

## Journey since 2009...

**Ranjit Kumar**  
**R Kalpana Sastry**  
**Sanjiv Kumar**  
**KH Rao**  
**PC Meena**

**MARCH 2017**



भाकृअनुप-राष्ट्रीय कृषि अनुसंधान प्रबंध अकादमी  
राजेन्द्रनगर, हैदराबाद-500030, तेलंगाणा, भारत  
**ICAR-National Academy of Agricultural Research Management**  
(ISO 9001:2008 Certified)  
Rajendranagar, Hyderabad-500030, Telangana, India  
<https://www.naarm.org.in>





PGDMA Students and Trainees with Honorable Minister of Agriculture & Farmers' Welfare, GoI



'Sankalp' B-School Competition Organized by PGDMA Students and Prize Distribution



4th Batch of PGDMA



## **Journey since 2009...**

**Ranjit Kumar**  
**R Kalpana Sastry**  
**Sanjiv Kumar**  
**KH Rao**  
**PC Meena**

**MARCH 2017**



**ICAR- National Academy of Agricultural Research Management**  
(ISO 9001:2008 Certified)

Rajendranagar, Hyderabad- 500030, Telangana, INDIA

<https://naarm.org.in>



## **Correct Citation**

Ranjit Kumar, R Kalpana Sastry, Sanjiv Kumar, KH Rao and PC Meena (2017). *PGDMA: Journey Since 2009*. Occasional Paper 18, ICAR- National Academy of Agricultural Research Management, Hyderabad.

## **Published by**

Director, ICAR-NAARM

## **Printed at**

Printing Press, ICAR-NAARM



डा. नरेन्द्र सिंह राठौड़

उप महानिदेशक ( कृषि शिक्षा )

**Dr. Narendra Singh Rathore**

Deputy Director General (Agril. Edn.)

Phone : 011-25841760 (O)  
Fax : 011-25843932  
E-mail : ddgedn@gmail.com  
nsrdsr@gmail.com  
Website: www.icar.org.in

## Foreword

The Indian Council of Agricultural Research (ICAR), with its vast network of deemed to be universities, research institutes, AICRPS and KVKs spread across the country, is spearheading and catalysing research innovations in the area of agriculture and allied sciences. The council is taking various initiatives in order to keep pace with the dynamic changes in the global food economy. On the other hand, agriculture and allied sector are becoming more complex on account of changing technologies, climate scenario, information ecosystem and market dynamics. The vision 2050 of ICAR also envisages that agri-food marketing systems are likely to undergo a significant transformation towards demand-driven, vertically coordinated systems, managed by the agribusiness and marketing firms. To meet such challenges, the ICAR also initiated 'Agribusiness Management' as one of the ARS disciplines in 2012.

The ICAR-NAARM, a unique institute under the Council, mainly entrusted for capacity building of NARES professionals, took a big leap in 2009 by initiating the two-year Post Graduate Diploma in Agriculture (PGDMA). No doubt, the programme is serving various purposes to the Council as well as nation, for instance, transforming agri-graduates into industry-ready professionals, imparting skills and inculcating spirits to create agripreneurs, strengthening capacity of NAARM to train the NARES personnel in the field of agribusiness management, undertaking research in agribusiness, etc. Management education is considered to be one of the most demanding area in the corporate arena. I am very happy to see that this study has been taken after completion of six batches of PGDMA to take stocks. The journey since 2009 has been captured vividly and also charted out future plan to grow organically. The feedback of its Alumni offers interesting insights to look into the challenges and opportunities in the field of agribusiness as well as changing aspirations of youths.

I compliment the entire team for bringing out this interesting report, which may give directions to other institutions also to undertake similar assessment studies for their ongoing activities. I am sure that the reader will find this report to be of great value.

**(Dr. NS Rathore)**

Deputy Director General (Education)  
Indian Council of Agricultural Research, New Delhi

## Preface

New era heralded in the history of the ICAR-National Academy of Agricultural Research Management, Hyderabad in the year 2009, when 2-year full-time AICTE-approved Post-Graduate Diploma in Management- Agriculture (PGDMA) programme commenced. The programme is equivalent to MBA in Agribusiness Management. Now seven years since the launch, with six batches successfully graduated from the Academy, it is imperative to relook and introspect the journey to make the future path stronger and enjoyable. The Agri-Business Management (ABM) division of the Academy was asked to assess the progress of the PGDMA so far and suggest ways to improve and build this as “unique and differentiated” programme of ABM at national and global levels.

Studies of this nature are to be carried out at regular interval for continuous improvement and bringing innovation in teaching and learning in the field of agribusiness management. The present study is structured through insights into the programme structure, using valuable feedback from the NAARM-PGDMA Alumni and analyzed the future potential to expand. The authors place on record the support of all the faculty and staffs of the Academy, the guest faculty as well as the esteemed recruiters whose continuous encouragement and engagement helped the programme to reach to the present level. The timely feedback and other inputs provided by the NAARM Alumni is duly acknowledged. We also express sincere thanks to Ms. G. Ishitha, Young Professional of the ABM Division for her untiring help in compiling all the information and bringing in the present form through several iterations. Finally, we express our sincere gratitude to the Director, NAARM for taking this initiative, providing all support and guiding us time-to-time in carrying out this study.

**Authors**

## Contents

<i>Foreword</i>	<i>i</i>
<i>Preface</i>	<i>ii</i>
<i>Abbreviations</i>	<i>iv</i>
<i>List of Figures</i>	<i>v</i>
<i>List of Photos</i>	<i>v</i>
<b>1. The Academy at a Glance</b>	<b>1</b>
1.1 About NAARM	1
1.2 Vision, Mission and Mandate	1
1.3 Organization and Management	3
<b>2. Emergence of Agribusiness Management</b>	<b>4</b>
2.1 Agricultural Sector	4
2.2 Agribusiness: A Sunrise Sector	5
2.3 Opportunities in Agribusiness Sector	6
2.4 Agribusiness Management Education	7
<b>3. PGDMA: A New Beginning at NAARM</b>	<b>8</b>
3.1 Inception and Genesis	8
3.2 Admission Process	9
3.3 Evolving Course Curriculum	10
3.4 Exquisite Learning Environment	12
3.5 Timeline of PGDMA	13
<b>4. Profile of PGDMA Aspirants</b>	<b>14</b>
4.1 The Study Approach	14
4.2 Rising Interests about PGDMA@ NAARM	15
4.3 Academic Background	16
4.4 Students Representing Several Agricultural Universities	18
<b>5. Creating Agribusiness Leaders of Tomorrow</b>	<b>22</b>
5.1 Preferences of Under-graduates and NAARM Alumni	22
5.2 Contribution of PGDMA programme in the professional career	23
5.3 Placement Experience	24
5.4 Perceived Level of Satisfaction	30
<b>6. Bridging Skill Gaps &amp; Creating Impact</b>	<b>34</b>
6.1. PGDMA Alumni Catering Different Job Profiles	34
6.2. Initiatives for Brand Building	35
6.3. PGDMA-Creating Impact	38
<b>7. Leapfrogging to Next Level</b>	<b>41</b>
<b>References</b>	<b>49</b>
<i>Annexure-I</i>	<i>vi</i>
<i>Annexure-II</i>	<i>viii</i>
<i>Annexure- III</i>	<i>xi</i>
<i>Annexure- IV</i>	<i>xii</i>

## Abbreviations

ABI	Agri-Business Incubator
AICTE	All India Council for Technical Education
AIU	Association of Indian Universities
AU	Agricultural University
CAI	Centre for Agri Innovation
CAT	Common Admission Test
CIIE	Centre for Innovation Incubation and Entrepreneurship
CMAT	Common Management Admission Test
CTC	Cost to the Company
DARE	Department of Agricultural Research and Education
GIS	Geographic Information System
ICAR	Indian Council of Agricultural Research
IIM	Indian Institute of Management
IPTM	Intellectual Property and Technology Management
ITMA	Information Technology Management in Agriculture
MANAGE	National Centre for Management of Agricultural Extension
MAT	Management Aptitude Test
MBA	Master of Business Administration
NAARM	National Academy of Agricultural Research Management
NBA	National Board of Accreditation
NIAM	National Institute of Agricultural Marketing
NIF	National Innovation Foundation
PGDMA	Post Graduate Diploma in Management
PGD-TMA	Post Graduate Diploma in Technology Management in Agriculture
R&D	Research and Development
R4D	Research for Development
TELAge	Technology Enhanced Learning in Agricultural Education
TBI	Technology Business Incubator
UG	Undergraduate
UGC	University Grants Commission



## List of Figures

Vision, mission and mandate of the Academy	3
Indicative factors influencing agricultural sector	4
Emerging industries in agribusiness sector	6
Ongoing course curriculum	11
Generic timeline for any PGDMA batch	13
Size for first six batches of PGDMA and their responses	15
Year wise trend of applicants number for PGDMA	16
UG discipline of PGDMA students	17
University-wise students' representation	18
State-wise representation of NAARM graduates	20
Batch-wise proportion of girl-students	21
Percentage of students joining NAARM and their preference for it	23
Contribution of PGDMA course	24
Placement experience of NAARM graduates	25
Initial and current job profile of NAARM alumni	26
Preference for government job to private sector	27
Period of association with the first company and reasons for leaving	28
Initial and current CTC for first six batches	29
Average CTC trend	29
Achievement of aspirational goal	30
Aspiring to start own venture	31
Interest towards PhD programme	32
Journey of NAARM students	33
PGDMA brand building initiatives	34

## List of Photos

First Batch of PGDMA with the NAARM Faculty	15
Girls of 3rd Batch of NAARM-PGDMA	21
Students of PGDMA programme winning prizes in different Business Plan competitions	35
Students with Center for Agri-Innovation	35
Incubatees participating in Food and Agri-Business Accelerator Programme organized by NAARM	36

## The Academy at a Glance

### 1.1 About NAARM

High quality and policy relevant research emerges only from organizational and institutional environments that encourage and facilitate good academic practices. This involves professional training that leads to inter-generational transfer of research capacity. For a vibrant and knowledge-based organization, it is imperative to enhance the abilities of individuals, organizations and systems, to undertake and disseminate high quality research efficiently and effectively. Since recent past, technology is being harnessed to improve agricultural productivity in India, and agricultural scientists are playing pivotal role in this endeavor. Formal education system empowers scientists and students to specialize in certain areas, but lags behind in making them scientific managers who could lead the research and organizations for a bigger role of benefiting the society at large. It is highly important to be sentient to the importance of scientific management in agriculture.

To meet this need and provide an opportunity for persons pursuing career in agricultural research, the National Commission on Agriculture recommended establishment of All India Institute of Agricultural Administration and Management for training to the agricultural scientists. Later, the government appointed an expert committee in 1973, which recommended the setting up of a National Staff college for Agriculture. The Indian Council of Agricultural Research (ICAR) accepted the recommendation and established the Central Staff College for Agriculture (CSCA) in Hyderabad on September, 1976. Later, the CSCA was rechristened as the National Academy of Agricultural Research Management (NAARM) in 1979<sup>1</sup>.

### 1.2 Vision, Mission and Mandate

The Academy has been organizing training programs, workshops and seminars related to agricultural research and education management for the professionals of ICAR institutes and Agricultural Universities (AUs)<sup>1</sup> since its inception. It has reached all the stakeholders of NARES (National Agricultural Research and Education System), apart from

*National Academy  
of Agricultural  
Research  
Management was  
established in 1976.*

extension personnel, R&D managers and entrepreneurs in agribusiness sector by expanding its activities.

In the process of continuous evolution and in keeping itself relevant to the changing needs with respect to R&D and R4D in agriculture and allied sectors, the Academy transformed itself over the years. In its perspective plan *Vision 2020*, the Academy envisioned to make “NAARM as a World Class institution for the professional management of agriculture in the global context” by focusing mainly on training and research.

Later in the XI Five Year Plan, the Academy gave equal importance to the creation, dissemination, application and exchange of knowledge by capacity building, research and policy support and post graduate education. Hence, the vision is translated as:

**“By the year 2025, the Academy will emerge as India’s premier institute of excellence in the field of agricultural management, known and sought nationally and globally for its expertise in management of agricultural education, research, training, consultancy, public policy programmes and agri-business, and will contribute significantly to promote the sustainable growth and development of agriculture”<sup>2</sup>.**

Accordingly, the Academy has widened the scope of its activities by initiating academic courses like one-year distance education course, Post Graduate Diploma in Technology Management in Agriculture (PGD-TMA) and 2-year full time Post Graduate Diploma in Management-Agriculture (PGDMA) in 2009.

The Vision 2050 of ICAR also provides a strategic framework with innovation-led inclusive and sustainable agricultural growth in the country<sup>3</sup>. The Academy has thus kept revising its vision in synchronous with societal and country needs in the field of agriculture and updated itself with new vision, mission and mandates as shown in figure 1. Through research-based inputs and advice to the agricultural policy makers, planners and administrators, the Academy seeks to emerge as a ‘Global Thought Leader’ and become a leading agricultural management organization.

*Post Graduate  
Diploma in  
Management  
(Agriculture)  
started in 2009.*

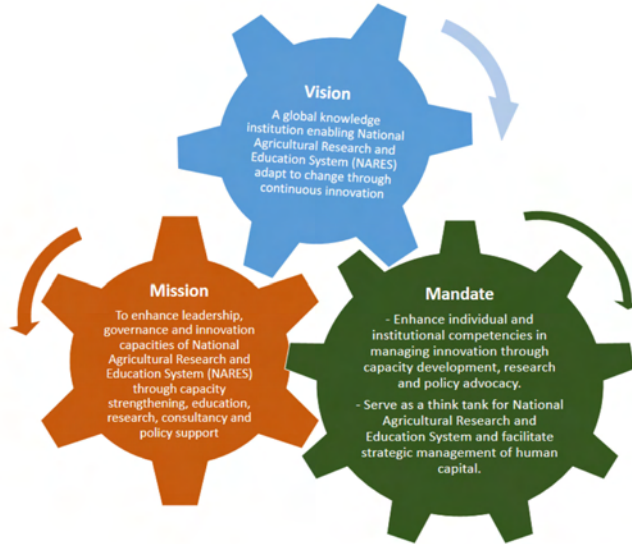


Figure 1. Vision, mission and mandate of the Academy\*

### 1.3 Organization and Management

Initially, the Academy had three divisions till 2011. Those were

- a) Agricultural Research Systems Management and Policies
- b) Information and Communication Management
- c) Human Resource Management

On 6<sup>th</sup> and 7<sup>th</sup> of January 2011, a high level national consultation meet was held at the Academy and one of the recommendation made was to introduce new organizational structure with six divisions<sup>4</sup>.

Subsequently, the Academy organized itself into six divisions namely:

- i) Agribusiness Management (ABM)
- ii) Education Systems Management (ESM)
- iii) Extension Systems Management (XSM)
- iv) Human Resources Management (HRM)
- v) Information and Communication Management (ICM), and
- vi) Research Systems Management (RSM)

*The Academy currently has six divisions- ABM, ESM, XSM, HRM, ICM and RSM.*

\* NAARM-Vision 2050

## Emergence of Agribusiness Management

### 2.1 Agricultural Sector

Agriculture continues to play an important role in the Indian economy, mainly on account of dependency of large proportion of Indian households for their livelihood. About 54.6 percent of the population directly depends on agriculture<sup>5</sup>. As per Central Statistics Office (CSO), share of agriculture and allied sectors like crops, livestock, forestry, fisheries and aquaculture, is expected to be 17 percent of Gross Value Added (GVA) during 2016-17 at 2011-12 prices<sup>6</sup>. Moreover, the sector itself is being influenced by several factors, particularly after remaining strongly connected to national and global economy (Figure 2).



Figure 2. Indicative factors influencing agricultural sector

*About 54.6 percent of the population directly depend on agriculture.*

Agriculture is growing and evolving into a technology and market driven industry, extending from primary production to value addition, service-orientation and market-linkages<sup>7</sup>. According to the convergence theory, the Indian economy has medium term growth potential between 8 and 10 percent during the period 2015-2030<sup>8</sup>. For such high growth, agriculture and allied sectors have to grow consistently at about 4 percent annually.

## 2.2 Agribusiness: A Sunrise Sector

The term agribusiness was coined by Ray A. Goldberg together with John H. Davis, Harvard University in 1957. Agribusiness refers to the various businesses involved in food production from seed supply, farm machinery, agro-chemicals, processing, wholesaling and distribution, marketing to trade and retailing<sup>9</sup>. It also includes finance, research, distribution and marketing activities that provide services to the production agriculturalists.

The food industry in India, which is currently valued at US\$ 39.71 billion, is expected to grow annually by more than 10 per cent. The Indian food retail industry is expected to reach US\$ 915 billion by 2020. Therefore, the agribusiness sector as a whole is being considered today a sunrise sector in India. With the increase in backward and forward linkages, the distinction between agriculture and agri-industry is getting blurred. Thus, farm production, processing and trade are getting increasingly integrated. Thereby, requirement of strong marketing, better management, faster decision making and effective use of resources is increasing<sup>10</sup>.

Major drivers for such a transformation include limited availability of natural resources, urbanization, economic liberalization, changing consumer preferences, infrastructure, commercialization, Information and Communications Technology (ICT) revolution, etc. Corporate farming is one example for commercialization of agriculture which led to mounting pressure on farmers and businesses to be competitive and profitable.

*Agribusinesses are estimated to contribute 25 percent to the GDP*

## 2.3 Opportunities in Agribusiness Sector

Agribusiness as a sector is estimated to contribute 25 percent to the Gross Domestic Product (GDP)<sup>10</sup>. The food processing sector alone constituted 9-10 percent of Agricultural GDP in 2014<sup>10</sup>. Food processing sector has employed more than 15 percent of total workforce in organized manufacturing sector and 32 percent in unorganized sector aggregating almost 48 million people directly and indirectly highlighting its potential in job creation<sup>11</sup>. The size of agrochemical industry was estimated to be USD 4.4 billion in FY15<sup>12</sup>, while the size of agri-warehousing was pegged at USD1.0 – 1.25 billion in FY13<sup>13</sup>. Thus conventional agriculture is evolving into a complex and knowledge intensive industries (Figure 3) that require skilled manpower with domain knowledge and adequate soft skills to efficiently manage the change process. The inner circle in figure 3 represents the traditional agricultural sub-sectors while the outer circle represents new-age emerging sectors which require Agribusiness Professionals.

A demand for more than 6.5 lakhs agriculture and allied graduates is estimated by 2020<sup>14</sup>. This is much higher than the estimated supply. There is a decline in the proportion of public sector employment whereas

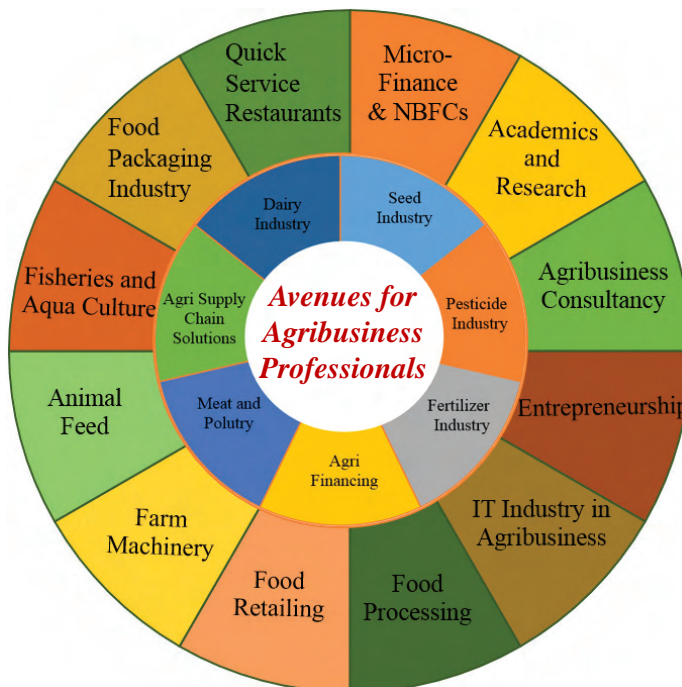


Figure 3. Emerging industries in agri business sector

*By 2020, there will be demand of approximately 6.5 lakhs agriculture and allied graduates.*

there has been consistent increase in availability of opportunities in the private sector. The food basket is shifting towards high value food products. The food sector is also witnessing institutional changes like cooperatives, contract farming, supermarkets and producer associations in the food procurement and distribution system. Thereby, requirement of strong marketing, better management, faster decision making and effective use of resources is increasing. All of these are creating a lot of demand for professionals in agribusiness.

## 2.4 Agribusiness Management Education

Agribusiness management encompasses activities, with backward and forward linkages, related to production, processing, marketing, distribution and trade of raw and processed food, feed and fiber, livestock products, including supply of inputs and services. Integration of both the aspects of value creating and sharing can be achieved through specialized management programs that are designed to adapt to local needs, strengths and conditions.

Market requires agribusiness professionals and has the required capacity to absorb them. To meet the market demand, many universities and institutes commenced post graduate courses in Agribusiness Management. The Department of Agricultural Economics, Tamil Nadu Agricultural University, Coimbatore started first ever post graduate program in the country in Agricultural Marketing Management in the year 1981. Moreover, it was only in the mid 90's, need for agribusiness management education was felt and many institutes started the Post-graduate programme. For example, MANAGE, Hyderabad started a programme in Agribusiness Management in 1996. Later, GBPUAT, Pantnagar initiated College of Agribusiness Management in 1998. Since then, many universities and institutes joined the group (complete list given in Annexure-I). Every sector has unique challenges, and a customized course will alone provide the students the appropriate competencies and abilities required to deal with the same. Agribusiness management education helps transform an individual into a professional agribusiness manager and therefore, the main objective is to ensure that all the components of the agribusiness value chain operate in synergy, profitably, efficiently in creating higher value for the customers in a sustainable manner.

*Growing diversity and complexity in agribusiness industry require well-trained agribusiness professionals.*



## PGDMA: A New Beginning at NAARM

### 3.1 Inception and Genesis

In the year 2007, ICAR constituted Fifth Quinquennial Review Team (QRT) to review the activities taken up and achievements of the Academy in the period 2001-2005. As part of the review, QRT gave several recommendations in the field of Agricultural Management. One of the recommendation was that the Academy should strive to attain the status of a deemed-to-be University by initiating Postgraduate Degree and Diploma programmes in areas relating to Agricultural Management<sup>15</sup>. Thus, the seed for initiating PGDMA course was sown. It was emphasized that the Academy has all the necessary infrastructural facilities as well as highly qualified faculty for the programme and these should be viewed as inherent strength.

In its transition from core training institute to academic education, the Academy initiated two programs of one-year duration: 1) PG Diploma in Information Technology Management in Agriculture, and 2) PG Diploma in Intellectual Property and Technology Management in 2008. The successful conduct of both the courses triggered upgradation of first course into 2-year full-time PG Diploma in Management-Agriculture (PGDMA) and second course into distance mode PG Diploma in Technology Management in Agriculture (PGD-TMA) aiming to reach even working professionals.

As part of this process, a brainstorming workshop was conducted on 25<sup>th</sup> May, 2009 to understand the nuances of agribusiness management education and to finalize the curriculum<sup>16</sup>. Twenty eminent personalities from academic and industrial background intensively discussed various aspects of the Agribusiness Management education<sup>16</sup>. Consequently, the two-year PG Diploma in Management-Agriculture (PGDMA) course was launched by Dr. Mangla Rai, Secretary, DARE (Department of Agricultural Research and Education) and DG, ICAR on July 25<sup>th</sup>, 2009 after approval by AICTE (All India Council for Technical Education)<sup>16</sup>.

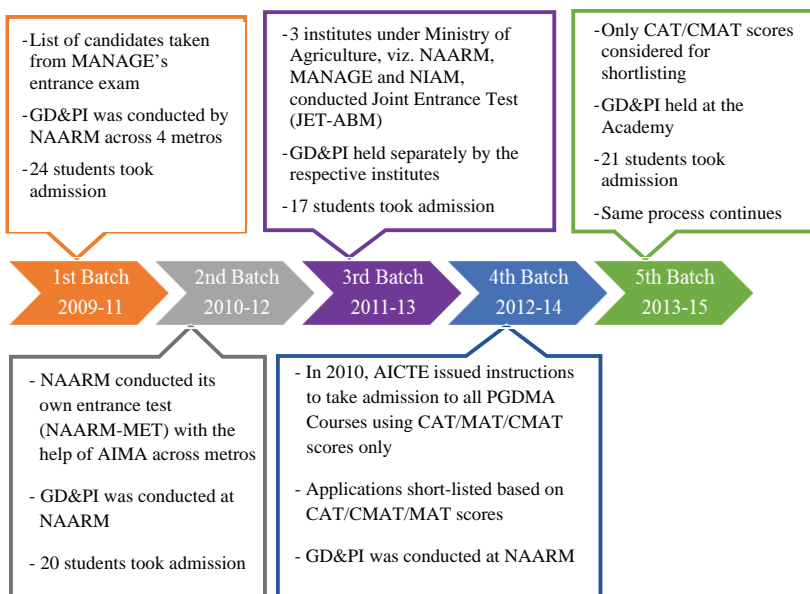
*PGDMA was launched on July 25th, 2009.*

## 3.2 Admission Process

The minimum qualification for admission to the PGDMA programme at NAARM is a four-year bachelor's degree in agricultural and allied sciences from any ICAR/UGC recognized Agricultural University or Institution. The eligible candidates wishing to join the course have to appear in CAT (Common Admission Test) or CMAT (Common Management Admission Test), which is the basis of shortlisting for the next stage of selection process viz. Group Discussion and Personal Interview (GD&PI). Thus, the candidates are finally selected on the basis of weighted scores obtained as academic performances (10 percent), CAT/CMAT scores (40 percent), Group Discussion (25 percent) and Personal Interview (25 percent). Previous experiences play a vital role in management education. Therefore, the candidates with previous work experience are also given preference in final selection. Such students represent about 10 percent of the total students at NAARM with average working experience of about 16 months.

### 3.2.1 Evolution in Admission Process

The admission process itself at NAARM has evolved over the years. When the course started in 2009, the Academy took help from the neighboring management school MANAGE in identifying the probable candidates for the course. However, it changed dramatically in due course.



*Admission in PGDMA is based on scores of CAT/CMAT, GD/PI and academic performances.*

### 3.3 Evolving Course Curriculum

The PGDMA course is a 2-year full time residential programme comprising broadly of 4 segments which catapult the agri-graduates into business industry ready professionals. These are **Classroom teaching, Live projects & Industrial visits, Summer Internship** and Independent Project. The course offers holistic development to the students through imparting domain knowledge, sharpening soft skills like communication, leadership quality, decision making ability, go-getter attitude and team spirits. It also promotes personal grooming and vibrant social life through various CLUBS, ENTREPRENEURSHIP CELL, WORKSHOPS and SEMINARS with national experts. The PGDMA programme is organized in six trimesters with total 105 credits of course load (Figure 4). There is significant focus on nurturing analytical skills, application of information technology in agribusiness and implication of policy changes. Moreover, the course curriculum of the programme has also been changed over time depending upon the contemporary needs of the industry. The current outlay of course modules is summarized in figure 4 and annexure II.

#### USP of PGDMA@NAARM

- ❖ Only ICAR institute offering Agribusiness Management course
- ❖ AICTE approved course
- ❖ Opportunity for student to participate in national level workshops/business meets
- ❖ Highly qualified in-house faculty with excellent faculty-student ratio
- ❖ Pool of guest faculty from industry
- ❖ Real time learning of incubation process through in-house agribusiness incubators
- ❖ Management course exclusively for agri-graduates
- ❖ Sylvan learning ecosystem
- ❖ Fully Wi-Fi enabled campus

*Course Curriculum has evolved over the years to cater to contemporary needs of the industry.*



Figure 4. Ongoing course curriculum

The course includes a compulsory **8-week Summer Internship** module after third trimester with leading agri-business industry. The last and sixth trimester is completely focused on an '**Independent Project work**' module. It adds a substantial amount of value to the students by offering an opportunity to analyze and learn the nuances of science based decision making to the real time problems as part of problem solving.

### 3.4 Exquisite Learning Environment

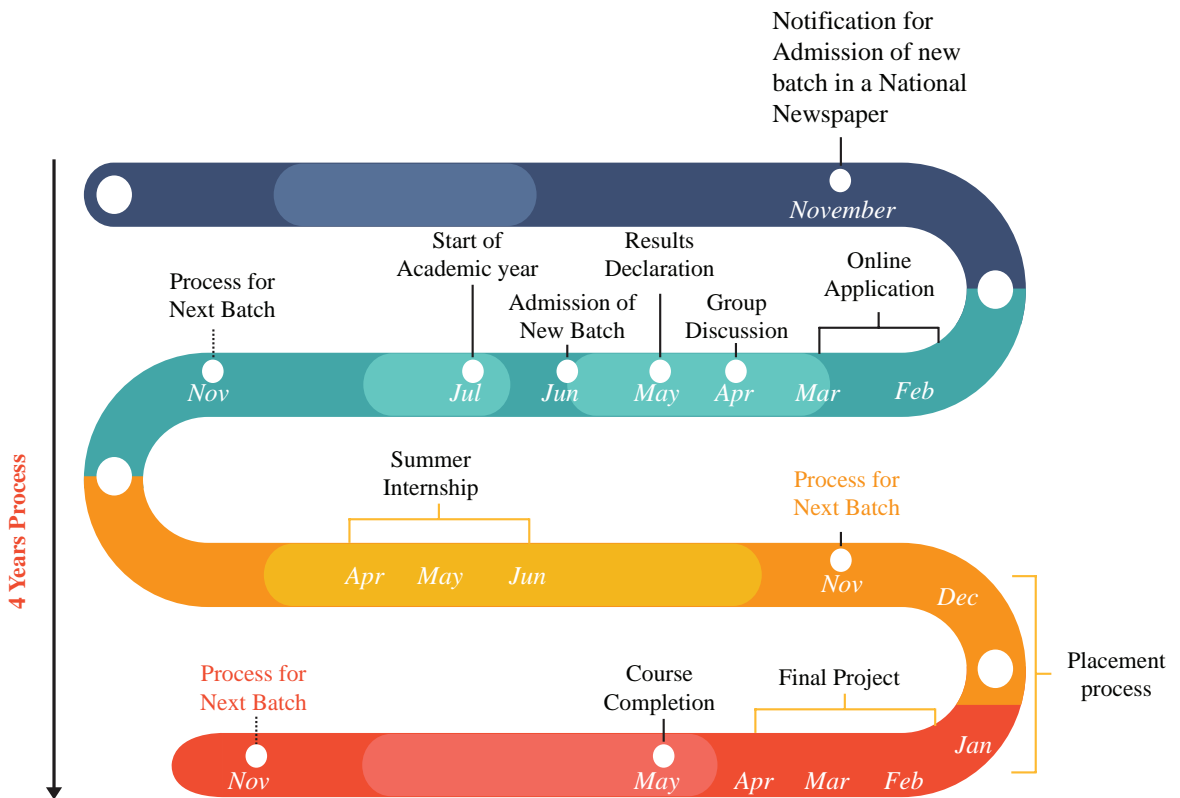
The Academy offers a very conducive academic ambience with a focus to develop students as future “Agribusiness Leaders”. The Academy has a library with exhaustive collection of about 19 online journals, over 30,400 books, more than 174 journals. Apart from this, the Academy is member of CeRA (Consortium for e-Resources in Agriculture), an online platform for accessing over 10,000 journals. Online databases like CMIE (Centre for Monitoring Indian Economy), IndiaStat, EBSCO, Proquest, Patent, OECD, J-Gate are also accessible in the campus. The students are given hands-on training on statistical software packages like MS Excel, SAS, SPSS and R, and other business analytical tools like ERP.

The cutting edge IT-enabled learning platform like **Technology Enhanced Learning in Agricultural Education** (TELAge) Lab and **Centre of Agri-Innovation**, hosting unique Agribusiness Incubator facility are other areas where students get opportunity to learn. The expanding platform of agri-startups hosted by CAI in the Academy offers the students an opportunity to meet and interact with agripreneurs, mentors and investors. The Academy's GIS lab endowed with latest tools and databases of agri-based information allows students to practically learn business analytics in the agriculture. Besides, the Academy hosts several training, workshops, symposia and business meet every year within the campus, through which students interacts with various stakeholders at one place. Inadvertently, the delegates/participants represent different parts of the country and abroad. Therefore, the students get an exposure of pan-India presence being at NAARM.

*Project work in the last trimester adds substantial value to the students.*

### 3.5 Timeline of PGDMA

The complete process of PGDMA for any single batch takes about four long years, starting with call for admission for new batch till course completion. Figure 5 exhibits various steps involved in the process during the four-year journey. There is an overlap in the processes every year with the process for next batch (indicated in the figure).



*Process for single batch takes four long years.*

**Figure 5. Generic timeline for any PGDMA batch**

## Profile of PGDMA Aspirants

The first batch of students took admission in PGDMA course in 2009. The course has completed seven years and six batches have already graduated in May 2016. Each batch has its own dynamics and demographics. Hence, to understand the progress of the course and to identify possible areas of improvement, the present study was undertaken with the following objectives.

- ❖ To understand the effectiveness of the PGDMA programme in terms of creating quality manpower catering to the agribusiness sector.
- ❖ To get first-hand information about the aspirational goals of agri-graduates interested in career opportunities in non-government sector.
- ❖ To identify the opportunities for the scaling up and in diversifying the agribusiness management education.

### 4.1 The Study Approach

The study corresponds mainly to six passed out batches during the period 2009-2016. Information and feedbacks were collected from the **NAARM-PGDMA Alumni** who graduated from the Academy during this period. For this purpose, a structured questionnaire was prepared and pre-tested before sending it to the Alumni. The questionnaire was sent to the Alumni using google forms (<https://docs.google.com/forms/u/0/>). Total 123 students have graduated from NAARM so far (2009-2016). Out of them, 107 (87% of Alumni) participated in the survey. The following graph (Figure 6) depicts the batch-wise strength of the students and their response rate. Besides, other information were gathered from the existing reports, prospectus and placement brochures of the past batches.

*The period of this study was 2009-2016. Therefore, only first 6 batches are covered.*

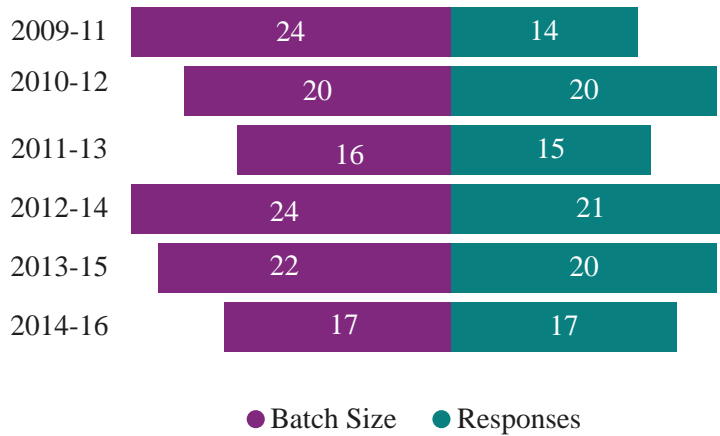


Figure 6. Size for first six batches of PGDMA and their responses



Photo 1. First batch of PGDMA with some of the NAARM faculty

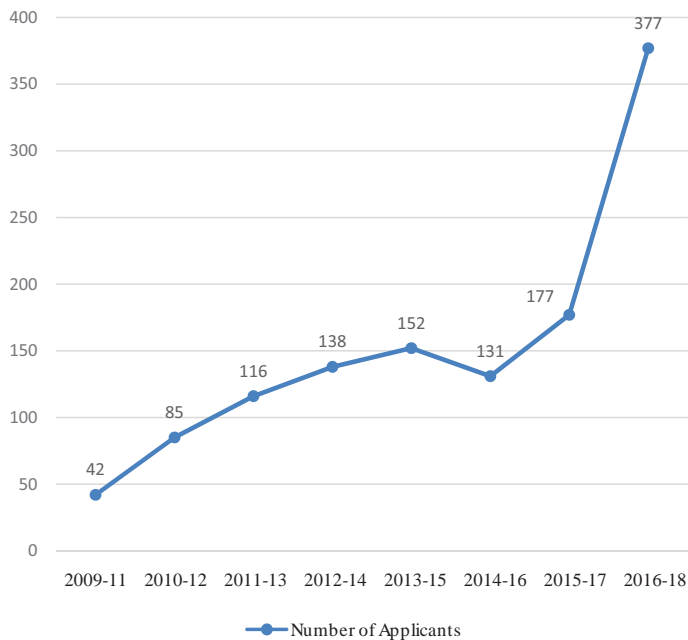
## 4.2 Rising Interests about PGDMA@ NAARM

The number of applicants for a course shows the awareness about the course among the aspiring students. As the number of applicants increases, so does the value of the course and this shows its ability to cater to the needs of the market. During the time range of this study, there has been consistent increase in the number of applicants, though the number has been very small. An upward trend was observed in terms of interests of agri-graduates to pursue management education at the Academy. The number of applicants has increased from a meagre 42

*Total 123 students  
(2009-2016)  
have successfully  
graduated from the  
Academy*



for the first batch to 377 for the forthcoming batch (Figure 7). While it might appear as a very small number, it is imperative to put into the perspective. The PGDMA course of NAARM invites application from only graduates of agriculture and allied sciences. Most of these students belong to medium class family, for whom government job is still the first preference. Keeping this in view, other agribusiness management schools are allowing admission of non-agri students also. Moreover, the Academy has taken proactive initiatives to attract the students from various agricultural universities, which is reflected in the astounding response in the current year.

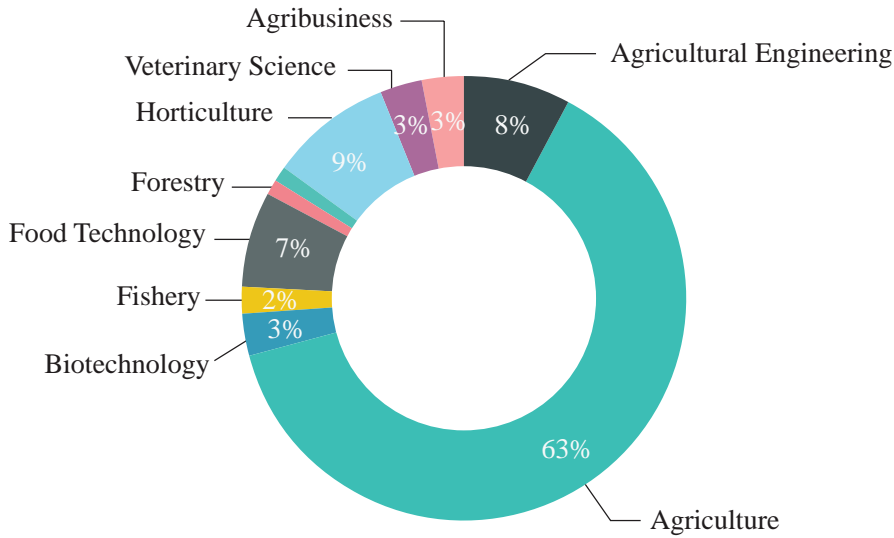


**Figure 7. Year wise trend of applicants number for PGDMA**

### 4.3 Academic Background

The essential qualification for admission into PGDMA programme at the Academy is graduation in agriculture and allied disciplines from any Agricultural University (AU) or institution recognized by the ICAR/UGC. An analysis of the type of UG discipline of applicant indicated that PGDMA course has attracted more candidates with an undergraduate degree in agricultural science than other allied sciences (Figure 8).

*Number of applicants is constantly increasing for the PGDMA.*



**Figure 8. UG discipline of PGDMA students**

This trend can be attributed to growing opportunities in the agricultural input industry. Concurrently, the number of students graduating in B.Sc. (Agriculture) is much higher than in any other allied courses in the country. Further, the graduates in disciplines such as veterinary science, fishery science and agricultural biotechnology proportionally get better job opportunities after graduation. This can be a reason of lower representation of students from these disciplines in the PGDMA programme. Personal interaction with the students from these disciplines indicates a personal goal and drive to shift from UG to Management.

Juxtaposing the PGDMA of NAARM with that of other management schools offering PG Diploma in Agribusiness Management course (except several Agricultural Universities offering MBA in Agribusiness), like IIM Ahmedabad, IIM Lucknow, MANAGE Hyderabad, NIAM Jaipur, IRMA (Institute of Rural Management Anand), VAMNICOM (Vaikunth Mehta National Institute of Co-operative Management) Pune, etc. reveal that they do not restrict candidates based on educational background. In these institutions, many of the students opting for the ABM course don't have adequate knowledge about agriculture and livestock, which the industry is looking for. Though, due to their long history in the field, they get the advantage in terms of the visibility and network.

*Only Graduates from any discipline offered by AUs and/or affiliated colleges are eligible for PGDMA admission.*

#### 4.4 Students Representing Several Agricultural Universities

The PGDMA course of NAARM has attracted students from nearly 26 agricultural universities across different parts of the country (Figure 9). Though more number of students came from Acharya N. G. Ranga Agricultural University (ANGRAU), Hyderabad, which is now bifurcated into ANGRAU and PJTSAU. This may be due to the proximity of the university from NAARM, who are well aware of the PGDMA programme. This is followed by PDKV, Akola and GBPUAT, Pantnagar.

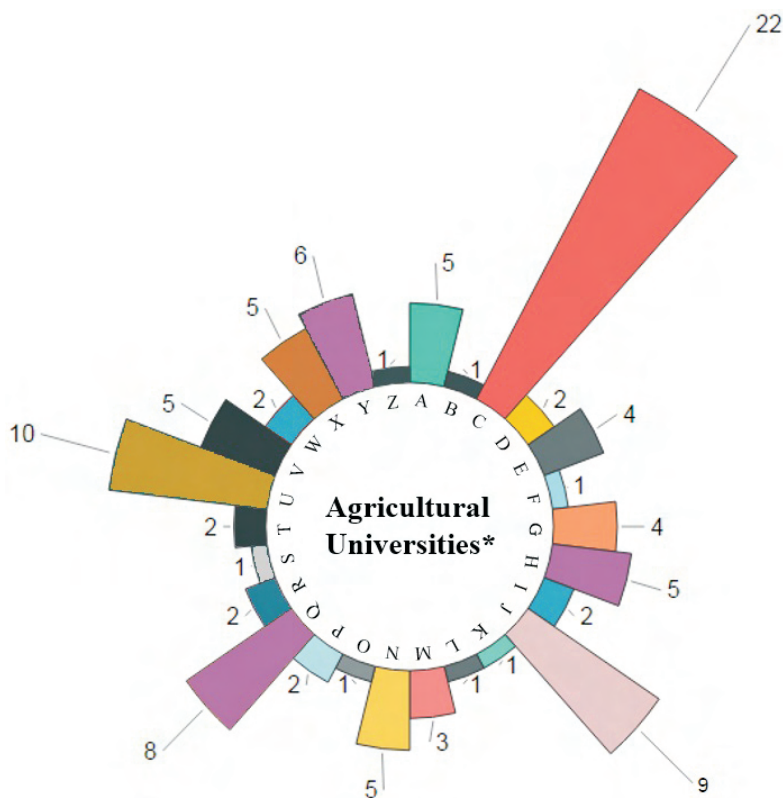


Figure 9. University-wise students' representation\*

\*A-AAU (Jorhat), B-Amity University (Noida), C-ANGRAU(Hyderabad), D-BAU (Bhagalpur), E-BCKV (Mohanpur), F-BSKVV (Dapoli), G-CSAUA&T (Kanpur), H-CSKHPKV (Palampur), I-Dr. YSRHU, J-GBPUAT (Pantnagar), K-HNBGU (Srinagar), L-IGKV (Raipur), M-JNKVV (Jabalpur), N-KAU (Thrissur), O-KUFOS (Panangad), P-LAOU(Hyderabad), Q-MPKV (Rahuri), R-MPUAT (Udaipur), S-Nagaland University, T-OAUT (Bhubneshwar), U-PDKV (Akola), V-SVPUA&T (Meerut), W-SVVU (Tirupati), X-TNAU (Coimbatore), Y-UAS (Dharwad), Z-WBUT (Kolkata).

*NAARM attracted students from 26 Agricultural Universities.*

It is pertinent to note that these universities are also running similar courses offering MBA(Agribusiness). Even then the students prefer NAARM over their own universities. Besides, the students pursuing graduation course in a university may not always belong to the same state, where the university is located. The ICAR entrance exam to UG course provide very good opportunity to pool the talents from different parts of the country to several universities beyond their home state.



Figure 10. State-wise representation of NAARM graduates

*Large number of agri-graduates prefer NAARM over their own university for Agribusiness Management course.*

## 4.5 Geographical Diversity

The selected students at NAARM represent 19 states presenting truly national character to the course and in tune with the NAARM's focus as a national academy in Agribusiness Management.

Initially, students from 1-2 northern states were maximum, followed by those from Andhra Pradesh and Telangana together and Maharashtra. Though many of these students had graduated from agricultural universities outside their native states. However, the dynamics keep changing every year. Figure 10 illustrates the picture of state domicile of the selected students across 19 states.

## 4.6 Gender Diversity

The Academy maintains gender-neutral stance for the programme and received good number of girl-students in the course. Globally, the enrollment of female students in top MBA schools is around 40 percent in 2016<sup>17</sup>. In the year 2015, out of total 1,79,602 aspirants appeared in Common Admission Test (CAT), 32 per cent were the girl candidates<sup>18</sup>. In case of agricultural education, 36 percent are females<sup>19</sup> as compared to 45 percent of girls entering higher education in the country<sup>20</sup>. In the academic year 2014-15, female representation in undergraduate courses in agriculture and allied courses was approximately 23 percent<sup>20</sup>.

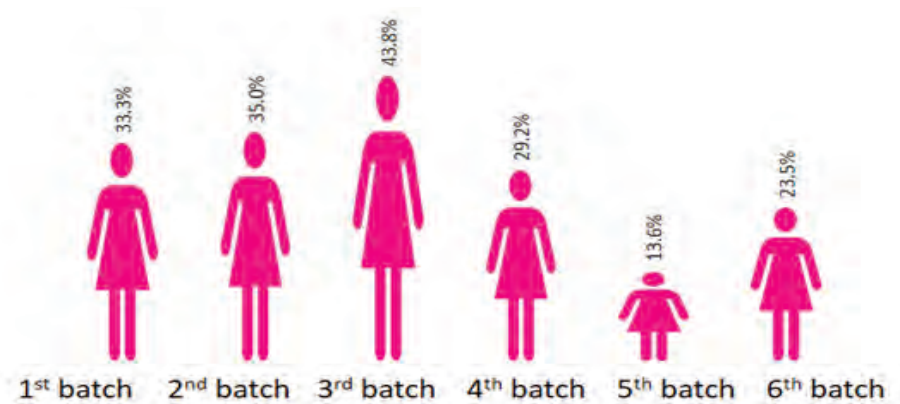


Figure 11. Batch-wise proportion of girl-students

NAARM graduates represent 19 states.

Against this background and fact that course is only for UG students with agri and allied sciences background, the representation of girls in PGDMA has been approximately one third. The year-wise composition is varying while the Academy is making efforts for increasing the reach to more girl students. Interaction with most students and industry reveals a reluctant trend for girls to apply. The reasons stated through personal interview indicated the dynamic nature of agribusiness jobs which includes extensive travel like field orientation trips and less of desk job.



**Photo 2. Girl-students of 3rd batch of PGDMA**

*PGDMA at NAARM is gender-agnostic. About 1/3<sup>rd</sup> of students are girls.*

## Creating Agribusiness Leaders of Tomorrow

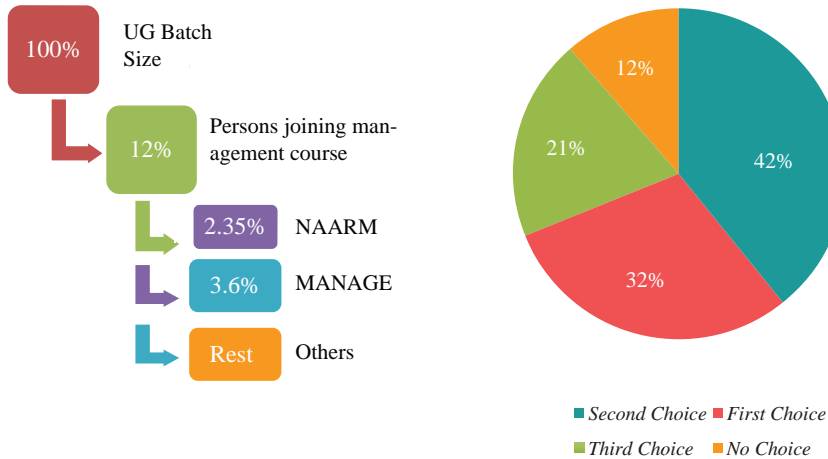
Being part of the world's largest network of National Agricultural Research and Education System (NARES), the impetus of the NAARM is to impart quality education in agriculture management. The PGDMA programme aims to create and nurture agribusiness leaders of tomorrow, who would steer the agribusiness sector from the front. With the changing consumer behavior, demographic dynamics, rapid urbanization and increasing middle income group in the country, the demand of well-trained manpower to manage the complexity of agribusiness industry is also increasing rapidly. In order to put into the test of ongoing programme in the above perspective, the feedback on various issues was invited from the NAARM-PGDMA Alumni belonging to first six batches (2009-2014). The responses received from them are eye-opening in many ways and to large extent encouraging. The response was asked on various aspects starting from their previous universities, juxtaposing themselves against their UG batch-mates, their aspiration, as well as suggestions to further strengthen the programme.

### 5.1 Preferences of Under-graduates and NAARM Alumni

Examining the Under-graduate (UG) batch size in the agricultural universities and their preferences for higher studies is one way of knowing the potential size of PGDMA aspirants. The UG batch size in those universities from where NAARM students came from, varied with average number of 65. Out of this, 48 percent preferred joining a management course, while 38 percent opted for higher studies in agriculture and allied sciences. It shows that there is a good pool of UG candidates preferring management education nowadays. This is big departure in trend of current agri-graduates from yesteryears, when most of them were aspiring for government jobs in academics or research. On an average, 12 percent of UG students joined management course (Figure 12).

NAARM was the second most preferred business school attracting around two percent of UG students, next only to MANAGE which is in lead in agribusiness management. NAARM was the top choice for 30 percent of the NAARM Alumni, while 39 per cent of them had second preference for it (Figure 12).

*About 12 per cent of Agricultural Universities' graduates prefer to join management course.*



**Figure 12. Percentage of students joining NAARM and their preference for it**

The reason for this trend is obvious. MANAGE and NIAM, two national autonomous institutes under Ministry of Agriculture, Government of India started the PGDMA programme about 15 years before NAARM did. MANAGE being one of the first-mover (since 1996) in agribusiness management education have strong network of its alumni in the industry providing good traction in the placement process. Moreover, our target students are graduates from Agricultural Universities (AUs) only, while all graduates, irrespective of subject domain are eligible in MANAGE.

## 5.2 Contribution of PGDMA programme in the professional career

A scale comprising of five degrees of attributes was developed to assess the contribution of the course in the life of NAARM Alumni. The Alumni-respondents ranked these attributes on a scale of 1 to 5 (1 being least, 5 being highest). The items comprised of various components offered in the programme which is expected to benefit the graduates in their career. The NAARM graduates felt that the course benefited them in big way in improving their communication skills with respondents strongly agreeing with the scale value of 5 (Figure 13). Besides, it also helped them in improving their analytical skills, management skills and IT skills. These are the most sought after skills in this new age agribusiness industry in India.

*Almost 70% of applicants had first or second choice for NAARM.*





Figure 13. Contribution of PGDMA course

### 5.3 Placement Experience

Placement is one of the most important “pull factor” in any management college. It is the most talked about indicator of success of any business school and students as well as their parents wish to know all about the placement record of the organization. In most of the cases, the students take educational loan to pursue their management course. Therefore, it becomes even more critical to have the least payback period for the same after completion of the course. Even though the Academy has been a late starter and conventionally inexperienced in such area, the placement scenario of PGDMA has been more than satisfactory with 100 percent placement to students in all batches. The Academy offers placement assistance through in-house placement committee which invites the prospective recruiters in agribusiness sector in the campus. The positive echoes of respondents on placement is encouraging to the efforts of placement committee which has now institutionalized SOP (Standard Operating Procedure) at the Academy (Figure 14).

*100 % campus placement since inception.*



Figure 14. Placement experience of NAARM graduates

### 5.3.1 Job Profile

A variety of companies from agribusiness and related sectors visit campus for recruitment of PGDMA students, which offer the job according to their requirement. A survey was conducted in the year 2015 by Graduate Management Admission Council (GMAC). It revealed that 54 percent of the employers globally preferred to fill the marketing and sales positions with the recent graduates<sup>21</sup>. The job description is an important indicator that shows whether our course curriculum is able to prepare competent graduates to the varied nature of job profiles existing and emerging in the agribusiness industry.

The job profile of NAARM graduates is in line with that of general management graduates with more than 50 percent start their career in marketing and sales followed by finance (Figure 15). However, over the years, the job profile changed significantly, as with seniority and experiences, the NAARM Alumni moved to higher level of business development, consultancy, and even senior managerial position. Three alumni started their own business.

*Sales and Marketing is the most offered job profile in the campus.*

### Entry job profile

Sales & Marketing (58)

Business Development (15)

Options (8)

Consultancy (7)

Procurement (6)

Others (13)

### Current job profile

Sales & Marketing (37)

Business Development (16)

Consultancy (8)

Operations (7)

Procurements (2)

Others (37)

Figure 15. Initial and current job profile of NAARM alumni

### 5.3.2 Private vs. Public Sector

There is always an ever ending debate on preference of youth for government job vs private job. A study by IIM-A which was commissioned by the Seventh Pay Commission shows that entry level jobs in government sector are paid more as compared to that in private sectors<sup>22</sup>. This sometimes lures the management professional towards the government jobs, particularly those who come from middle income category for whom job security remains most important goal. Though campus placement ensures decent job for each and every student, over time the students start rethinking their choices and search for safe heaven (public sector/government department) in expectation of job security, 9-to-5 job, less travel need, job without time-bound targets, etc. This shift has also been observed with NAARM-graduates, mainly towards public sector banks for the post of Agriculture Officer.

*Dilemma to be in public or private still continues to haunt the management graduates.*

Moreover, almost 25 per cent of NAARM-graduates have no interest in government job, while additional 32 per cent couldn't make up their mind. Contrary to it, almost 50 percent of the graduates either agree to shifting to government job or have already shifted to the same (Figure 16).

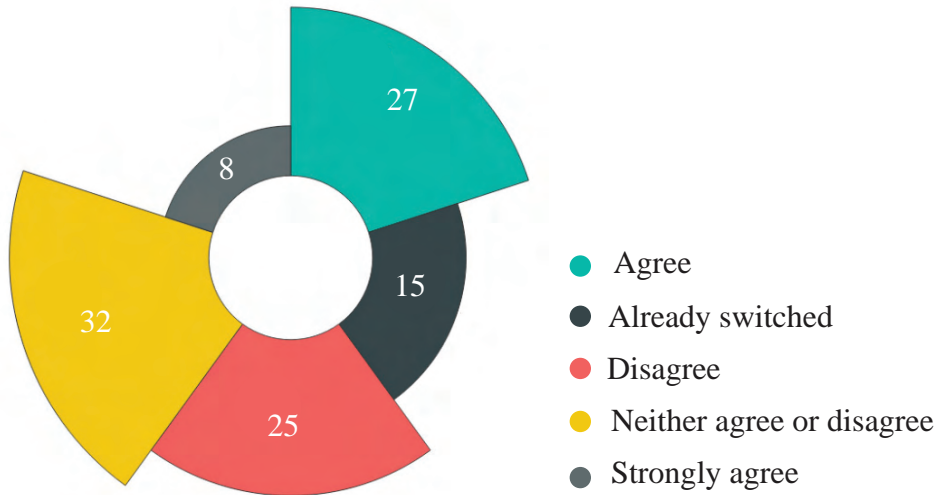


Figure 16. Preference for government job to private sector

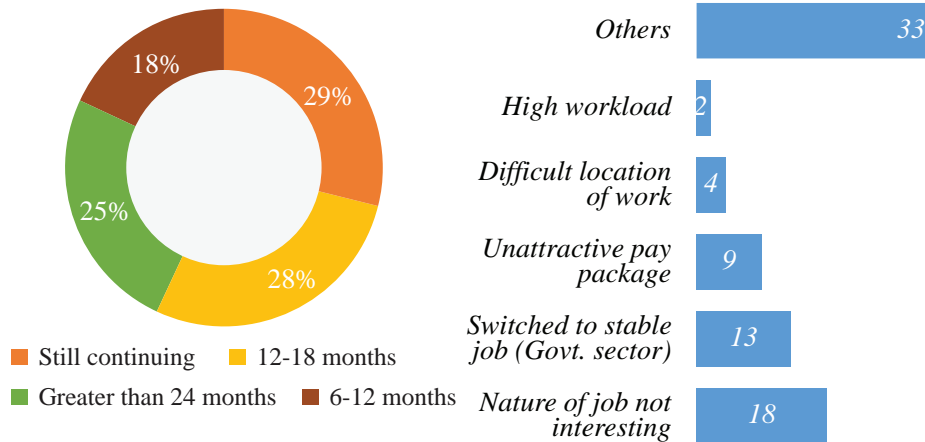
### 5.3.3 Job Attrition

Another major concerns for the industry is frequent change of job by the young employees. The company invests significant amount of resources on those employees during initial years. However, after receiving good training and practical experiences, the employees also get better opportunity- sometimes financially rewarding or better service conditions or higher ranks. Higher attrition hampers the performance of the companies. India is witnessing about 16.3 percent attrition rate, with the highest (22.6%) in retail sector<sup>23</sup>.

It has been revealed by the NAARM-graduates that more than 50 percent of them have shifted from their first job within first year itself. The period of association with certain employer can be considered as an indicator of satisfaction level. Longer period of association shows the contentment of the employee with the job. There is a huge variation in the duration of association with the first employer (Figure 17). It varies from as low as

*In early career, job switching is quite high.*

3 months to highest 58 months. On an average, the duration of association with first employer is about 17 months among NAARM graduates. As per the survey, 63 percent of the graduates felt that there were better and sufficient opportunities for them if they decide to switch.



**Figure 17. Period of association with the first company and reasons for leaving**

Reasons for the change in job were mainly; uninteresting job, unattractive pay, better opportunity (Figure 17). Work load and work environment formed small percentage of the reasons. Quite good proportion of NAARM-alumni left the company due to other reasons like family reasons, marriage, starting own entrepreneurship, to have a break to pursue higher education, etc. Deloitte, a consulting firm, found that better pay package elsewhere, better career opportunities and better work life balance are the top three reasons for attrition in any industry<sup>24</sup>.

### 5.3.4 Pay Package

The annual Cost to Company (CTC) received by an employee gives an indication about his/her worth in terms of knowledge, skill and capacity and their value to the company. It also indicates the brand equity of the institution and the marketability of the candidates before the industry. CRISIL in its study categorized the B-Schools into four categories (Tier-I, II, III, IV) and found that around 52 percent of them fall in tier-III category. The average annual CTC for these graduates vary from ₹3 to ₹5 lakhs<sup>25</sup>.

*At entry level, average annual salary ranged from ₹3 to ₹7 lakhs.*

Figures 18 and 19 present encouraging trend for the PGDMA programme of the Academy. Over the years, not only the average CTC at the beginning of the career has been improving, but also the minimum CTC offered by the recruiters is rising upward. The overall average CTC for the first six batches was ₹4.9 lakhs per annum. The minimum was found to be ₹3 lakhs (mostly for the first batch) whereas the highest CTC offered was ₹9.04 lakhs per annum. Graduates with work experience are able to entice higher salary than their counterparts.

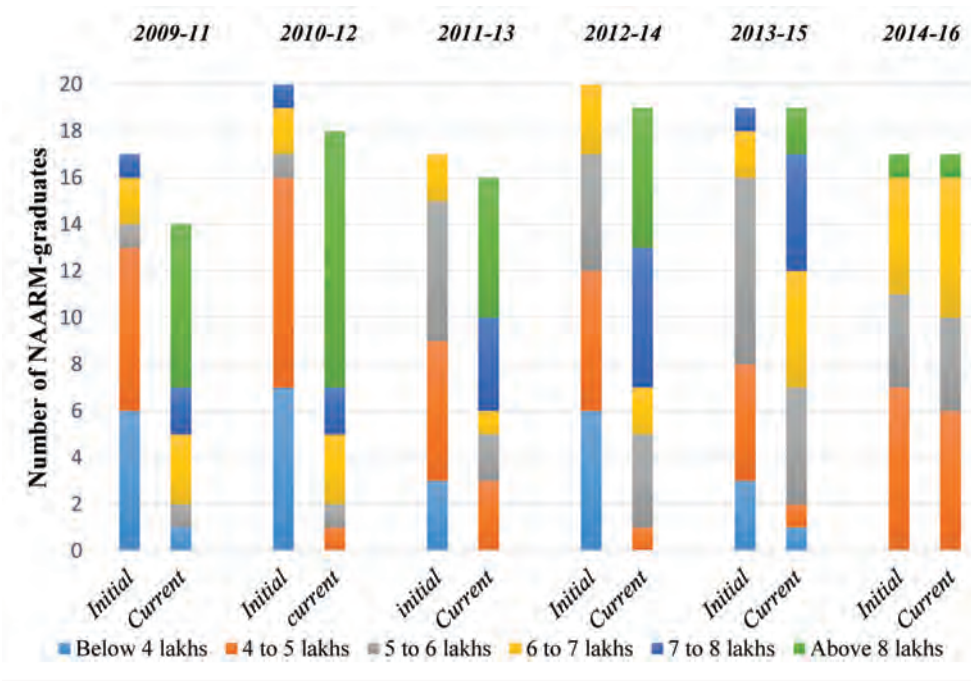
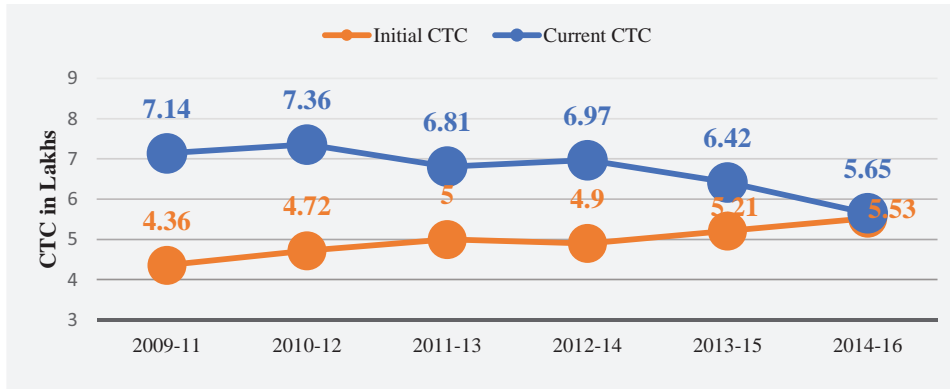


Figure 18. Initial and current CTC for first six batches



**Figure 19. Average CTC trend**

Salary increase survey by Aon Hewitt Consulting shows that the annual salary increase in the private sector is hovering somewhere between 10 to 10.5 percent in the past five years in India<sup>26</sup>. It was down to 6 percent in 2009 when a global recession affected the whole economy. The annual increment in salary for the NAARM-graduates is witnessing a CAGR (Compound Annual Growth Rate) of 15.65 percent which is higher than any standard. During initial years, the increase was less but it is now picking up indicating the performance of our graduates in the industry.

## 5.4 Perceived Level of Satisfaction

### 5.4.1 Personal Achievement vis-à-vis UG Batchmates

Achievement level is an indicator of satisfaction that helps in understanding the contribution of the course in helping the students to achieve their goals. From the feedback of PGDMA Alumni, it is evident that more than half of the graduates achieved what they expected from the PGDMA course in terms of their career goal, a few but significant number of graduates also felt that they have achieved more than what they expected (Figure 20).

*There is significant jump in CTC and the average current CTC is ₹5.65 lakhs.*

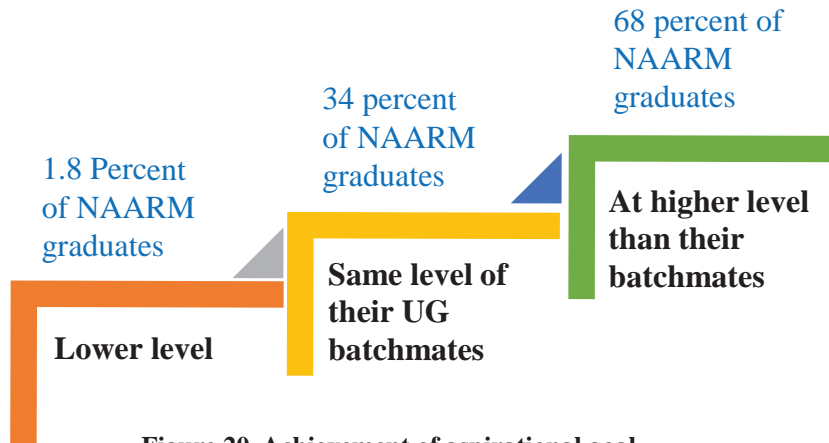


Figure 20. Achievement of aspirational goal

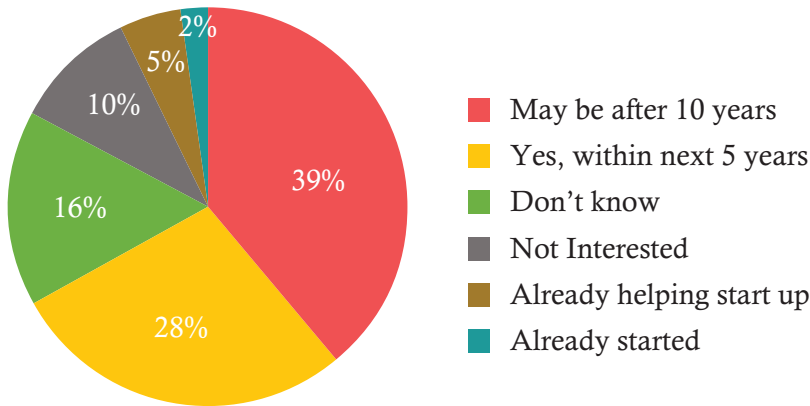
Consequent upon their achievement, 68 percent of graduates felt that they are in better/much better position compared to their UG batch mates in other management institutes. Besides, 34 percent place themselves in same level as compared to their UG batch mates. It shows that the course is by and large in line with other management courses and has been providing requisite skills.

#### 5.4.2 Self-Confidence to Start Own Venture

Since 2014, startups in the country are upbeat with high scale investments. Several startups also offer competitive pay packages. An important aspect is that startups generate significant employment among rural youth. The ability of a course to instill confidence and equip the students with necessary skills for starting and maintaining a startup reflects the maturity of the programme.

*68 percent felt that they are in higher position compared to their UG batch mates.*





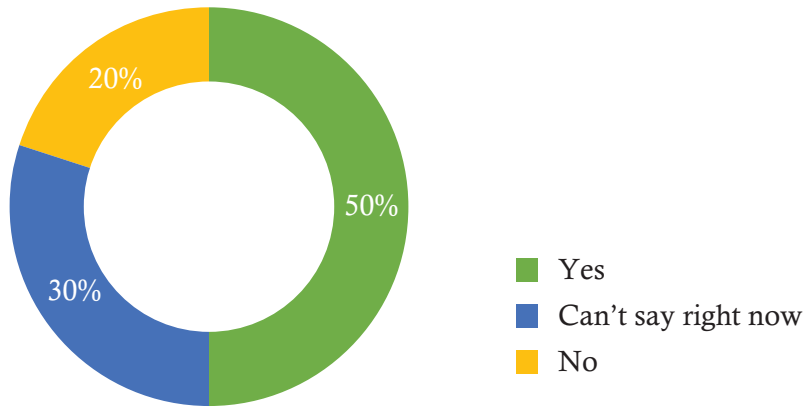
**Figure 21. Aspiring to start own venture**

The total number of management colleges in India are estimated to be around 4,500 (2014)<sup>25</sup>. In many business schools, some graduates opt out of placement to start their own venture. In IIM-A, three students out of 38 in the year 2015 opted out of placement to launch their own start-up venture<sup>27</sup>. NAARM too expects this trend in coming years. As a start, study indicated a trend of few students joining start-ups. These start-ups can catalyze joiners in acquiring the necessary skills sets to start their own venture. Around 7 percent of the NAARM graduates are either working with startups or have started their own venture (Figure 21).

### 5.4.3 Interest in PhD course

Some time we get contrasting feedback from the young graduates, who remain in the dilemma to continue in the same state or shift to new area or switch the career path itself. It is also observed with NAARM alumni, as around 50 percent of the graduates have shown interests to

*Almost 7% of graduates are working with startups.*



**Figure 22. Interest towards PhD programme**

join PhD programme in future to take a career in academics (Figure 22). Moreover, it is also established fact that the management education sector is facing serious crisis of experienced faculty. Therefore, more academia is needed having working experiences in industry with higher qualification.

*Almost 50% of NAARM Alumni are interested in PhD programme.*

## Bridging Skill Gaps & Creating Impact

The Post Graduate Diploma in Management- Agriculture (PGDMA) offered at NAARM since the year 2009, is getting wider acceptance among the agri-graduates (increasing number of applications for admission) as well as among the agribusiness industry (excellent placement record). Although NAARM started the Agribusiness Management programme around 15 years later than its peers, say MANAGE, NIAM, some of the SAUs, however, it is the second most preferred business school among those candidates who joined the Academy.

### 6.1. PGDMA Alumni Catering Different Job Profiles

The agri-graduates with diverse disciplines are getting not only placed with respectable pay packages, adapting to different job profiles, but they are also getting very good acceleration in their career within couple of years. The journey of NAARM-Alumni from each batch is depicted in the chart below (Figure 23).

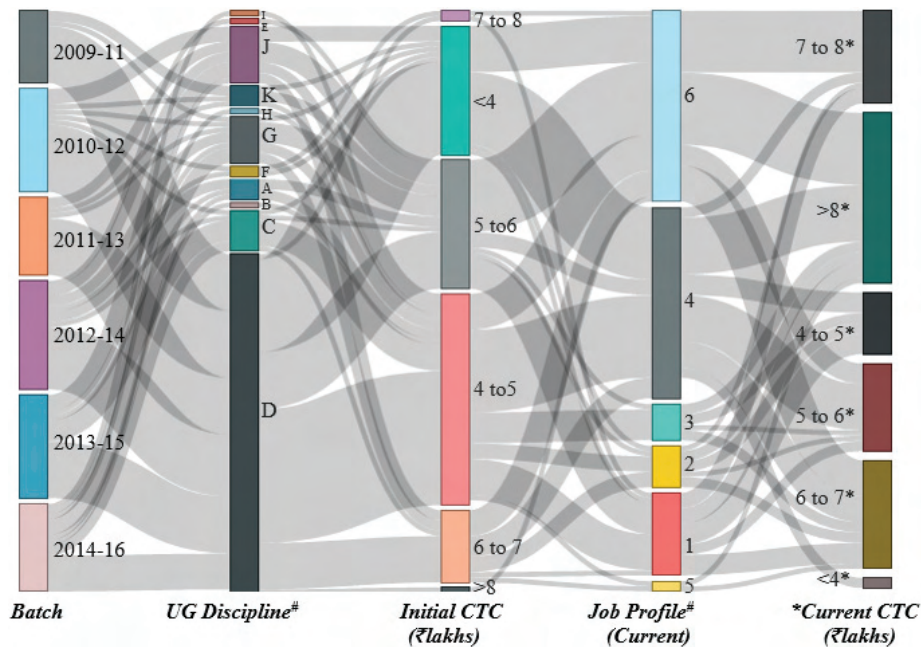


Figure 23. Journey of NAARM students

*NAARM is the second most preferred business school for agriculture graduates.*

#A-Agribusiness, B- Agricultural Biotechnology, C- Agricultural Engineering, D- Agriculture, E- Biotechnology, F- Fishery, G- Food Technology, H- Forestry, I- Home Science, J- Horticulture, K- Veterinary Science  
1- Business Development, 2- Consultancy, 3- Operations, 4- Others, 5- Procurements, 6- Sales & Marketing

## 6.2. Initiatives for Brand Building

Brand building and positioning takes central stage in the new age professional courses, where competition is stiff and continuously growing. For this, the Academy is having multipronged strategy and taken several initiatives for brand building of the PGDMA programme (Figure 24).



Figure 24. PGDMA brand building initiatives

Several initiatives taken to build the PGDMA brand.

Like any other marketing field, the finished products viz. graduating students are pitched not only against each other within campus, but also between campuses and the recruiters have different valuation parameters according to the complete package of the students, reputation and image of the institution, its networks, etc. In the process, every organization needs to make their product differentiated and distinct, to enable the product stand out, and let the industry be aware about these attributes of the product. Therefore, publicity plays a very vital role. With this perspective, the Academy is constantly innovating and taking several initiatives to make the intake process stringent, constantly improving the throughput journey and finally, creating buzz in the ecosystem. Organising inter-school competition and participating in such events are important steps in the process (Photo 3).



**Photo3. Students of PGDMA programme winning prizes in different Business Plan competitions**

### 6.2.1 Partnering with Center for Agri-Innovation

The Academy has recently set up the Centre for Agri Innovation (CAI), which provides a platform for business incubation for the agristart ups through its initiatives like Agri-business Incubator (ABI). This provides a good opportunity to the PGDMA students too in developing better understanding of Agri-start-ups and Agripreneurships, which in turn inculcates entrepreneurial and business acumen in them (Photo 4). It brings the culture of Ideation, Innovation, Incubation, Business Solution, Business acceleration, Fund raising, etc. Currently, CAI is hosting three initiatives- a-IDEA which is a Technology



**Photo 4. Students with Center for Agri-Innovation**

*Business Incubator facility at NAARM is a great enabler.*

Business Incubator (TBI), Agribusiness Incubator (ABI) and Grass Root Innovations (GRI).

**a-IDEA:** The Association for Innovation Development of Entrepreneurship in Agriculture is a technology Business Incubator supported by the Department of Science and Technology, Government of India. It helps entrepreneurs in ideation process and helps the potential food and agribusiness ventures to incubate and accelerate their innovations at the early stage of startup.

**Agribusiness Incubator (ABI):** a-IDEA and NAARM have jointly proposed for an ABI at NAARM under National Agricultural Innovation Fund of ICAR. Under this fund, NAARM was given responsibility to support 27 Agribusiness Incubators. NAARM helps in their capacity building, and acts as a facilitation center for IP management.

**Grass Root Innovations:** Its framework was conceptualized by NAARM with the help of National Innovation Foundation (NIF) and Honey Bee network. A total of 74 grass root innovations were identified and would be taken up for commercialization at a later stage under the network of ICAR institutes.

**Food and Agri-Business Accelerator:** India's first food and Agri-business Accelerator programme in partnership with CIIE, IIM-A was conducted and eight start-ups were selected for hand holding. Three of these startups raised substantial investments and expanded their



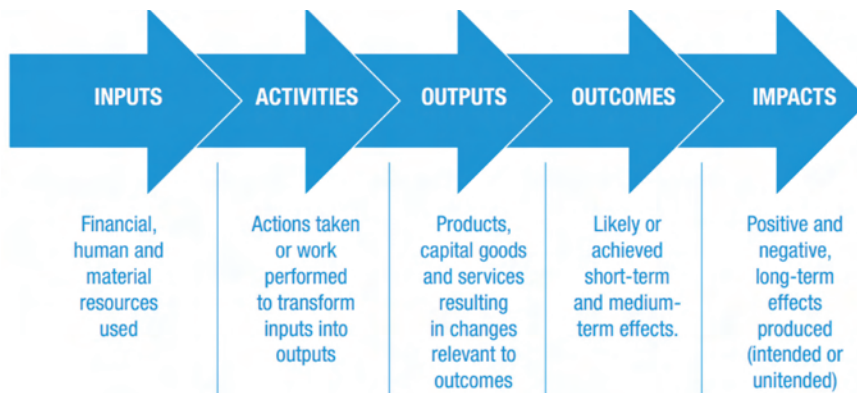
Photo 5. Incubatee participating in Food and Agri-Business Accelerator Programme organized by NAARM

operatives leading to increased direct and indirect employment. Presently, 12 incubatees are in place at the Center for Agri-Innovation and seed investment is extended to 4 start-ups. CAI is undertaking efforts towards building eco-system of sensitization, agri-innovation, incubation and entrepreneurship. This is the unique ecosystem available at the Academy and the students are exposed to all the opportunities arising around it.

*Events like Business Competition, Business Accelerator, Ideathon, etc. help in grooming the students.*

### 6.3. PGDMA- Creating Impact

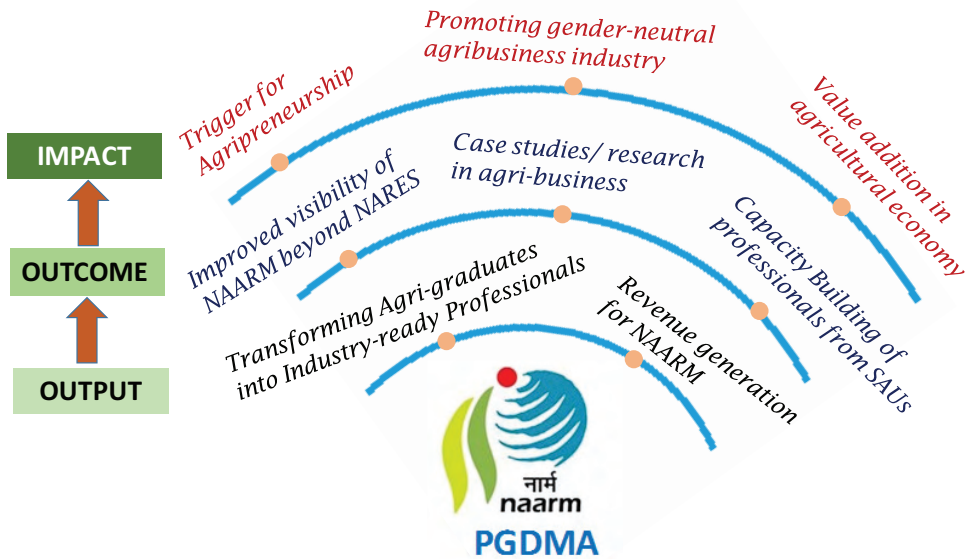
The results chain is often used as a model to help in understanding how the resources we provide and activities we are engaged in are meant to produce certain desired changes. According to OECD (2013), the results chain is the causal sequence for a development intervention that stipulates the necessary sequence to achieve desired objectives beginning with inputs, moving through activities and outputs, and culminating in outcomes, impacts, and feedback<sup>28</sup> (Figure 25).



**Figure 25. Results chain framework**

Keeping the above framework in mind, the inputs and activities being undertaken in PGDMA programme has already been mentioned in the previous sections. Coming to the output, outcome and impact, it is observed that PGDMA has a positive ripple effect. The effect can be categorized into three set of waves. The first effect is immediate output in the form of agribusiness professionals and also as a new source of revenue generation for the Academy. The second wave is an outcome which is intangible but more valuable in the form of improved visibility of NAARM and building a new area of research in specific field of agri-business. The third wave is a long-term impact which can be felt through increase in agripreneurship, increase in value addition to agricultural economy and a gender neutral agribusiness industry (illustrated in Figure 26). In cumulative terms, the

*To create impact, NAARM follows stringent procedures to control the intake, throughputs and outputs.*



**Figure 26. Ripple effect of PGDMA programme**

programme is not only helping the Academy to develop new niche area for itself, but also helping the Council in meeting long-term goals of catalyzing agriculture sector through intervention in marketing and value chains. The PGDMA course is also helping indirectly in meeting the expectation of government in terms of recent initiatives like ARYA (Attracting Rural Youth in Agriculture) and Start Up India, by stimulating agri-graduates not remain job seekers but help in building their own entrepreneurship and provide employment opportunities to the rural youth. The output, outcome and impacts of the PGDMA has been vividly presented in Figure 27.

*PGDMA has created several tangible and intangible outputs, outcomes, and leading to meaningful impacts.*



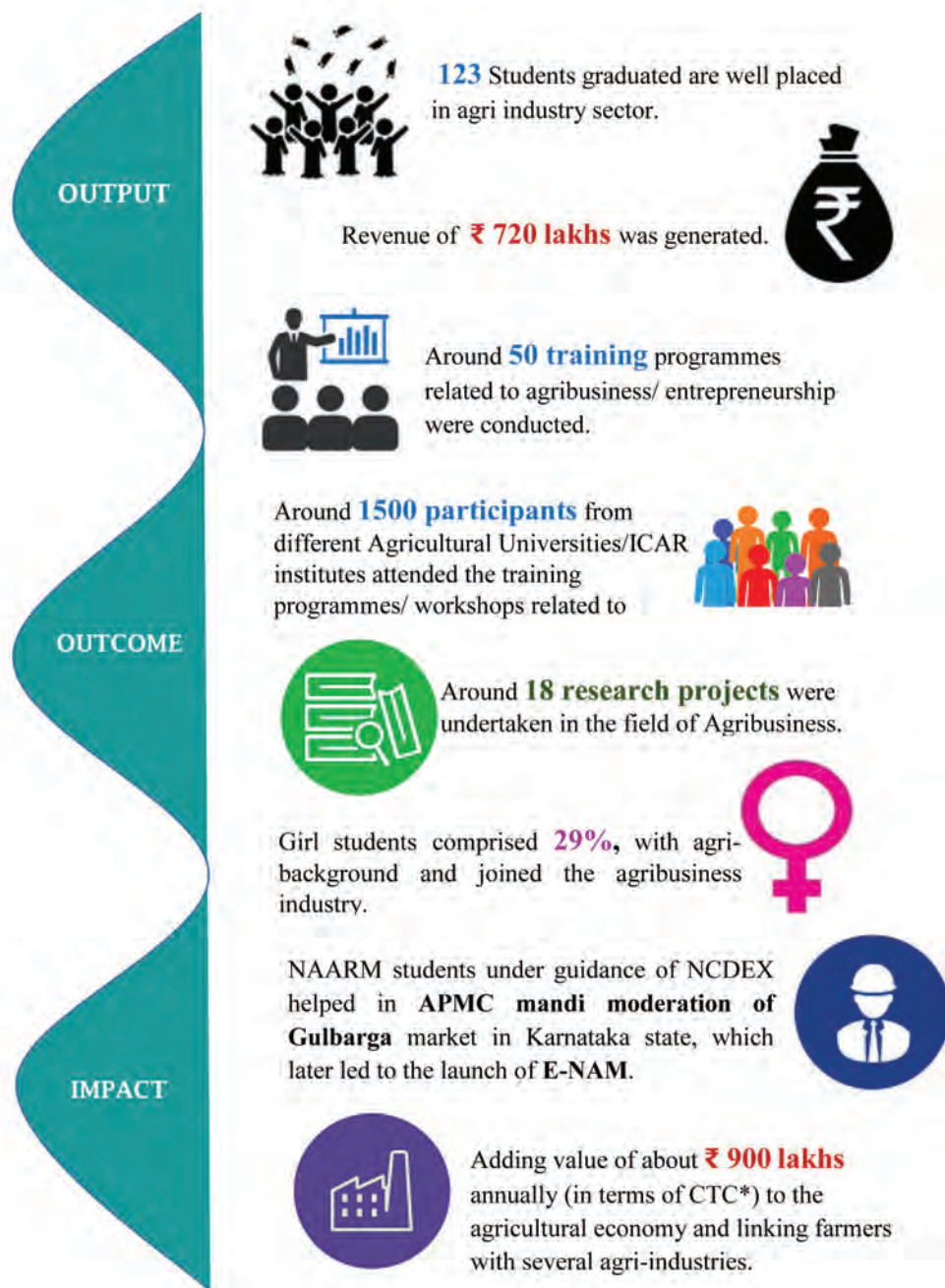


Figure 27. Output, outcome and impacts of PGDMA

\*The CTC offered to the PGDMA graduates is a contribution made to the agricultural economy.

## Leapfrogging to Next Level

The PGDMA Programme at NAARM aspires to be in the top-three agribusiness management destination in India in next five years. Though, it has come a long way and earned distinct place in the arena of agribusiness management in a short period. It still has a long way to go with innovations and adaptations during the course. There are few challenges in scaling the aspirational height. However, with the continued support from the various stakeholders, it can be easily achieved. The major challenges which needs special attention are discussed below:

### Dedicated Faculty



From the feedback from NAARM Alumni, it has strongly emerged that the Academy needs well-trained and committed faculty with relevant industry experience. Though, NAARM boasts of having the best faculty-student ratio in terms of number, however their engagement with other prioritized and mandated activities put a lot of strains on PGDMA. Only fulltime faculty can devote sufficient time to keep updating the courses according to the industry needs and conduct research in the related fields. This brings a sense of ownership to the faculty for the programme. Hence, it is essentially required to strengthen the Academy with the dedicated additional faculty having adequate industry experiences.

### Networking with global management schools



The networking and collaboration with global universities and reputed business schools would add significant value to the programme by cross-learning the courses and the business environment across continents. This may also help in introducing the student exchange programmes with other business schools, which in turn would provide opportunity for the students to study in different country and learn the optimum solutions practiced in those environmental settings.

#### NAARM Faculty (as on 31/03/2017)

*Dr. R Kalpana Sastry (Director)*  
*Sh. Ashish Roy (JDA & Registrar)*  
*Sh. P George (Comptroller)*  
*Dr. A Debnath (Medical Officer)*

#### **ABM Division**

*Dr. Ranjit Kumar (Head)*  
*Dr. GP Reddy*  
*Dr. B Ganesh Kumar*  
*Dr. N Sivaramane*  
*Dr. PC Meena*  
*Dr. Sanjiv Kumar*

#### **ESM Division**

*Dr. M Krishnan (Head)*  
*Dr. GRK Murthy*  
*Dr. D Thammi Raju*  
*Dr. S SenthilVinayagam*  
*Dr. VV Sumanth Kumar*

#### **XSM Division**

*Dr. Bharat S Sontakki (Head)*  
*Dr. N Sandhya Shenoy*  
*Dr. VK Jayaraghavendra Rao*  
*Dr. Surya Rathore*  
*Dr. P Venkatesan*

#### **HRM Division**

*Dr. RVS Rao (Head I/C)*  
*Dr. P Ramesh*  
*Dr. KH Rao*  
*Dr. Alok Kumar*

#### **ICM Division**

*Dr. SK Soam (Head)*  
*Dr. A Dhandapani*  
*Dr. S Ravichandran*  
*Dr. M Balakrishnan*  
*Dr. N Srinivasa Rao*  
*Dr. PD Sreekanth*  
*Shri. BS Yashavanth*  
**RSM Division**  
*Dr. I Sekar (Head)*  
*Dr. K Srinivas*  
*Dr. K Kareemulla*  
*Dr. MB Dastagiri*  
*Dr. P Krishnan*  
*Dr. Manju Gerard*  
*Sh. SP Subhash*

## International Accreditation



The international accreditation like South Asian Quality Assurance System (SAQS) given by AMDISA (Association of Management Development Institutions in South Asia), would help the NAARM in positioning the programme beyond India.

The criteria is developed from business and management schools of high national and international standing. Acquiring this would show that the institute is committed to quality assurance through continuous improvement. This global benchmarking would act as an indicator for the quality and global standards of the programme.

## Attracting foreign students



Attracting foreign students especially from SAARC nations and African countries would bring diversity in the campus and helps in catering to the diverse aspects of agribusiness management in different structural environments. As the dynamics of all the businesses are rapidly changing, limiting the knowledge to domestic affair would be a big constraint in future growth. Therefore, attracting and inviting students from different geographies would help the Indian students to better understand the realities and challenges at a global level.

## Scaling Up



The number of students per batch is also considered as critical success factor for an academic organization. The adequate number of quality of students bring with them more competitive environment of learning for everyone. Therefore, the capacity up- gradation through increase in student intake and enhancing infrastructure accordingly would be essential to take the PGDMA programme to the next level. With the increasing number of Agricultural Universities in India and the students graduating from those universities every year, it would be important to provide needed skill to get absorbed in expanding non-government sectors. Therefore, the Academy may plan well in advance to increase the students' intake to the minimum of 100 within next five years.

## Initiating PhD in Agribusiness



A PhD programme encourages students to further push the boundaries in understanding an issue related to their respective field of interests. The PhD programme shall further strengthen the capacity of the Academy in contributing to one of

the sunrise sector of the country, viz. food and agriculture industry. The feedback survey of NAARM Alumni has also reflected their keen interests to pursue for PhD course after having 4-5 years of industry experience. This would be a big contribution of the NAARM as the Agri-graduates having sufficient industrial experience will later join the academic and research field in agribusiness management after completing their PhD. Currently, most of the Agricultural Universities and other management schools offering Agribusiness Management course are short of quality faculty. Therefore, the Academy should initiate PhD programme in Agribusiness Management initially, which may further be upgraded to Post-doctoral programme as well.

## References

- <sup>1</sup>ICAR-National Academy of Agricultural Research Management (2004). Vision 2020, NAARM- Perspective Plan. Retrieved from <http://krishikosh.egranth.ac.in/bitstream/1/2058821/1/NAARM%209.pdf>
- <sup>2</sup>ICAR-National Academy of Agricultural Research Management, Annual report (2010-11). Retrieved from <https://naarm.org.in/wpcontent/uploads/2016/07/Annual-Report-2010-2011.pdf>
- <sup>3</sup>ICAR. (2015). ICAR-Vision 2050. Retrieved from <http://www.icar.org.in/files/Vision-2050-ICAR.pdf>
- <sup>4</sup>ICAR-NAARM, Annual report (2010-2011). Retrieved from <https://naarm.org.in/wp-content/uploads/2016/07/Annual-Report-2010-2011.pdf>
- <sup>5</sup>Ministry of Home Affairs- GOI. (2013). 2011 Census Data. Retrieved from <http://www.censusindia.gov.in/2011-Common/CensusData2011.html>
- <sup>6</sup>Indian Brand Equity Foundation (2017). Indian Agriculture Industry: An overview. Retrieved from <http://www.ibef.org/industry/agriculture-india.aspx>
- <sup>7</sup>Gandhi V. P. (2014). Growth and Transformation of the Agribusiness sector: Drivers, Models and Challenges Indian. *Journal of Agricultural Economics*, 69(1), 1-5.
- <sup>8</sup>Ministry of Finance-GOI (2017). Economic Survey 2016-17. Retrieved from [http://indiabudget.nic.in/budget2015-2016/vol1\\_survey.asp](http://indiabudget.nic.in/budget2015-2016/vol1_survey.asp)
- <sup>9</sup>Davis J.H & Goldberg R.A. (1957). A concept of Agribusiness. Retrieved from <https://babel.hathitrust.org/cgi/pt?id=uc1.32106006105123;view=1up;seq=8>
- <sup>10</sup>Iyer, Singhi. (2012). Indian Agribusiness-cultivating future opportunities. Boston Consulting Group. Retrieved from <http://media-publications.bcg.com/Indian-Agribusiness.pdf>
- <sup>11</sup>Gautam H.R. (2014). Employment opportunities in Food Processing Industry for Rural areas. *Kurukshetra-A journal on Rural development*, 62(7),3-6.
- <sup>12</sup>Indian Brand Equity Foundation (2016). Indian agrochemicals market to reach US\$ 6.3 billion by FY2020. Retrieved from <http://www.ibef.org/research/reports/indian-agrochemicals-market-to-reach-us-63-billion-by-fy2020-report>
- <sup>13</sup>Ernst and Young Global Limited. (2017). India's warehousing industry: an overview.

Retrieved from <http://www.ey.com/in/en/services/transactions/ey-summarizing-the-key-warehousing-segments-in-india>.

- <sup>14</sup>Rama Rao D, Rashmi Agrawal, Nanda SK, Awasthi IC, Joshi GP, Sanchita Bhattacharya, Indra Kumar D. (2011). Assessment of Future Human Capital Requirements in Agriculture and Allied Sectors. NAIP Project Report, National Academy of Agricultural Research Management, Hyderabad and Institute of Applied Manpower Research, Delhi, India
- <sup>15</sup>ICAR-NAARM. Annual Report (2007-08).
- <sup>16</sup>ICAR-NAARM. Annual report (2009-10).
- <sup>17</sup>Khosla, V. (2017, July 8). It's ladies first at global B-schools. The Economic Times. Retrieved from <http://economictimes.indiatimes.com/industry/jobs/its-ladies-first-at-global-b-schools/articleshow/53106995.cms>
- <sup>18</sup>CAT 2015 test center allotment: Number of girl candidates to shoot up: News. (2015, August 25). India Today. Retrieved from <http://indiatoday.intoday.in/education/story/cat-2015/1/460842.html>
- <sup>19</sup>ICAR. (2012). National Agricultural Education Project. New Delhi.
- <sup>20</sup>Department of Higher Education. (2016). All India Survey on Higher Education (2014-15). New Delhi.
- <sup>21</sup>Graduate Management Admissions Council. (2016). Corporate Recruiters 2016 Survey Report. Retrieved from <http://www.gmac.com/~media/Files/gmac/Research/Employment-Outlook/2016-corporate-recruiters-web-release.pdf>
- <sup>22</sup>Singh, M., Varkkey, B., Maheshwari, S. K., & Agarwal, P. (2015). A Study for Comparing Salaries/Emoluments in the Government Sector vis-à-vis Central Public Sector Undertakings/Private Sector in India.
- <sup>23</sup>Jain V. (2015, May 7). Titan's attrition rate is less than half of retail industry: HR Chief Rajnarayan. The Economic Times. Retrieved from <http://retail.economictimes.indiatimes.com/news/apparel-fashion/accessories/titans-attrition-rate-is-less-than-half-of-retail-industry-hr-chief-rajnarayan/47161374>
- <sup>24</sup>Deloitte Human Capital Consulting. (2015). Annual Compensation & Benefits Trends Survey India FY 2015-16. Mumbai.

- <sup>25</sup>Raol Y. (2014, May 31). An MBA doesn't mean big money, graduates of 37% of schools start at Rs 3 lakh: Report - Times of India. The Times of India. Retrieved from <http://timesofindia.indiatimes.com/india/An-MBA-doesnt-mean-big-money-graduates-of-37-of-schools-start-at-Rs-3-lakh-Report/articleshow/35803888.cms>
- <sup>26</sup>Singh A. (2016, February 17). Aon Hewitt Report: Here's how Indian companies across sectors are looking at salary increases for their employees in 2016. Business Insider. Retrieved from <http://www.businessinsider.in/Heres-everything-the-Aon-Hewitts-Report-tells-us-about-how-Indian-companies-across-sectors-are-looking-at-salary-increases-for-their-employees/articleshow/51036019.cms>
- <sup>27</sup>Placement Report for 2012-14 Post Graduate Programme in Agribusiness Management (PGP-ABM) Programme. (2014). Ahmedabad.
- <sup>28</sup>OECD (2013) Development results: An overview of results measurement and management. Retrieved from <https://www.oecd.org/dac/peer-reviews/Development-Results-Note.pdf>

## Annexure-I

### List of Institutes and Colleges/ Universities Offering Post Graduate Programme in Agribusiness Management or Equivalent

- 1 Indian Institute of Management, Ahmedabad (IIM-A)
- 2 Indian Institute of Management, Lucknow (IIM-L)
- 3 National Institute of Agricultural Extension Management, Hyderabad (MANAGE)
- 4 Vaikunth Mehta National Institute of Cooperative Management, Pune (VAMNICOM)
- 5 Choudhary Charan Singh National Institute of Agricultural Marketing, Jaipur (NIAM)
- 6 Xavier Institute of Management, Bhubaneswar.
- 7 Prin. L. N. Welingkar Institute of Management Development & Research, Mumbai
- 8 Food and Agribusiness School, Sagar Institute of Technology, Hyderabad
- 9 Institute of Agribusiness Management, New Delhi
- 10 ITM Institute of Management & Research, Nagpur
- 11 National Institute of Cooperative Management, Gandhinagar
- 12 Professor Jayshankar Telangana State Agricultural University, School of Agribusiness Management (SABM), Rajendranagar, Hyderabad
- 13 Sam Higginbottom University of Agriculture, Technology and Sciences, Allahabad (Uttar Pradesh)
- 14 Anand Agricultural University (International Agribusiness Management Institutes) Anand, Gujarat
- 15 Amity University, Lucknow, Gurgaon
- 16 Banaras Hindu University, Varanasi (Uttar Pradesh)
- 17 Birsa Agricultural University, Ranchi, Jharkhand
- 18 Chandra Shekhar Azad University of Agriculture and Technology, Kanpur
- 19 CCS Haryana Agricultural University, Hisar (College of Agriculture) Hisar
- 20 Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola (School of Agribusiness Management, Nagpur), Maharashtra
- 21 Dr. Y.S. Parmar University of Horticulture and Forestry (College of Horticulture) Nauni, Solan (HP)
- 22 GB Pant University of Agricultural and Technology (College of Agribusiness Management), Pantnagar, Uttarakhand.
- 23 Ganpat University (GNU), Mahesana, Gujarat
- 24 Suresh Gyan Vihar University, Jaipur (Rajasthan)-Gyan Vihar International School of Business Management, Jaipur



- 25 Indira Gandhi National Open University, New Delhi
- 26 Institute of Agribusiness Management, Noida
- 27 ITM University, Gwalior, Madhya Pradesh
- 28 Jawaharlal Nehru Krishi Vishwavidyalaya (College of Agriculture), Jabalpur
- 29 Junagadh Agricultural University, (Post Graduate Institute of Agribusiness Management, Junagadh) Gujarat
- 30 Kerala Agricultural University (College of Cooperation Banking and Management, Thrissur), Kerala
- 31 Lovely Professional University, Chandigarh
- 32 Maharana Pratap University of Agriculture and Technology (Rajasthan College of Agriculture, Udaipur) Rajasthan
- 33 Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra
- 34 Navsari Agricultural University (Institute of Agribusiness Management, Navsari) Gujarat
- 35 Punjab Agricultural University (College of Agribusiness Management, Ludhiana) Punjab
- 36 Swami Keshwanand Agricultural University (Institutes of Agribusiness Management, Bikaner) Rajasthan
- 37 SKN Agriculture University, (SKN College of Agribusiness Management, Jobner) Jaipur, Rajasthan
- 38 Sardarkrushinagar Dantiwada Agricultural University (College of Business Management, Dantiwada), Gujarat
- 39 Rajendra Agricultural University, Pusa, Bihar
- 40 Regional Institutes of Cooperative Management, Chandigarh
- 41 Symbiosis Institutes of International Business, Pune
- 42 Sri Sri University, Bhubaneshwar
- 43 Tamil Nadu Agricultural University, Coimbatore
- 44 University of Agriculture Science, Bangalore
- 45 University of Agriculture Science, Dharwad
- 46 University of Mumbai (Garware Institute of Career Education and Development)
- 47 University of Mysuru, (Agricultural and Food Management Institutes, Mysure)
- 48 Utkal University (Department of Business Administration and Center for Agribusiness Management, Bhubaneshwar) Odisha

## Annexure-II

### Evolving Course Curriculum of PGDMA

2009-11	2010-12	2011-13	2012-14	2013-15	2014-16
<ul style="list-style-type: none"> <li>• Institutional and Policy Environment</li> <li>• Agricultural and Food Systems</li> </ul>			Agriculture Systems and Policy		
<ul style="list-style-type: none"> <li>• Agricultural Economics</li> </ul>		Managerial Economics Macroeconomic Analysis			
		Marketing Management			
		Operations & Project Management			
<ul style="list-style-type: none"> <li>• Operations Management- SCM</li> <li>• Strategic Management</li> </ul>		Supply Chain Management Financial Accounting			
		Financial Management			
<ul style="list-style-type: none"> <li>• Managerial Accounting</li> <li>• Marketing Agricultural Inputs and Services</li> <li>• Planning New Agribusiness Ventures</li> </ul>		Management Accounting Agricultural Marketing Rural Marketing		Agricultural (Input & Output) Marketing	
<ul style="list-style-type: none"> <li>• Agricultural Banking and Insurance</li> <li>• Corporate Finance</li> </ul>		Agricultural & Corporate Finance			
<ul style="list-style-type: none"> <li>• Commodity Trading</li> </ul>	Commodity Trading and Futures Markets				
<ul style="list-style-type: none"> <li>• International Agriculture and Agricultural Trade</li> </ul>		International Trade in Agriculture			
<ul style="list-style-type: none"> <li>• Agribusiness Management</li> </ul>	Risk Management in Agribusiness		Agri-food Retail Management		
		Technology Management			
	Advertising & Brand Management				
				Business Mathematics Statistics for Manager	

2009-11	2010-12	2011-13	2012-14	2013-15	2014-16
• <b>Decision Models</b>	Quantitative Methods for Business				
• <b>Operations Management Quality</b>	<b>Market Research</b> Computers and Information Systems Management Information Systems ERP in Agriculture		Business Analytics with SAS <b>Marketing Research</b>		
• <b>e-commerce</b>			GIS in Agribusiness		
• <b>Foundations of Teamwork and Leadership</b>		Human Resource Management			
• <b>Management of People at Work</b>	Organizational Behaviour				
• <b>Management Communication</b>	Business Communication				
• <b>Legal Environment and Business Ethics</b>	Business Ethics		CSR & Business Ethics Agripreneurship		
• <b>Emerging Issues in Agribusiness</b>			Agribusiness Strategies		
• <b>Microfinance Management</b>					
<b>Elective Courses</b>	<b>Elective Courses</b>	<b>Elective Courses</b>	<b>Elective Courses</b>	<b>Elective Courses</b>	<b>Elective Courses</b>
• GIS and Data Mining	• Business Analysis with SAS	• Contract Farming	• Contract Farming	• Contract Farming	• Contract Farming
• ICT based Community Services	• Contract Farming	• <b>Marketing Communication and Advertisement</b>	• <b>Rural Marketing</b>	• <b>Rural Marketing</b>	• <b>Consumer Behavior</b>
• Food Processing and Packaging	• Marketing Communication and Advertisement	• E-commerce in Agribusiness Management	• E-commerce in Agribusiness Management	• E-commerce in Agribusiness Management	• E-commerce in Agribusiness Management
• Livestock Products	• E-commerce in Agribusiness Management	• <b>Business Negotiations</b>	• <b>Microfinance Management</b>	• <b>Microfinance Management</b>	• <b>Government Policy &amp; Institutions</b>
• Marine Products	• Business Negotiations	• Government Policy and Institutions	• <b>Government Policy &amp; Institutions</b>	• <b>Government Policy &amp; Institutions</b>	• <b>Government Policy &amp; Institutions</b>
• Floriculture	• Government Policy and Institutions	• <b>Corporate Social Responsibility</b>	• <b>Export-Import Management in Agriculture</b>	• <b>Export-Import Management in Agriculture</b>	• <b>Export-Import Management in Agriculture</b>
• Biotechnology	• Corporate Social Responsibility				
• Pharmaceutical Products					
• Agricultural Research Management					

\* **Red:** Course dropped from next year; **Green:** Introduced during that year; **Blue:** Name and/or syllabus of the course changed/updated from previous year  
**Source:** PGDMA Prospectus of all the Years

## Annexure- III

### Companies in which students are working currently



## Annexure- IV

### Areas of Improvement in the PGDMA Course, based on the survey

Areas of Improvement	Responses
<b>Teaching Quality</b>	
i) <b>Faculty with industry experience</b>	Dedicated in-house faculty Guest faculty from industry or other B-Schools Regular interaction of faculty with industry
ii) <b>Pedagogy</b>	Case based studies More interactive session Group Discussions
<b>Attractive Placement</b>	
i) <b>Exposure</b>	Live projects for each student Winter project with industries Participation in Seminar/workshop/trade show Industrial visits to increase the touch points
ii) <b>Diversified Companies</b>	Academia-industry linkage FMCG sectors Procurement companies Importance to students' preference Targeting startups
iii) <b>Publicity</b>	AIU/ NBA accreditation Publicity in agricultural universities Ranking with other Agri B-schools
<b>Stronger Alumni Network</b>	
i) <b>Vibrant Alumni</b>	Complete Database of Alumni Online registration & updation platform Regular Alumni meets Alumni Newsletter/ Blogs
<b>Making NAARM First Choice</b>	
i) <b>Branding</b>	Publicity among universities Regular linkages and networking with industries Equivalence with MBA AIU accreditation
ii) <b>Placements</b>	Reputed Companies Diverse Sectors MNCs
iii) <b>Pay Package</b>	Competitive Package



PGDMA students at AP-TEC 2012 Conference



Independence Day Celebrations



First Convocation



Director and Joint Director  
Awarding Prizes to Winners of  
Business Plan Competition



First Meet of NAARM-PG Alumni

## Occasional Papers

- Curriculum Development for Higher Education in Agriculture: Arising Issues by K.V. Raman and R. Sundarsanam
- Agro-Forestry Education: A Leader-Centred Approach by R. Sundarsanam and K.V. Raman
- Training- Is it Panacea for all Performance Problems of Employees in R&D organizations? by T. Balaguru
- Electronic Commerce and the Opportunity for Agribusiness in India by N.H. Rao
- Generating High Research Performance in ICAR: Reorienting Organizational Change to Team Performance and Developing People by D. Rama Rao and N.H. Rao
- Towards Labour Policy in Agricultural Research Institutes by R. Kalpana Sastry and S.N. Saha
- Leading Change in ICAR: Organizational and Management Reforms by N.H. Rao and K.P.C. Rao
- HRD Strategies for Integrating Agricultural Sciences with Corporate Business Management by Jagannadham Challa
- Embedding the Sustainability Perspective into Agricultural Research: Implications for Agricultural Research Management by N.H. Rao, J.C. Katyal and M.N. Reddy
- Orienting Agricultural Research for Direct Short-term Attack on Poverty-An Exploratory Study by B.S. Chandel and S.K. Nanda
- Agricultural Education: Strategy for Tenth Five Year Plan by N.H. Rao
- Integrating Information and Communication Technologies into Agricultural Research and Education in India by M.N. Reddy, N.H. Rao and J.C. Katyal
- Operationalizing Values and Value Systems in National Agricultural Research System by N.H. Rao
- Communication for Capacity Building and Change in Individuals and Organizations by R.K. Samanta
- Scientist-Administration-Finance Interface in Agricultural Research-A Survey of NARS by Jagannadham Challa
- Agriculture has changed so has to Agricultural Extension by R.K. Samanta
- Developing Leadership in National Agricultural Research System by P. Manikandan, K.H. Rao and R. Kalpana Sastry

