ISBN: 978-81-974088-6-1

16. Role of ATMA

Khushboo Yadav

Ph.D. Research Scholar,
Department of Extension Education and Communication Management,
College of Community Science,
Professor JayashankarTelnagana State Agricultural University,
Saifabad, Hyderabad.

Dr. B. Spandana

Young Professional-II, AICRP on WIA,
Professor Jayashankar Telangana State Agricultural University,
Rajendranagar, Hyderabad.

Dr. M. Preethi

Professor, Extension Education Institute,
Professor Jayashankar Telangana State Agricultural University,
Rajendranagar, Hyderabad.

Abstract:

The Agriculture Technology Management Agency (ATMA) plays a crucial role in enhancing agricultural productivity, improving agricultural economic growth, supporting research and development, and creating capacity in India. ATMA accelerates the spread of innovative agricultural methods by utilizing modern technology such as Global Positioning System, Geographic Information System (GPS, GIS), and Remote Sensing, fostering precision farming and crop-specific management systems. ATMA also works to improve soil health through literacy programmes, the promotion of organic fertilizers, and sustainable agricultural techniques. ATMA improves agricultural economics by facilitating market links, promoting financial management through education on agricultural insurance programmes and digital literacy, and encouraging sustainable farming methods.

ATMA also bridges the gap between the research and agricultural communities by connecting university researchers with farmers, supporting novel farming methods, and facilitating farmer participation in innovation.

Furthermore, ATMA promotes capacity building through various initiatives such as training and skill development programmes, infrastructure development initiatives, and collaborative planning and implementation via inter-institutional exchanges and collaborations with international agricultural organizations. ATMA's diverse strategy makes a substantial contribution to India's agricultural sustainability.

Keywords:

Agriculture Technology Management Agency, agricultural productivity, advanced technologies, capacity building, financial management, market linkages, precision farming, sustainable farming practices, research and development.

16.1 Introduction:

The Agriculture Technology Management Agency (ATMA) in India, established in 2005 under the "Support to State Extension Programmes for Extension Reforms" (ATMA Scheme), stands as a pivotal governmental initiative aimed at enhancing agricultural development. Its primary objective is to empower farmers with modern farming technologies and methodologies. ATMA operates at the district level, acting as a hub for coordinating a variety of agricultural programmes. It makes it easier to incorporate technical improvements into agricultural operations, increasing production and sustainability in farming communities (Government of India, 2005).

ATMA's founding goal was to revitalize the agricultural extension system by encouraging a participatory approach in which farmers, extension workers, academics, and other stakeholders collaborate on decision-making and implementation procedures.

This participatory extension service approach empowers farmers by giving them timely access to knowledge, tools, and skills needed to implement location-specific, environmentally friendly, and sustainable farming techniques (Singh*et al*., 2018).

History:

ATMA initiative was launched by the Government of India in conjunction with the World Bank to overcome the deficiencies of traditional agricultural extension services. According to Singh, Meena, and Singh (2018), the initiative was developed in response to the centralized extension system's inability to address the different and changing requirements of farmers across India. Recognizing the need for a more decentralized and participatory approach, ATMA was created to allow district-level agricultural authorities and stakeholders to customize extension services to local circumstances and priorities. This trend towards decentralization was intended to improve the responsiveness and efficacy of agricultural extension services, ultimately leading to increased agricultural productivity and farmer livelihoods.

The inception of the ATMA plan was a substantial divergence from India's traditional top-down expansion strategy. As stated by the Government of India (2005), the initiative aimed to establish a platform for collaborative decision-making and knowledge exchange among farmers, extension workers, researchers, and government agencies at the district level. ATMA sought to develop an agricultural culture of innovation, adaptation, and sustainability by decentralizing the extension system and encouraging participatory techniques. The ATMA initiative created the framework for India's agricultural growth to be more inclusive and farmer-centric by emphasizing local empowerment and contextualized solutions.

16.2 Objectives:

Under the "Support to State Extension Programmes for Extension Reforms" initiative, the Agricultural Technology Management Agency (ATMA) is a centrally financed programme. This programme was put into effect in 2005 and is presently running in 691 districts throughout 28 states and 5 Union Territories in India.

An extension system that is decentralised and sympathetic to farmers is the main goal of the ATMA Scheme. The following are some essential components and actions related to ATMA:

- **Demonstrations**: Showcasing new techniques and practices on the field.
- **Farmers Training**: Providing training sessions to farmers.
- **Exposure Visits**: Allowing farmers to learn from successful models.
- **Kisan Melas**: Organizing agricultural fairs.
- **Mobilization of Farmers Groups**: Encouraging collective learning.
- **Farm Schools**: Establishing learning centers for practical knowledge.

16.3 State-Level Implementation:

This programme helps state administrations in their endeavours to improve agricultural extension services. It guarantees that farmers have access to the newest methods and technology pertinent to many agricultural and related industries' themes. Beneficiaries: The extension efforts of ATMA serve farmers in a number of states. For example, the programme targeted farmers in many states in 2021–22 (up until October) through exposure visits, training, demonstrations, and other activities. Here are a few instances:

More than 141,000 farmers in Gujarat took part in different ATMA events.

The programme helped about 259,000 farmers in Tamil Nadu. There were about 217,000 farmers in Uttar Pradesh. The programme benefited more than 159,000 farmers in Maharashtra.

Autonomous Institution: At the district level, ATMA functions independently of other institutions. In order to improve overall agricultural development, it works with a variety of stakeholders involved in agricultural operations.

The objectives of ATMA cover a wide range of aspects related to agricultural development in India, with a particular emphasis on increasing farmer income, productivity, food security, and sustainable farming methods. Providing farmers with timely access to information, technology, and inputs serves as the foundation for these goals.

A. Promoting production: By easing the adoption of better farming techniques, technology, and inputs, ATMA seeks to increase agricultural production. This involves promoting crop types with high yields, effective water management techniques, integrated pest control plans, and management practices that maintain the

health of the soil. Research by Kumar et al. (2019) found that by encouraging farmers to embrace contemporary agricultural technology, ATMA's initiatives had significantly increased crop yield.

B. **Increasing Farmer Income:** Increasing farmers' revenue from agricultural pursuits is one of ATMA's main objectives in terms of helping them have a better financial standing. Adopting income-boosting strategies including crop diversification, value addition, post-harvest management, and market accessibility helps achieve this. According to a Singh et al. (2020) study, ATMA plays a crucial role in providing farmers with economic empowerment by fostering market connections and capacity-building initiatives that boost farm revenue.
C. **Guaranteeing Food Security:** By encouraging the adoption of sustainable agriculture methods that increase both the amount and quality of food production, ATMA plays a critical role in guaranteeing food security. This entails encouraging crop diversity, boosting climate change resistance, and optimising nutritional results. According to research by Mohanty et al. (2018), ATMA helps to improve food security by encouraging sustainable agricultural methods and expanding rural people' access to wholesome food.
D. **Encouraging the Adoption of Sustainable Agricultural Practices:** ATMA places a strong emphasis on the adoption of economically feasible, socially and ecologically acceptable, and environmentally friendly sustainable agricultural practices. Promoting organic farming, climate-smart agriculture, agroforestry, and conservation agriculture are all part of this. According to research by Patel et al. (2017), ATMA plays a part in advancing sustainable agriculture by educating farmers on the value of protecting natural resources and utilizing environmentally friendly agricultural methods.

16.4 Silent Features:

The Agriculture Technology Management Agency (ATMA) implements several key features to enhance agricultural development:

A. **Decentralization:** ATMA decentralizes decision-making to the district level, empowering local agricultural authorities and stakeholders (Government of India, 2005).
B. **Participatory Approach:** Through a participatory approach, ATMA engages farmers, extension workers, researchers, and other stakeholders in planning and implementing agricultural programs (Singh, Meena, & Singh, 2018).
C. **Technology Dissemination:** ATMA facilitates the dissemination of modern agricultural technologies and practices to farmers. This includes training sessions, demonstrations, and exposure visits to showcase effective farming techniques (Government of India, 2005).
D. **Convergence:** ATMA promotes convergence among various agricultural development programs and schemes. By integrating resources and efforts, ATMA maximizes the impact and effectiveness of interventions (Government of India, 2005).
E. **Capacity Building:** ATMA focuses on building the capacity of farmers, extension workers, and other stakeholders. This is achieved through training, workshops, and skill development programs aimed at enhancing agricultural knowledge and skills (Government of India, 2005).

16.5 Unveiling the Dynamic Role of ATMA:

16.5.1 Enhancing Agricultural Productivity:

Increasing agricultural production is essential for rural development, environmental sustainability, and food security. Achieving sustainable growth is crucial in India, where the sector employs about half of the labor force and accounts for 14% of the country's GDP.

But obstacles including inheritance rules, population pressure, and a lack of off-farm options impede development. India wants to increase its agricultural GDP by 4% annually and diversify its economy by focusing on higher-value goods including fruits, vegetables, dairy, and poultry. Important tactics are irrigation investments, assistance for farmers, and input subsidies. Long-term success depends on striking a balance between these initiatives and spending on rural infrastructure, health care, and education.

A. Adoption of Advanced Technologies:

Adoption of advanced technologies plays a pivotal role in shaping modern businesses. These technologies, including robotics, artificial intelligence, and specialized software systems, are rapidly spreading across industrialized economies. However, adoption remains relatively low for cutting-edge technologies like AI and robotics, with only **3.2%** and **2%** of firms adopting them, respectively.

In contrast, **19.6%** to **40.2%** of firms adopt dedicated equipment and specialized software. Large firms predominantly lead the adoption, exposing a significant share of workers, especially in manufacturing, to these technologies. While adopters experience higher labor productivity, they also witness lower labor shares. Firms associate these technologies with increased demand for skills rather than a direct expansion in employment levels.

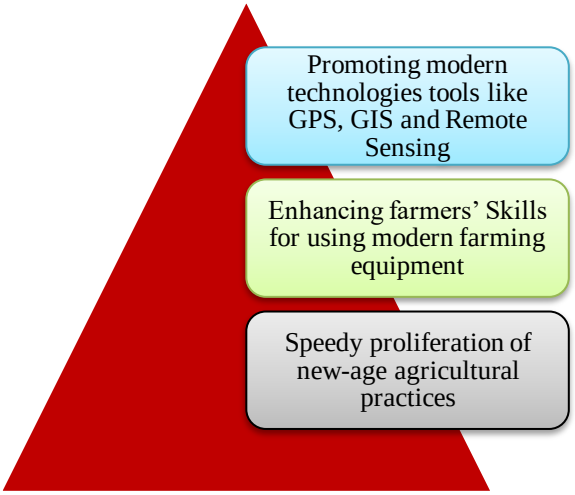

Figure 16.1: Adoption of Advanced Technologies

B. Assistance in Crop Management:

In order to maximise agricultural output and guarantee sustained crop production, assistance with crop management is essential. Farmers can get important assistance from agricultural organisations such as the Agriculture Technology Management Agency (ATMA) in putting into practice efficient crop management techniques.

This support includes a variety of actions meant to boost crop health, increase potential production, and reduce risks related to pests, illnesses, and environmental stresses. For example, ATMA promotes the use of precision agricultural methods, which apply inputs like water, fertiliser, and herbicides precisely according to site-specific circumstances, maximising resource efficiency and reducing environmental impact.

In order to ensure ideal growth and development, ATMA also encourages the implementation of crop-specific management techniques that are adapted to the requirements of various crops and agro-climatic zones.

Additionally, encouraging the adoption of climate-smart farming methods—like conservation agriculture and drought-tolerant cultivars—helps farmers adjust to shifting climatic circumstances and lessen the effects of climate change on crop productivity.

ATMA equips farmers with the information and abilities necessary to adopt efficient crop management methods through capacity-building programmes and extension services, eventually promoting sustainable agricultural development.

C. Improvement of Soil Health:

Increased agricultural output and sustainable agriculture depend on better soil health. The physical, chemical, and biological characteristics of soil that promote plant development and ecosystem services are referred to as soil health.

The use of organic fertilizers, such as compost and manure, which improve soil structure, fertility, and microbial activity, is one agricultural technique that supports soil health. Reducing soil disturbance by using techniques like decreased tillage also aids in maintaining soil structure and halting erosion. Cover farming increases soil water retention, inhibits weeds, and adds organic matter to the soil by planting non-cash crops to cover and protect it during fallow seasons.

Programmes for soil health literacy help farmers get a better grasp of soil biology and ecology by educating them about the value of sustainable management techniques and soil conservation.

Agriculture Technology Management Agency (ATMA) and other agricultural organizations support these practices in order to ensure food security and environmental sustainability by enhancing the long-term productivity and resilience of agricultural systems.

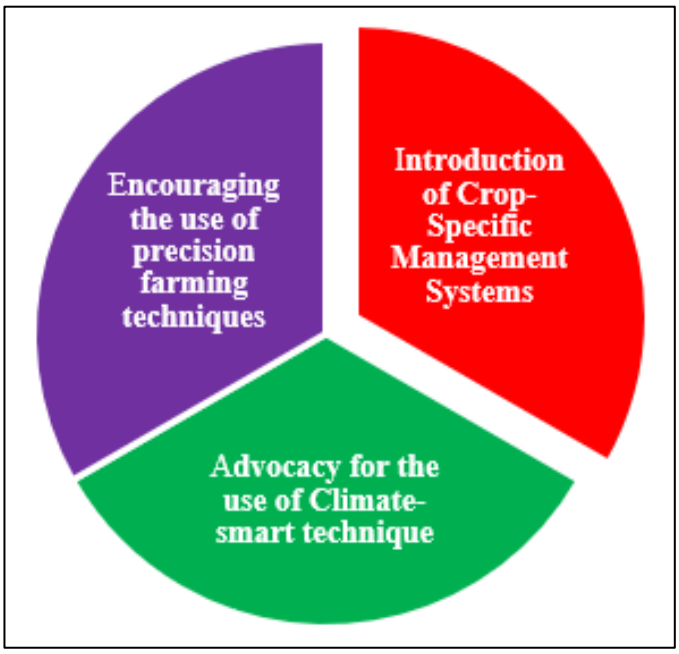

Figure 16.2: Improvement of Soil Health

i. Organizing Soil Health Literacy Program:

- *Goal:* To increase farmers' knowledge of soil ecology and biology for long-term production.
- *Techniques:* Teach farmers about reduced tillage, cover crops, and organic fertilisation.
- *Delivery Channels:* Make use of instructional materials, training sessions, and seminars.
- *Benefits:* Encourage environmental stewardship by empowering farmers to adopt soil-friendly techniques.
- *Organisations:* Including best practices and scientific research for enhanced soil management and sustainability, under the direction of agricultural associations such as ATMA.

ii. Encouraging the Use of Organic Fertilizers:

- Promote the use of organic fertilisers for soil health and sustainable agriculture.
- For soil fertility and structure, use plant wastes, compost, and manure. By releasing nutrients gradually, organic fertilisers lessen leaching and runoff.
- Encourage microbial activity to enhance plant growth and nutrient cycling.
- Minimise chemical inputs, improve soil health, and lessen the impact on the environment.
- Agriculture groups such as ATMA use extension services and education to promote organic fertilisers.

iii. Promotion of Sustainable Farming Practices

- Promote environmentally friendly farming methods to improve agricultural sustainability.
- Use strategies such as integrated pest control, conservation tillage, and crop rotation.
- Reduced chemical inputs, cover crops, and organic fertilization can all help to improve soil health.
- To improve biodiversity and ecosystem services, apply agroforestry and agroecological techniques.
- Reduce environmental footprint and boost climate change resistance.

16.5.2 Boosting Agricultural Economics:

Ensuring better farmer conditions and sustainable development also highly connects to improving agricultural economics. One such step is taken by the Agriculture Technology Management Agency. ATMA is engaged in several programs that focus on improving the financial side of agriculture. First of all, this agency promotes market linkages to broaden access to markets and profit-generating opportunities for farmers. Using the services of ATMA, farmers can secure better prices for their products, as the agency provides direct connections with buyers and information about market trends, demand, and so forth. Furthermore, by giving farmers the tools and training they need to fulfil international quality standards and reach foreign markets, ATMA promotes the export of farm products.

In order to improve farmers' capacity for risk management and financial resilience, ATMA backs financial management programmes. To lessen the impact of crop losses brought on by unfavorable weather conditions or insect outbreaks, this involves teaching farmers about agricultural insurance programmes (Government of India, 2005). Additionally, ATMA integrates digital and financial literacy initiatives into its plans, equipping farmers with the know-how to take advantage of technology-enabled financial services and better manage their funds. ATMA supports a healthy agricultural sector and the general economic prosperity of rural communities by promoting agricultural economics through market connections and financial management assistance.

16.5.3 Research and Development:

ATMA's objective to promote agricultural innovation and improved farming heavily relies on research and development. In order to create and apply best practices, research and development are essential because ATMA serves as a bridge between the agricultural community and the academic and scientific levels of study. Research initiatives for farmers and the dissemination of research findings among farmers through extension services are a couple of the ways it accomplishes this aim. ATMA makes sure farmers can learn about the latest developments in agricultural science and technology so they may stay innovative and grow more productive and sustainable. This is accomplished by giving farmers access to current agricultural research. Additionally, ATMA fosters agricultural innovation by supporting the creation and uptake of cutting-edge farming concepts and technology. ATMA promotes a culture of continual development and adaptation in farming techniques through farmer-participative innovation programmes and partnerships

with research institutes and agricultural professionals. ATMA advances agricultural knowledge and encourages the adoption of sustainable farming techniques by utilizing research and development projects. This, in turn, increases the agricultural sector's production and resilience.

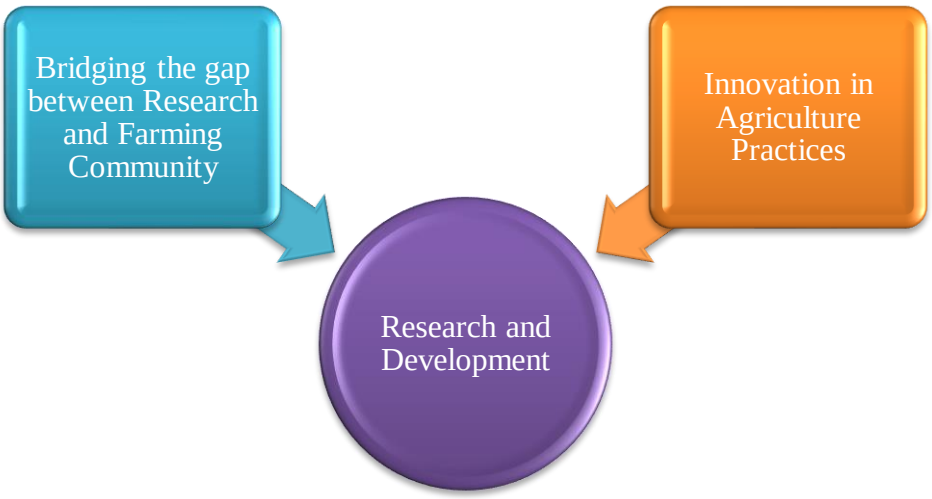

Figure 16.3: Research and Development

16.6 Conclusion:

The Agriculture Technology Management Agency (ATMA) plays a critical role in moulding the future of Indian agriculture by improving agricultural production, increasing agricultural economics, supporting research and development, and fostering capacity building. ATMA promotes the implementation of new technologies such as GPS, GIS, and remote sensing, facilitating the modernization of farming operations and increasing production and efficiency. ATMA helps with crop management by promoting precision farming and climate-smart approaches, as well as increasing soil health through literacy programmes and the use of organic fertilisers.

Furthermore, ATMA contributes significantly to agricultural economic development by facilitating market linkages, improving financial management through education on insurance schemes and digital literacy, and encouraging sustainable farming methods. Furthermore, its emphasis on research and development helps to bridge the gap between academics and rural communities, encouraging agricultural innovation and sharing research findings to farmers. Furthermore, ATMA's dedication to capacity building through training, infrastructure development, and collaborative planning supports the agricultural sector's overall growth, allowing farmers and stakeholders to survive in an ever-changing agricultural landscape. ATMA stands as a light of progress as a result of these collaborative efforts, pushing sustainable agricultural growth and laying the road for Indian agriculture's future prosperity.

16.7 References:

1. Agricultural Technology Management Agency (2017), ATMA Shimla. Available: http://atmashimla.net/about.html
2. Agricultural Technology Management Agency (ATMA) (2015), TNAU Agritech Portal. Available: https://agritech.tnau.ac.in/atma/atma_intro.html
3. Agricultural Technology Management Agency (ATMA) (2024), Glimpse of Support to State Extension Reforms Programmes (ATMA), The Land of Pioneers Mokochung, Digintal Indian. Available: https://mokokchung.nic.in/agricultural-technology-management-agency-atma/
4. Agricultural Technology Management Agency (ATMA) (2024), State Agriculture Management & Extension Training Institute (SAMETI). Department of Agriculture & Horticulture, Government of Assam. Available: https://sameti.assam.gov.in/about-us/detail/agricultural-technology-management-agency-atma
5. Agricultural Technology Management Agency (ATMA) Scheme. 2021. Ministry of Agriculture & Farmers Welfare, PIB Delhi. Available: https://pib.gov.in/PressReleasePage.aspx?PRID=1778910
6. Agricultural Technology Management Agency (ATMA) Scheme, India Filings. Available: Agricultural Technology Management Agency Scheme - IndiaFilings
7. Agricultural Technology Management Agency, NATP Series- Agricultural Technology Management Project. Available: https://www.manage.gov.in/publications/series2.pdf
8. Daberkow SG, McBride WD and Norwood SH. 2010. Information and the adoption of precision farming technologies. Journal of Agribusiness. 28(2): 187-203.
9. Fountas S, Wulfsohn D, Blackmore BS, Jacobsen HL, Pedersen SM. and Vougioukas S. 2006. A model of decision-making and information flows for information-intensive agriculture. Agricultural Systems. 87(2):192-210.
10. Ghorbani M, Rajaeifar, MA, Rahimi M and Azadi H. 2019. The Role of Education in Developing Farmers' Skills to Adopt Precision Agriculture Technologies: Evidence from Iran. Agricultural Systems. 172:30-39.
11. Government of India. 2005. Agricultural Technology Management Agency (ATMA) Scheme: Operational Guidelines.Department of Agriculture & Cooperation, Ministry of Agriculture & Farmers Welfare. Available: https://agriwelfare.gov.in/Documents/ATMA-Guidelines%202018.pdf
12. Introduction and Background of ATMA, Agriculture Department Haryana. Available: https://agriharyana.gov.in/data/SchemeDoc/Support_toStateExtensionProgrammesForExtension.pdf
13. Jayasuriya H, Visvanathan T, Mohammed A and Sabesan T. 2020. Application of GIS and Remote Sensing in Precision Agriculture: A Review. Journal of Remote Sensing & GIS. 11(3):234-248.
14. Kumar A, Singh RK and Sinha A. 2019.Impact of ATMA programme on crop productivity in Bihar. Economic Affairs. 64(3):503-507.
15. Lal R, Singh BR, Manna MC, Nayak AK, Saha JK and Bhattacharyya R. 2019. Pedospheric Inputs of Crop Management Techniques for Enhanced Food Production in the 21st Century. Journal of Experimental Botany. 70(20): 5375-5403.
16. Lipper L, Thornton PK, Campbell BM, Baedeker T, Braimoh AK, Bwalya M, Caron P, Cattaneo A, Garrity DP, Henry K, Hottle RD, Jackson LE, Jarvis A, Kossam F, Mann W, McCarthy N, Meybeck A, Neufeldt H, Remington Sen PT, Sessa R, Shula

R, Tibu A and Torquebiau EF. 2014. Climate-smart agriculture for food security. Nature Climate Change. 4: 1068-1072. https://doi.org/10.1038/nclimate2437
17. McDaniel MD, Tiemann LK and Grandy AS. 2014. Does agricultural crop diversity enhance soil microbial biomass and organic matter dynamics? A meta-analysis. Ecological Applications. 24(3): 560-570.
18. Mohanty BK, Singh R and Mishra RR. 2018. Contribution of ATMA programme in enhancing food security: Evidence from Odisha. Economic Affairs. 63(4):787-793.
19. Patel A, Patel H and Patel D. 2017. Role of ATMA in promoting sustainable agriculture practices in Gujarat. Journal of Pharmacognosy and Phytochemistry. 6(6): 175-178.
20. Ray GL. 2017. Systems of Extension in India.Extension Communication and Management. Kalyani Publishers.183-226.
21. Savary S, Willocquet L, Pethybridge SJ, Esker P, McRoberts N and Nelson A. 2019. The Global Burden of Pathogens and Pests on Major Food Crops. Nature Ecology & Evolution. 3(3): 430-439.
22. Singh KM, Meena MS, Singh RKP, Kumar A, Kumar U. 2013. Agricultural Technology Management Agency (ATMA): A Study of its Impact in Pilot Districts in Bihar, India.
23. Singh KM, Meena MS and Singh RK. 2018.Decentralised Extension System in India: Relevance of ATMA Model. Economic Affairs. 63(4): 843-851.
24. Singh PK, Sharma D and Prasad P. 2020. Role of ATMA in enhancing economic status of farmers in Gorakhpur district of Uttar Pradesh. International Journal of Current Microbiology and Applied Sciences. 9(10): 2807-2811.
25. Six, J., Bossuyt, H., Degryze, S., &Denef, K. (2013). A history of research on the link between (micro) aggregates, soil biota, and soil organic matter dynamics. Soil and Tillage Research, 114, 31-50.
26. World Bank. 2006. Implementation Completion and Results Report on a Credit in the Amount of SDR 75.4 million (US$110 Million Equivalent) to India for a Second National Agricultural Technology Project. Retrieved from http://documents.worldbank.org/curated/en/617131468757522324/Implementation-completion-and-results-report-ICR-on-a-credit-in-the-amount-of-SDR-75-4-million-US-110-million-equivalent-to-India-for-a-Second-National-Agricultural-Technology-Project-NATP-under-IDA-Credit-3904-IN-Late-Correction-Subjec
27. Zhang X, Davidson EA, Mauzerall DL, Searchinger TD, Dumas, P and Shen Y. 2019.Managing nitrogen for sustainable development. Nature. 528(7580): 51-59.
28. Jayasuriya H, Visvanathan T, Mohammed A and Sabesan T. 2020. Application of GIS and Remote Sensing in Precision Agriculture: A Review. Journal of Remote Sensing & GIS. 11(3): 234-248.