-7)

From the above table we found that Dupont India has more market size in Bargarh district as compare to other district. In rice productivity Bargarh district has a position in India, it also called the rice bowl of Odisha. It has approximately 40 corer market in pesticides , from it approximately 20-30% are granular pesticide market. And DuPont has an effective product name Ferterra (granular pesticide) and it has good result in rice stem borer and leaf folder insect. The market size of DuPont is 125 MTs in Rabi season and 200 MTs in Kharif season.

As compare to other district in Bhadrak district it has low market size because Bhadrak district earlier in un-divided Balasore district, now it form its own official area and be a independent district. Most of people depended on Balasore market. So it has low market in value (4-5 corer). In Bhadrak district the market size is 15 MTs in Rabi and 40MTs in Kharif.

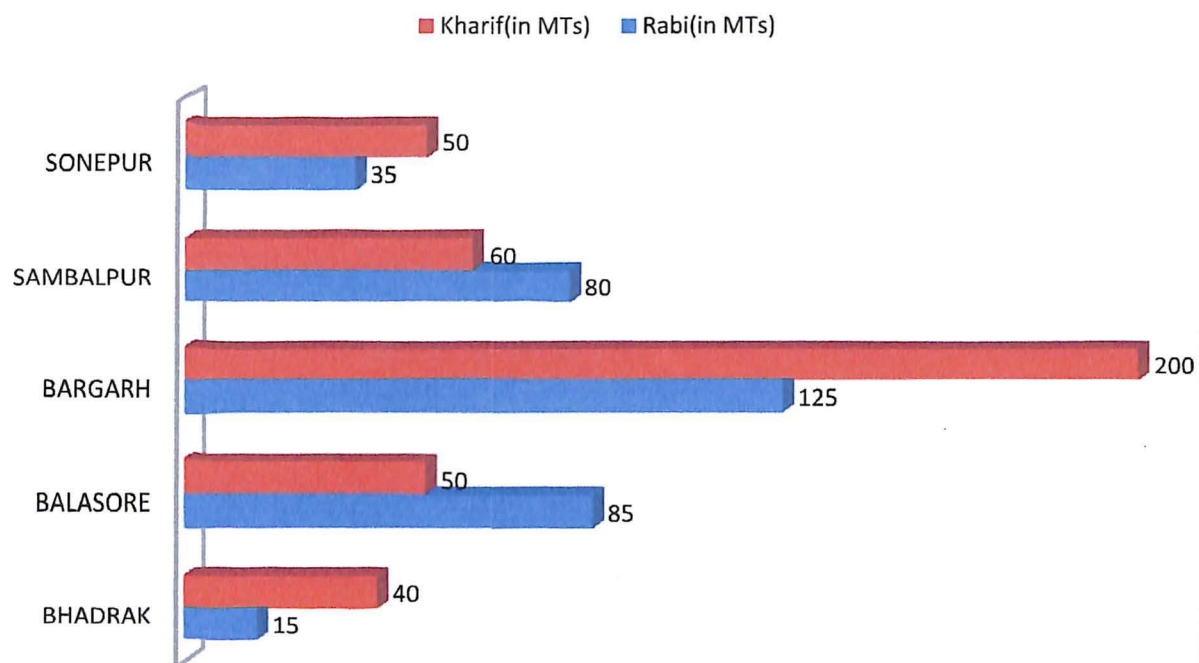
In Balasore and Sambalpur district the market size of DuPont granules is same in both the district. In Balasore 85 MTs in Rabi and 50 MTs in Kharif and in Sambalpur district 80 MTs in rabi and 60 MTs in Kharif. Sonepore district has also a good market size.

The graph-5 given below give the figure of Market size of DuPont's granular pesticide in different district.



(Graph-5)

### Market Size of Rynaxypyr Granules in Different district



## CHAPTER-V

### **RECOMMENDATIONS**

After conducting the survey and analyzing the results we can suggest the following remedies for betterment of the organization in those prescribed areas.

- ❖ More and more awareness campaigns should do.
- ❖ Especially the distributors meetings should be arranged.
- ❖ More transparency should be done.
- ❖ Special care should be taken during transportation.
- ❖ More number of projects work should do.
- ❖ Make aware the farmers about the granular pesticides, its use and safety.

## CHAPTER-VI

### **SUMMARY AND CONCLUSION**

There is a showing interest for rice production and sustainability of the production program with good margin of profit can be ensured only when the paddy protected from pest and insects. In case of company promoting critical input like pesticides support to create used technical gaps at the distributor level.

Pesticide as the term suggests its importance. It acts like a magic stick on the Agriculture field. It provides a protection to the plant against the pest attack. Pesticide marketing occupies an important place particularly in context of new liberalization process and value addition requirements of the agricultural sector . In pesticide marketing, there are number of pesticide companies plays an vital role in distributing the pesticide. There is a big pesticide market in study area ,which may be increasing in future in which some companies plays a vital role like Dhanuka Agritech India Ltd , E.I. Dupont India Pvt Ltd., Tata Rallies India Ltd, Pesticide India Ltd, Coramandel International Ltd. Among those company E.I. Dupont is one of the pesticide company which contributes its important in pesticide market. The fore going analysis in this study amply support this view and highlights the important role of E.I. Dupont play in pesticide market and allied aspect of production . The increasing in sales of Dupont product and their market size in pesticide marketing reveals that there is a huge opportunities in pesticide industries in future. The market size of different company reveal that Dupont is in the third position in study area. Market size of E.I. Dupont in study area (Sambalpur district, Bargarh district, Sonapur district, Bhadrak district, Balasore district) in the growing stage.