Responsible agricultural inputs marketing: A key to save environment

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ABSTRACT
India is mainly an agricultural country and for making farming a profitable enterprise in India, it is essential to make use of agricultural inputs in scientific way. In this study we attempt to find out lacuna in existing agro input’s marketing and service delivery system and environmental consequences of indiscriminate use of agrochemicals. Marketing of inputs should be done by considering what is in the best interest of farmers in the present and long term. Input marketing companies have to develop strategies that can make their products of good quality but cheap for rural customers and safe for environment. Responsible agro input marketing will help farmers to get good returns from farm and also help to supply quality food to the health conscious consumers and for protection of environment.

Key words: Agriculture, Agro inputs, Inputs marketing, Responsible marketing.

INTRODUCTION
In India, agriculture sector is the backbone of country’s development. India is a top producer country of many crops. Agricultural inputs and services are the basic requirements in the agricultural production. Agricultural input is something put into a farm or expended in its operation to achieve output or a result. The focus of the current agricultural policy of the country is to increase agricultural productivity. Raising the productivity of the crops, vegetables, and livestock depends on the quality farm inputs and services (Senapati, 2014). The farmer’s access to modern agricultural inputs is the backbone of any agricultural revolution. Agricultural productivity is measured as the ratio of agricultural outputs to agricultural inputs.

Raising the productivity of the crops, vegetables, trees and livestock depends on the quality of farm inputs and services. Use of high yielding varieties’ seed, chemical fertilizers and pesticides and higher farm mechanization can play a positive role in increasing agricultural productivity and in making India self-sufficient in food grain production. Low use of inputs by farmers, due to market constraints that reduce profitability of input use, is one of the factors responsible for the gap between potential and actual yields (Bationo et al., 2011).

Ago inputs are crucial for small farmers in terms of yield enhancement, cost cutting, and better quality production for better price realization (Singh, 2008). An efficient delivery system for quality agricultural inputs and services can play a pivotal role in the agricultural productivity. Highly productive farmers require the right inputs, at the right time, in the correct quantities and at affordable prices.

In an attempt to answer these key questions, we have adopted a systematic literature review (SLR) approach. In this way we will be able to address the longstanding calls of previous researchers. To this end, the rest of paper is organized as follows.

Agricultural inputs: The impressive growth in agricultural production since independence has been generated by higher input use, particularly purchased inputs as well as technology induced productivity improvement (Senapati, 2014). The information and access of farmers to modern agricultural inputs is the backbone of any agricultural revolution. The key inputs of agriculture include high yielding varieties seeds, chemical fertilizers, irrigation, pesticides, farm machineries and equipment, credit, labor, feeds, and machines which support crop and allied production. A specialized distribution effort is required to reach the farmers who are spread across the nooks and corners of the country. Improved access to inputs must be coupled with training in business and financial management for input suppliers, as well as expanded extension services for clients on pest diagnosis, soil testing, input selection and application.

The Agricultural inputs can be classified into Consumables and Durables/Capital inputs.

| Consumables | Durables |
|-------------|---------|
| Seeds       | Tractors |
| Oil and lubricants | Harvesters |
| Fertilizers | Threshers |
| Agrochemicals, etc. | Tools (levers, cultivators, etc.) |

Source: Singh, 2008. Rural Marketing: Focus on Agricultural Inputs, Vikas Publishing House, New Delhi.

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**RESEARCH QUESTIONS**

In this study we posit three key research questions:
- **RQ1.** How is the existing agro input’s marketing and service delivery system?
- **RQ2.** What are the environmental consequences of indiscriminate use of agro inputs?
- **RQ3.** Can we propose comprehensive approaches for responsible agro input marketing?

**MATERIALS AND METHODS**

In an attempt to answer the RQ1, RQ2 and to further help us to address RQ3; we use a literature review approach.

1. **Stage 1**
   - Identification of Review
2. **Stage 2**
   - Electronic search in databases using key words
3. **Stage 3**
   - Title and abstract reviews of identified papers (178 articles)
4. **Stage 4**
   - Apply inclusion and exclusion criteria
5. **Stage 5**
   - Papers selected for review (35 articles)
6. **Stage 6**
   - Create data extraction files
7. **Stage 7**
   - Descriptive and schematic analyses

**Fig 1**

**Source:** Adapted from Malviya and Kant (2015) and further refined as per our study needs.

**RESULTS AND DISCUSSION**

**Existing marketing channels for agricultural inputs and challenges faced by farmers:** Marketing channels includes a set of activities which transfer the ownership of goods and move goods from the place of production to place of consumption and these consists of all the agencies and all the marketing process. Input companies are distributing inputs to farmers through distribution channels like whole sellers and retailers. Selection of distribution channels is most important in input marketing. The availability, accessibility, quality and price have been major issue in this sector from the farmer perspective. Farmers buy such agro inputs in their locality more often from private traders like input retailers. There are reported to be 282000 farm input retailers in India (Kaegi, 2015) but the issues of availability in terms of time and quality still remain across inputs.

In spite of their business interest, the input retailers provide various services to the farmers for better production of the crops (Das et al., 2010). Increased availability and quality of inputs to retailers and smallholders is possible by providing technical assistance to existing wholesalers to understand the benefits of quality inputs, improve supply chain management and financial planning, and establish linkages to major international suppliers. The problem of poor communications, inadequate transport systems and lack of competition among traders generally result in high costs and delivery problems for farm inputs (Bhairava et al., 2016). One of the most difficult challenges for smallholder farmers is a reliable source of high quality agricultural inputs.

Fertilizers and high yielding varieties are good examples of inputs that played crucial role in green revolution, but now days their use is not so much profitable to farmers due to lack or improper supply, absence of subsidies, poor infrastructure, lack of farm credit, weak marketing institutions for selling final products and poor delivery systems etc. There are issues of lack of availability of major consumable inputs in adequate quantity on time, reliable quality, especially in seed and crop protection products and feed. This dimension of agribusiness hits the farm production subsector hard as poor input quality and economics compromise the entire agribusiness sector especially farmers and output users whose costs go up and benefit is reduced (Singh, 2016).

Existing input and service delivery system is not appropriate for proper supply of agro inputs. There is inefficient and unreliable delivery of farm inputs and agro services at higher prices. There is still not to be ensured and adequate supply of quality seeds, pesticides, farm implements and other services at right time and reasonable prices. There is also lack of support and guidance from agriculture department on agro inputs and their prices. Farmers are doubtful about price of inputs because of most agricultural inputs and pesticides dealers did not display rate lists of agricultural inputs (Bhairava et al., 2016). The limited use of modern inputs is also due to lack of finance, inadequate information, and unfavorable input and output prices (Goletti and Govindan, 1995).

All the agricultural input companies use seasonal personnel called “Field Assistants” for the extension work. These field assistants are non-technical people who gained some knowledge through training on the job. The retailers of agricultural inputs are mostly traders who use their hunch and commercial consideration in recommending the inputs to the farmers rather than scientific information. As a result farmers have been continuously exposed to information which is not technically accurate (Venugopal and Kaundinya, 2014).
In the recent past, there have been many experiments in the ago-input sector in terms of new distribution and marketing channels and some players have attempted to deliver total solutions to farmers including farm and allied inputs. These new channels range from marketers own outlets to supermarkets to franchised outlets besides traditional mainstream channel of selling through distributors and dealers/retailers. The major ones include: DCM Sriram Limited (DSL)’s, Hariyali Kissan Bazaar (HKB), ITC’s Choupal Sagar, Triveni Khushhali Bazar, Khushali Krishi Kendras, Champion Agro, Future’s Aadhaar, and Mana Gromor of Coromondal Group. They also operate in/across different states of India. There are also agri start-ups like farms and farmers and its agribusiness arm Green Agrievolution Pvt. Ltd. (GAPL) and Zamindara Farm Solutions (ZFS) which also attempt same objectives for small farmers (Nagendra, 2015 and Singh et al., 2016).

**Environmental consequences and indiscriminate use of agro inputs:** The current agriculture system promotes the reliance on inputs like synthetic fertilizers and pesticides for increasing farm production. But while making use of these inputs in farms the technical aspects have taken a back seat and environmental issues are emerged. If the credits of pesticides include enhanced economic potential in terms of increased production of food and fiber, and amelioration of vector-borne diseases, then their debits have resulted in serious health implications to man and his environment (Day, 2016 and Bhardwaj and Sharma, 2013). The farmers are not aware about the environmental degradation created by the indiscriminate application of modern inputs (Umanath et al., 2016).

The environmental issues due to agrochemicals are health issues, socio economic problems and pollution of water and soil, bio diversity, etc. Farmers, farm workers and their families, bystanders and consumers are exposed to dangerous synthetic pesticides. Handling, storage and disposal of these chemical agricultural inputs can cause acute and chronic negative health effects, cause cancer and negatively influence reproduction or disrupt the endocrine system. Pesticide residues in food and drinking water can cause similar problems affecting large number of people. Diffuse agricultural pollution can result in the contamination of the soil, air and water environments resulting from farming activities (Harikumar, 2012).

Farmers are making excessive use of inputs which leads to adverse soil effects including hardening of soils, depletion of soil fertility and increase in acidity. In high productivity irrigated regions, excessive and imbalanced use of agrochemicals like fertilizers and pesticides often leads to decline in soil fertility (Baishya, 2015). The results showed that soil physical characteristics such as bulk density is changed it is increased compared to control soil. The heavy metals accumulation in soil is highly affected and the concentration of some metals such as cadmium has reached a limit beyond the standard for agricultural purposes (Yargholi and Azarneshan, 2014).

An extensive field study and investigation showed the negative impact of pesticide on soil and environmental pollution. It affects the population of bird species that feed on insects and invertebrate. It kills the blooming species of insects that pollinates plants (Mada et al., 2013). In addition to killing insects or weeds, pesticides can be toxic to a host of other organisms including birds, fish, beneficial insects, and non-target plants (Singh et al., 2016). Rampant use of synthetic pesticides is playing havoc with human as well as other form of life on earth. If the credits of pesticides include enhanced economic potential in terms of increased production of food and fiber, and amelioration of vector-borne diseases, then their debits have resulted in serious health implications to man and his environment. There is now an overwhelming evidence that some of the agrochemicals do pose a potential risk to humans and other life forms and unwanted side effects to the environment (Forget, 1993; Igbedioh, 1991; Jeyaratnam, 1985).

Agrochemicals have severe negative effects on natural flora and fauna, biodiversity, water resources and ecosystem functioning and the equilibrium of agricultural systems. The impact of indiscriminate use of fertilizers on soil and ground water has come under sharp focus because soils are deteriorated due to excessive use of fertilizers without soil testing. Ground water is also polluted because pesticides can reach to water through runoff from treated plants and soil (Ioris, 2016). Contamination of water by pesticides is widespread.

Heavy treatment of soil with pesticides can cause populations of beneficial soil microorganisms to decline. Overuse of chemical fertilizers and pesticides have effects on the soil organisms that are similar to human overuse of antibiotics (Aktar et al., 2008). Indiscriminate use of chemicals might work for a few years, but after a while, there aren’t enough beneficial soil organisms to hold onto the nutrients” (Savonen, 1997). The excessive agrochemicals application reduces the biodiversity of the soil. The microorganisms of soil are more spoiled by soil disturbance by application of chemicals than any other parameters (Baishya, 2015 and Biswas 2012).

Farmers are using a huge amount of fertilizers, insecticides and pesticides. Laboratory findings indicated that the environment is highly polluted as there were many toxic metals and residues found in the soil, water, humans, animal and plants (Rejendran, 2003). The pesticides particles also enter into agricultural products (some times more than 500 times of maximum permissible limit) because of this people suffer from various chronic diseases like indigestion, gastric problems, weakness and also low mental development. All these can be related to the indiscriminate
use of pesticides (Mujumdar, 2011). It was observed in the field study that due to continuous exposure to herbicide farmers are complaining of contacted diseases, acute poisoning and health. Health and contacted disease include ulcer, heart pain, skin rashes respiratory condition, nervous disorder and eyes problem (Mada et al. 2013).

**Responsible marketing of inputs:** Responsible marketing is using eco-friendly materials, using less paper, using more digital technology to save on materials and cost of delivery. Sure, that’s part of it, but the core element of responsible marketing is truth. We need to romanticize our products and services somewhat to put them in their best light, but that is something that can be done truthfully, and not manipulatively (Watson, 2012). Responsible marketing of agri inputs is important because it involves focusing efforts on attracting consumers who want to make a positive difference with their purchases. It is the marketing of inputs by considering what is in the best interest of farmers in the present and long term. Marketing and advertising can influence consumer choice so it is important to market products responsibly.

Experience, education and extension contact are the major determinants of higher level of awareness of negative impacts on ecosystem due to application of modern inputs of chemical fertilizers and pesticides (Umanath, et al., 2016). Input companies must organize farmer training programs, which will help to create a platform to communicate farmers about the negative impact of excessive use of inputs in farm. Radio, TV, newspaper etc. must be innovatively used for interactive programming to provide real time solutions to local needs of the farmers and to disseminate relevant information on quality inputs and correct use of inputs. Number of mobile phone users is increased in the rural area. This will enable input companies for continuous relationship building through tele-marketing and faster dissemination of information to the farmers. The private firms should create goodwill among other stakeholders through good business practices that are based on innovation and good ethics.

It is crucial to link farmers with improved private sector distribution, improve market structures, expand financial services, strong transportation and facilitate the free flow of quality inputs from surplus to deficit areas (Bairawa, 2016). There’s an urgent need to go beyond what’s being done today in order to achieve the end objective of advertising. The methodologies need to undergo changes, to keep pace with the changing farmer and the technology (Nandkumar, 2014). Both the public and private sectors also need to develop alliances that mobilize the capacities and resources to support agricultural scientists, policy makers, and business leaders as well as farming community (Kargbo, 2010).

Farmers in India are not adopting modern agricultural inputs because the average quality of hybrid seeds and fertilizer is so poor that their adoption is not profitable at current prices. The rural customer is price sensitive and expects value for money. Therefore, the pricing has to be in accordance with their expectation. Input marketing companies have to develop strategies that can make their products of good quality but cheaper for rural customers (Senapati, 2014). If the product is from an expensive category, then the positioning of the product should be done in such a way that the product is perceived as a bundle of utilities, which will provides value for money (Kaur 2013).

In recent times big corporate houses are making rural forays with wide variety of solutions for farmers and consumers (Senapati, 2014). For example corporate houses like Bayer, Syngenta, Rallis India Limited, ITC, etc. are some of the models which are in news and they are doing responsible marketing. After studying different models, we suggest following comprehensive approaches for responsible agro input marketing for responsible marketing by agro input companies:

| Approach                        | Details                                                                                                                                                                                                 |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Evaluation of new agro products | Agro products must be subjected to extensive evaluation before they are approved for registration and sale.                                                                                           |
| Regulatory standards            | Before registering agro input, it must first demonstrate that it meets the regulatory standards of the country, that it can be used safely by workers, and that it has no adverse effects for the environment and the crops that it will protect, and to the food that will ultimately be produced from those crops. |
| Studies as per internationally   | The studies required for approval of the product must be conducted in accordance with internationally agreed test guidelines                                                                             |
| agreed guidelines               |                                                                                                                                                                                                         |
| Evaluation of risk              | It is essential to evaluate the risks which are associated with products in accordance with industry practices and relevant information must be provided to the farmers                                                |
| Product information             | Transparent product information should be given to the farmers                                                                                                                                           |
| Farmer training program         | Input companies must organize farmer training programs, which will help to create a platform to communicate farmers about products attributes, result and delivery mechanism etc. This will also help to solve the farmer queries so that farmers will be satisfied. Training must be given to farmers to handle and to use products safely. |
to-face training must be complemented by safety messages on crop protection products through a variety of media including picture based training, actor-led dramas, and even TV and radio programs.

| Business ethics | Commitment by input companies must be there for ethical sales and marketing practices that meet the standards set by external regulations and codes of practices. Good ethical behavior and transparent business practices. |
| Communication | Commitment by input companies for accurate and scientifically substantiated communication with the farmers. |
| Advertisements | All advertisements must undergo internal review for accuracy & compliance before publishing. |
| Promotion | Recommendation and promotion only of lawful uses, e.g. no off-label promotion for products. |
| Statements about product | No misleading statements about products or about use of products |
| Consistency of information | Consistency of information irrespective of form and forum (e.g. press information, social media, customer letter). |
| Business ethics | Good ethical behavior and transparent business practices |
| Interaction | Responsible interaction with all stakeholders groups |
| Monitoring | Monitoring of the responses of growers to different safety messages, including the effectiveness of training programs, in order to ensure that these important messages are understood by farmers who need them. |
| Customer Feedback | Collection of feedback from farmers and consider farmers views. |
| Regular Review | Regularly review marketing business operations to assure highest quality of products as well as safeguarding people and the environment. Corrective actions are essential to take where required and transparent reporting on reassessments. |
| Sell through authorized persons only | Authorization to sell must be documented with a “registration certificate” issued by the regulatory authority. |
| Supply of inputs | Provision of inputs timely supply and according to demand of beneficiaries is crucial to boost up production and productivity of smallholder farmers |

Benefits of responsible marketing: Agricultural input companies provide inputs to farmers through a network of distributors and retailers that often reach thousands of farmers. The goods and services they provide can help farmers to achieve greater yields and improved quality crops. Responsible marketing by agro input companies will help to increase production of crops grown by farmers and in turn it will help to give proper returns to the efforts of the Indian farmers. It will not only help to improve farmers’ revenue but also help to supply quality food to the health conscious consumers and save our environment by reducing environmental consequences. Responsible marketing will help input companies to increase demand for quality inputs and also to improve recognition through a responsible multi-media awareness campaign designed to encourage retailers and farmers to purchase quality agro-inputs.

CONCLUSION
Agricultural revolution is possible only by use of modern agricultural inputs. The agro input companies should be innovative and they have to produce very effective, safe and cheap agro inputs. Products must be subjected to extensive evaluation before they are approved for registration and sale. Responsible marketing of inputs is essential in order to reduce the costs and risks associated with the challenges of providing inputs to small farmers. One of the consequences of indiscriminate use of inputs (pesticide, fertilizers, seed etc.) is the adverse health impact on society. Input companies have to guide farmers for scientific and correct use of inputs in their farms. It is the responsibility of input companies to develop less toxic agrochemicals which will be safe for human being and environment by understanding environmental issues. It is very important to do responsible marketing of inputs by guiding farmers regarding safe and right use of right input in right quantity at a right time. Commitment by input companies is essential for ethical sales & marketing practices.

IMPLICATION OF STUDY
Finding of this study will be useful for agro input companies to do responsible marketing. It will help to increase awareness about responsible marketing. Findings are also useful for the policy makers of agro input marketing while deciding policy related to agro inputs. Responsible agro input marketing will help not only to increase production of crops grown by farmers but also in turn it will help to give proper returns to the efforts of the Indian farmers, help to supply quality food to the health conscious consumers and protect our environment.
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