Trust for Advancement of Agricultural Sciences at 20: Report of the Independent Review

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Preface

I am highly privileged and honored to be asked by Dr. R.S. Paroda, Formerly Secretary, DARE; DG, ICAR and now Chairman, TAAS during June 2021 to undertake an independent review of TAAS programs and activities during the last 20 years since its establishment in 2002. Immediately he arranged to share two key publications (TAAS, 2015; TAAS 2021) along with many other publications, emails, correspondences etc. to enable me to be fully aware of what TAAS stands for and what it has done/doing to accomplish its vision, mission, and objectives. After studying the literature shared and others available on the TAAS website, developed/shared a draft base paper/concept note on proposed Review with TAAS covering what is the task about and how I would like to attempt. After a detailed discussion with Dr.Paroda along with Dr.Bhag Mal, Secretary, TAAS, the work on the Review started. But the work was disrupted on account my other committed engagements and health related problems of my close relations. I am really indebted to Dr.Paroda for his special consideration to permit some delay in the completion of the Review.

TAAS is the brain- child, passion and enviable complementary think tank in agriculture and rural development in India, region, and the globe for creating public awareness and policy advocacy in advancing agricultural sciences, innovations for agriculture, food, and nutrition security for SAD. The review using standard methodology and studying documents, publications, analyzing responses of stakeholders and thought leaders through survey schedules, reflections of stakeholders on key publications, success stories on policy advocacy, public awareness and raising the concerns beyond the border on science governance, clearly and conclusively demonstrates brilliant performance of TAAS. The review also points-out some governance concerns like reach, diversity of activities, effectivity, staff strength and soft skills. To harness the immense underutilized potential and successfully overcome/manage the few concerns of TAAS, the review suggests twin strategy in succession for doing the business differently in the short and medium run up to 2030 followed by radical/disruptive reforms beyond 2030 to build on very rich Paroda legacy and emerge as a great, high level think tank to make the much cherished dream by Dr.Paroda, a reality.

To complete the review successfully, Dr.R.S. Paroda, Chairman, TAAS, Dr. Bhag Mal, Secretary TAAS, Dr. Umesh Srivastava, Consultant TAAS, and staff in TAAS secretariat particularly Mrs. Simmi, Office Secretary, TAAS helped a lot. I am highly grateful to them. Similarly, the help and support for statistical analysis and write-up by Ms. Priyanka, V and Mr. Manojkumar Patil, Ph.D. Scholars, Department of Agricultural Economics, UAS, Bangalore and helpful suggestions from Dr. Lalith Achoth, formerly Professor of Agricultural Economics, KVFSU, Veterinary College, Bangalore and Mr.Rajashekarappa, Senior Analytical Manager, SAS Corporation, Bangalore for statistical analysis of survey responses are gratefully acknowledged. I am highly thankful to Dr.Uma Lele, Dr. Kundhavi Kadiresan, and Dr. Ms. Rita Sharma for their very helpful comments and suggestions on the draft review report. Finally, I am grateful to all the stakeholders and thought leaders for their timely, very useful, frank responses to survey schedules on TAAS actions, outcomes, and way forward.

Bangalore, December 7,2022 Mruthyunjaya

Abstract

The Review has clearly demonstrated that TAAS as an independent neutral think tank is doing what it was planned to: promoting growth and advancement of agriculture through scientific interactions and partnerships in the thrust areas of science based on unbiased policy advocacy, technology and knowledge sharing on key issues of national and global importance in agriculture. The outcome analysis of TAAS actions and their sincere follow up using standard methodology clearly suggests that it has clearly emerged as a credible/effective think tank not only in India but region and globe. One of the most significant factors for the outstanding success of TAAS was the charismatic, driving leadership of its Chairman, Dr. R.S. Paroda. However, some concerns mostly O&M related still pinch TAAS for not being able to utilize its potential to be fully effective on account of skill, activity diversity, reach, resources, communication, and governance deficits. TAAS is now at a deciding moment in its journey when it needs to take some bold decisions through debate and consensus by the Management to integrate the brilliant past, present and a highly promising but challenging and uncertain future. Significant past and present performance, tremendous goodwill among key players/stakeholders within the country and the region, growing complex issues in agri-food nutrition systems and the pressing need for a strong professional, independent, credible, effective think tank relevant to address present and emerging complex problems and frightening unanticipated challenges of AFNS in the coming years, and some O&M concerns still to be addressed by TAAS are all great opportunities as well as difficult challenges for TAAS to consider bold reforms while moving forward. Considering the unlimited opportunities and difficult challenges which need for bold reforms, a matrix of strategies (Table 32) to move forward is suggested. The strategies include: 1) Doing Business as Usual; 2) Doing Business Differently (up to 2030) and 3) Doing Radical/Disruptive Business beyond 2030. The overwhelming conclusion from the review is that the preferred strategies for TAAS are 2 followed by 3 as they lead to continuation and enhancement of Dr.Paroda legacy by consolidating gains, extension of gains and making new gains. Strategy 1 do not make any sense neither to TAAS nor to science and society as both are losers if Strategy 1 is followed.

Executive Summary

The Report provides an independent foreword looking review of TAAS, a neutral platform for promoting growth and advancement of agriculture through scientific interactions and partnerships in the thrust areas of science based on analysis of multiple sources of information on TAAS actions and key outcomes relating to unbiased policy advocacy, technology and knowledge sharing on critical issues of national and global importance in agriculture.

The review, pursuing the impact pathway, covered activities of TAAS in the last 2 decades of its establishment in 2002 and their regular follow up, uptake, and perceived influence on science based, informed decision/policy making. The review is considered as very timely as it takes place after 2 decades of sincere experiment and practice by TAAS with lofty ideals, ideas, activities, outcomes, learning on strengths and deficits for moving forward aiming at still greater heights towards excellence in future. The review accounts for different levels of impact pathway covering changes in depth and width of selection of activities; mobilization of diverse stakeholders and partners for organizing activities; conduct of regular meetings, lectures, and other events; professional drafting, vetting, and inviting and attending to the feedback on the proceedings /recommendations; communicating the recommendations to the concerned policy makers and development agencies/departments; and monitoring the progress and outcome of recommendations. The report illustrates progress on outcomes of sample of key TAAS actions and their impact and suggests strategies for the future by building on and enlarging Paroda legacy, strengths and overcoming deficits/issues aimed at further improving the relevance, efficiency, and effectiveness of TAAS as a unique global think tank for policy advocacy and public awareness for promoting AFNS to achieve Prime Minister's Vision of agricultural science-based crusade for the elimination of poverty, hidden hunger, and malnutrition. The review consisted of study of its available documents, profile, and involvement of participants in debates and discussions, varied socio-metric analysis of survey responses of key national, regional, and international stakeholders and thought leaders, opinions of stakeholders on key publications of TAAS, reflections in the media on TAAS, and sample policy impact success stories including some on voicing the concerns on inclusive and efficient science management beyond the border. Specifically, the Review aimed at seeking answers to the following questions:

a) Is the stakeholder, sponsor, or customer satisfied with the outputs delivered? Which activities, output/s they consider more significant and main suggestions for future?
b) Is it a benchmark institution? Which are others in the field?
c) Did the outcomes advance the agricultural sciences significantly? Some clear examples?
d) Was there a sustainable advantage associated with the outcomes? Which activities are more effective and why?
e) Are new fields of study, policy gaps, policy implementation failures and opportunities explored/pointed out/ pursued regularly and with what outcome?

Over 20 years since its establishment in 2002, TAAS has organized 48 National /International Consultations, Conferences /Symposia /Workshops /Dialogues

/Brainstorming Sessions; published 81 publications on 14 major national/international contemporary issues confronting Agri-Food System; published 6 Policy Briefs; 20 Strategy Papers; organized 11 Foundation Day Lectures; 4 Special Lectures and conferred 11 Dr. M. S. Swaminathan Awards to science leaders/experts of global eminence. As stated already, the study made use of available documentation, did 6 case studies/success stories in two key areas of TAAS activities (policy advocacy and public awareness) and a total of 86 structured survey of responses (29 stakeholders and 57 national and global thought leaders/science agencies). From these, a sample of 36 TAAS related outcomes in 2 key action areas are assessed for their level of influence/impact using responses from well informed senior leaders knowing about mission, objectives, activities, and outcomes of TAAS since its inception (Annexure IV). From these results complemented with the results of survey responses and their exhaustive statistical analysis using standard multiple sociometric tools, meta judgement of TAAS outcomes contributing to AFNS for SAD are inferred. Sociometric analysis has clearly pointed out adequacies and inadequacies in structure, processes, performance, and relationships of TAAS as an organization and they provided clues/insights to suggest right strategic options for moving forward for still better performance in future. Further, the outcome analysis and results complemented with detailed insights on TAAS performance show a collective win for its partners spread across the globe along with the challenges and opportunities ahead to enhance the performance in future.

Table 1: Summary of Output/Outcome Performance (%) in key actions of TAAS

Sl No.	Key activities	Level 1	Level 2	Level 3	Level 4	Level 5		Level 6	
						Full	Partial	Full	Partial
1.	Policy Advocacy	100	100	100	100	80	20	36	64
2.	Public Awareness	100	100	100	100	59	41	45	55

Note: Level 1 = Opportunity created (Conference, publication, networking, capacity building)
Level 2 = Was active engagement during the event present? Did all participants give feedback?
Level 3 = Did something happen? Any takeaways? Any feedback on takeaways from participants?
Level 4 = Was joint action enabled? Communicated? Any actionable proposal developed?
Level 5 = So, what? Was institutional, policy reform happened? Was the plan implemented?
Level 6 = Inference on change/impact/influence owing to the action initiated?

From the study, the review strongly concludes that TAAS has clearly emerged as a credible/efficient/effective/highly promising think tank not only in India but region and globe to advance agricultural science for development. TAAS has even explored with involvement of Dr.Paroda new fields of study, policy gaps and policy implementation opportunities in agriculture and rural development in Indian States like Haryana, Rajasthan, Punjab where it facilitated establishment of Farmers Commissions to resolve increasing farmers distress and disconnect between policies, programs and their practice. It has raised the stature of agriculture in general and its importance in economic growth, provided pride to agricultural science and agricultural scientists, farmers, industries, filled the gaps between academic research and policy making, helped to get respect from the general-public. Careful selection of critical topics of national and transboundary importance, well prepared concept notes, effective presentations by eminent senior experts and high quality discussion/debate by equally competent senor diverse participants, professionally drafted, vetted recommendations,

communicating them timely to the concerned policy/decision makers, regular follow up on their uptake by highly committed TAAS staff, and above all the whole process meticulously planned, executed and monitored under the overall charismatic, driving leadership of its Chairman, Dr. R.S. Paroda. Overall, TAAS as envisioned as a high level think tank served as an effective complementary mechanism to bring positive change in the science based agricultural production system and policy making not only in India but also influenced regional/international institutions, their-works and performance because of Dr.Paroda's stature and involvement globally in the field of agriculture and rural development.

However, some concerns/issues mostly O&M related still pinch TAAS like not being able to utilize its potential to be fully effective owing to lack of enough follow up and demonstrate clear impact/change made which can be exclusively attributed to TAAS, not being enough proactive, still scope to professionalize, streamline activities and work streams, inadequate inhouse capability to effectively take up multiple tasks, lack of critical mass of core staff in key areas of work and support system, not able to institutionalize systematic, strong monitoring and evaluation of the activities to ensure better performance, effectivity of programs for impacts are systematically tracked, lessons for scaling up and sustainability are incorporated into program planning, inadequate fund mobilization, lack of visibility owing to limited diversification of activities, skewed geographic presence and coverage, and less involvement of youth, women, and farmers. Perhaps, the governance/O&M concerns/deficits may have some bearing on results of final-outcome analysis (Table 1) reflecting that TAAS has done extremely well up to level 4 (opportunity creation to actionable proposal development), but still need to give more attention to think, plan, prioritize, monitor, learn, make oncourse corrections to bridge the gaps so that it can convert all- of its' action proposals to reach level 5&6 (proposal implantation and intended impact realization) fully in the coming years. The stakeholders' responses are loud and clear in collectively conveying that TAAS can never remain second to none in the field in performance. This calls for transition of TAAS to move more and more towards program excellence and implementation besides building on and enhancing personal legacy for impact. Another advisable advance action yet to begin is thinking about succession planning to build on and enhance Paroda legacy beyond the dynamic and charismatic leadership of Dr. R. S. Paroda. Grooming the future leader meanwhile is critical to continue sustainably higher impacts even post Dr. Paroda.

TAAS is at crossroad of highly promising present and a very promising but challenging unknown future. The Review points out that the time for transition to move from promising present to bright and uncertain future has come. A well-considered strategy may take it to higher heights. The future directions of TAAS will need debate and consensus in TAAS management. To facilitate such a debate, considering the rich insights from desk and sociometric analysis using standard analytical tools and considering the opportunities and challenges stated earlier, a matrix of strategies/strategic directions to move forward for still better and sustainable performance in future is suggested (Table 32). The suggested strategies include: 1) Doing Business as Usual; 2) Doing Business Differently (up to 2030) and 3) Doing Radical/Disruptive Business beyond 2030. Strategy 1 in general suggests continuation of the present activities. Strategy 2 in general enables TAAS to enhance focus, relevance, effectivity, accountability, reach, depth, width, visibility, capability, stature,

viability, and independence. As TAAS is predicted to attain maturity and stability stage by 2030 in its organizational life (elaborated in Section 3.2), Strategy 3 enables TAAS to remain futuristic and continuously remain relevant, efficient, viable, independent, and top-level global think tank. We can see that strategy 2 and 3 are seamlessly integrated aiming at achieving the above goals by building on and enhancing Paroda legacy through consolidating the gains already made, extending the gains, and making new gains.

The overwhelming conclusion from the review is that TAAS has brilliantly performed despite some concerns of full effectivity, skill, reach, diversity of activities, resources, communication, and governance to achieve its vision and objectives. But time has come for TAAS to embark on bold reforms after due debate and consensus by the TAAS management to harness latent potential, build on brilliant past, and present performance, other untapped opportunities, and address challenges to emerge as a global leader and not just complementary think tank as envisioned at the time of establishment of TAAS but a major think tank of global fame. Accordingly, strategies 2&3 are suggested in succession. Strategy 1 do not make any sense neither to TAAS nor to science and society.

TAAS Review Report

1. Introduction

Trust for Advancement of Agricultural Sciences (TAAS) was registered as a non-profit organization in response to a vision statement on, "Food, Nutrition and Environmental Security" during 88th Session of Indian Science Congress on 17th of October 2002 and the new realization that much more to be done to carry out the Hon'ble Prime Minister's 'agricultural science based crusade for the elimination of hidden hunger and malnutrition' than the administrative and scientific back-ups of existing agencies/institutions like MoA & FW, NARS, NAAS, professional societies, NGOs, private sector, IARCs in India. A High-Level Think Tank could have been a complementary mechanism to assess, deliberate and recommend researchable and policy issues of highest esteem along with suitable suggestions. Accordingly, TAAS was conceived, and its office was opened in IARI Campus New Delhi on 14th December 2002. Over the years, TAAS is variedly considered/described/identified as a policy powerhouse, neutral platform, professional group, champion, crusader, advocate, lobbyist, pressure group, policy think tank in ARI4D. TAAS is more focused on its core activities for which it was established to remain as unique institution of its kind in the policy advocacy and creating public awareness on new advances/developments in agricultural science and important present and emerging national and international issues facing Agri-food and nutrition System (AFNS). A notable and unique feature of TAAS is that its stature, name, fame, distinction, credibility, and visibility is personified with charismatic visionary champion driving leadership of Dr. R.S. Paroda, former Secretary, DARE and D.G., ICAR and founding brain and continuing Chairmen of TAAS since its' inception (TAAS, 2021).

2. TAAS in Context

2.1 Vision, Goal, Mission, Strategy and Objectives

Vision: India becomes a prosperous agricultural country through science-based crusade for elimination of poverty, hidden hunger, and malnutrition

Goal: Harnessing the potential of agricultural science for the welfare of people

Mission: Promote growth and advancement of agriculture through scientific interactions, dialogues, publications, and partnerships

Strategy: TAAS acts as a neutral and vibrant think tank for strengthening agricultural research and innovation for development (ARI4D). It executes its programs and activities through collaboration and innovative partnerships with other national, regional, and international organizations and networks. Its major strategic thrusts are policy advocacy; technology transfer; information dissemination/knowledge sharing; and human resource development/capacity building.

Objectives: To achieve the goal and complete the mission, the following 5 major objectives are set out:

- To act as a think tank to deliberate on key issues relating to agricultural research and innovation for development (ARI4D) and influence policy decisions

- To organize workshops, conferences, brainstorming sessions, seminars and special lectures on emerging issues and new developments in agricultural sciences
- To disseminate knowledge among stakeholders through publication of proceedings and policy papers
- To confer national awards for outstanding contributions to Indian agriculture by the scientists of Indian and foreign origin
- To facilitate the scientific initiatives and build partnerships with non-resident Indian agricultural scientists on short visits to India

2.2 Governance

The activities of TAAS are managed by a Board of Trustees comprising of: Chairman, Vice-Chairman, Secretary, Treasurer and eight-member Trustees. New members are periodically inducted in place of outgoing Trustees. The Board meets once in every quarter, reviews progress of activities and formulates future programs depending upon the prevailing needs of the society. The Board also identifies the collaborating organizations to be involved in implementing its programs/activities. The finances of the Trust are audited annually by an authorized auditor appointed by the Board.

Board of Trustees (2016-2020)

Chairman: Dr. R.S. Paroda

Vice-Chairman: Dr. Gurbachan Singh; Secretary: Dr N.N. Singh (Jan.2016-May 2020) Dr. Bhag Mal (w.e.f. 27 June 2020); Treasurer: Dr Narendra Gupta (15 April 2017 – 15 October 2019); Dr. J.L. Karihaloo (Since 15 October 2019)

Trustees: Dr. T. Mohapatra; Dr. K.L. Chadha; Dr. A.K. Srivastava; Dr. (Mrs.) Rita Sharma; Dr. A. K. Singh; Mr. Raju Barwale and Dr. Narendra Gupta

Members: Institutional Members: 17; Corporate members: 12 and Life Members: 132

2.3 TAAS Secretariat

It Comprises of 2 Consultants, 1 Office Secretary and 1 Multitask Staff. In the responses by the stakeholders, it is expressed by many that the TAAS secretariat is most inadequately equipped to effectively handle the multifarious activities of TAAS. They have suggested to suitably increase the office facilities, staff in key areas of present and emerging need and periodically upgrade their skills (TAAS, 2021)

3. The Review- Objectives, Approach, Methodology and Scheme of Analysis

3.1 Objectives: The following are the TOR of the Review:

a) To review the programs and activities of TAAS since its inception
b) To have an overall impact assessment of TAAS
c) To undertake questionnaire survey of diverse stakeholders
d) To prepare a comprehensive report on impact assessment of TAAS
e) To suggest measures for improvement in the working and the scope of enhancing TAAS functions to better meet the expectations of stakeholders

3.2 Approach: The review of a high-level think tank like TAAS involved in assessing, deliberating, and recommending researchable and policy issues for action of the highest

esteem need to be well planned and focused (Gen and Wright, 2018; Engel, et.al.,2018). To remain continuously relevant, efficient, effective, and successful, progressive organizations like TAAS need to follow best management practices like regular review of programs and activities and continued learning to build on its strengths, overcome weaknesses, harness unlimited opportunities for even better performance in future under challenges of ARI4D/SAD and changing needs and aspirations of its stakeholders and society at large. For this we have selected a suitable analytical framework that enables to achieve the objectives of the review.

If we consider the normal 5 phases of organizational life (birth, growth, maturity, decline and renewal) of any organization, we may place TAAS in swiftly passing through growth phase. But TAAS has shown very high potential and promise to attain maturity with stability phase by 2030. So, rightly TAAS has now planned to have an independent external review of its activities to assess its strengths, weaknesses, demands for diversification of its activities like project funding, partnership, and collaboration with like- minded organizations, rewarding awardees with money besides citations, funding support for visits abroad, emerge as an active, significant regional, global player and way forward/directions for future. The idea of external review of impact of TAAS after 20 years of its purposeful journey towards reaching maturity with stability by consolidating the gains, extending the gains, and making new gains all conforming to the potential and competitive advantages of TAAS, is timely, a welcome step like other progressive organizations have done. In fact, Dr.M.S.Swaminathan Research Foundation (MSSRF), Chennai, India got its review done after 20 years of its establishment in 1988 (Uma and Kavita, 2009). Similarly Global Forum for Agricultural Research (GFAR), Rome, Italy got its review done in 2018 after nearly 22 years of its establishment in 1996 (Engel, et.al., 2018). Similarly, the present review will enable TAAS to introspect and assess where it is and where it should be. A searching question in such an initiative which should guide impact review/assessment of actions of any organization particularly involved in creating awareness, harnessing, advancing agricultural science and promoting science- based policy making is what would have happened if it did not exist, and how much would science and society have missed. In fact, it must be said that TAAS impact review cannot fit into formal/conventional output-outcome-impact framework. In policy area creating awareness, keeping the issue alive, making recommendations on facts and analysis without personal policy preferences, follow up and remain engaged in follow up is a great service (https://core.ac.uk>download>pdf; Gaieck, et.al.2020). It is a fact that policy continuity is more likely than policy change. As often said, that it is generally difficult to change policies because institutions are sticky, and actors protect the existing model/dispensation, even if it is sub-optimal (Cema, 2013). However, science/evidence-based recommendations generally lead to swings in moods and

environment to accept recommendations in policy making. Further, since TAAS is a credible, neutral platform, its recommendations are more likely to be impact making.

It is very important to note that TAAS has planned and organized professional activities under diverse topics/themes of great significance to Indian/Regional/Global agriculture through diverse modes of multi-stakeholder consultation with prompt timely quality publication, communication and a sincere follow up in all most all cases (TAAS, 2021, page no. 58 to 90). For assessing the impact of diverse TAAS activities of great significance to Indian agriculture (briefly in the outcome areas of policy advocacy, public awareness, networking for harnessing science, recognizing and rewarding outstanding agricultural scientists and incentives and award to young scientists, progressive farmers and capacity building) towards achieving the goal and mission of TAAS, listing and study of details of activities carried out under each major category by year since establishment, tracing/tracking and discussing their influence in achieving the objectives of review and goal and mission of TAAS and, finally concluding by answering the searching question, what would have happened if TAAS did not exist and how much science and society have missed it. To get further guidance/insights for our judgement on impact/influence and to remain more objective, transparent, specific and accord justice to the significant contributions of TAAS, we may also have to study the feedback/testimonial received through letters, emails, etc. from experts/leaders and also quickly seek through a survey the views/feedback of stakeholders of TAAS on the realized levels of success of above TAAS activities in relation to goals and mission with respect to the following queries among others:

a) Is the stakeholder, sponsor, or customer satisfied with the outputs delivered? Which activities, output/s they consider more significant and main suggestions for future?
b) Is it a benchmark institution? Which are others in the field?
c) Did the outcomes advance the agricultural sciences significantly? Some clear examples?
d) Was there a sustainable advantage associated with the outcomes? Which activities are more effective and why?
e) Are new fields of study, policy gaps, policy implementation failures and opportunities explored/pointed out/ pursued regularly and with what outcome? (Uma Lele and Kavitha, 2009; https://www.iaia.org>wiki-details.php?ID=23; (https:www.iph.cam.ac.uk/wp-content/uploads/2017/07/Policy-Impact-booklet-print-April-2017-1.pdf)

3.3 Methodology:

In recent years generally, evidence-based impact is emphasized to get sound and reliable results that inform what drives change and where more effectively (what works, and what does not and get a glimpse of what obstacles to overcome to attain positive better outcomes, scaling-up and scaling-out). Guiding principles of evidence are, whether appropriate, casual, credible, reliable, and sound/robust. Some of the simple,

popular types of impact evidence are, Emails or correspondence from key or pivotal individuals, quantitative data, if available, diversity of the audience reached, evaluation data, user feedback, testimony, reviews and commentary, media coverage along with date, evidence of downloads, statements from opinion leaders. Evidence hierarchy from informed opinion to evidence satisfying the guiding principles mentioned above consists of:

Fig. 1: Evidence Hierarchy

The bottom three layers/levels of triad of evidence hierarchy (Fig. 1) use unfiltered information with probable higher risk of bias whereas the top three layers/levels use filtered information with lower risk of bias (https://en.wikipedia.org/wiki>Heirarchy-of-evidence). Till TAAS builds/institutionalizes its capacity for systematic evidence-based impact assessment as pointed out in the suggested strategy of the Review (like use of randomized control trials, sophisticated quasi-experimental design techniques, meta-analysis, etc.) it may be reasonable to be satisfied with unfiltered information sources like informed opinion, self-report, user feedback and expert review. Based on the results of quantitative/qualitative analysis of the following 6 major TASS activities through tabular analysis/desk study, a quick stakeholder survey (a smaller schedule (Annex 1 in Annexure V) for senior national/international leaders/thought leaders and a longish schedule (Annex 2 in Annexure V) for stakeholders covering some specific queries as mentioned earlier in this note are drafted covering recollections (memory) about which TAAS output used, where used, when used, knowledge of its use and impact status) as stated earlier and making use of/supplementing /complementing with Emails or correspondence from key or eminent seniors/individuals, reflections on key publications, reports about the events/output, testimonials from national and global experts/leaders, policy makers, parliamentarians, event organizers, delegates feed- back, we infer/judge on the effectiveness of TAAS activities on achieving the goals and mission of TAAS with some suggestions for improving the influence in future. As discussed above, though the impact/influence assessment in this review is based on mostly unfiltered information, the meta judgement from multiple sources of unfiltered information is sufficient/well enough to establish that TAAS activities are useful in agricultural policy advocacy space and in

creating public awareness through important opinion makers/leaders in particular and TAAS mission of promoting growth and advancement of agriculture through scientific interactions and partnerships in general.

TAAS is not a policy decision maker *per se*. Its approach can only be persuasion, impress, not compel/compulsion. TAAS is raising the voice and keeping the issues alive which itself is an important impact of TAAS. Further, TAAS is continuously mounting and maintaining moral, knowledge, and science pressure on Government/decision making agencies on science/policy issues of critical importance. Also, it should be noted that policy impact in some sensitive/disruptive changes may not be successful/easy/early in all cases, normally it takes time in the Government/bureaucratic setup. These aspects may not fit into formal output, outcome, and impact framework, but in policy area, creating awareness, making recommendations based on facts and analysis is a great input/service leading to swings in the mood and environment to accept, for example GM food crops. Here impact cannot be attributed but supplemented and complemented with science- based facts (Cema, 2013). These aspects need to be kept in view while judging final outcomes of TAAS from this Review.

The suggestions for further strengthening the capacity of TAAS for improved impact assessment practice may include how to build/institutionalize in-house capacity to undertake evidence-based impact assessment, internalize learnings, prioritization of TAAS activities for maximum impact in which TAAS has the competitive advantage, need feasibility and frequency of impact assessment from third party to enhance credibility and funding/support prospects to TAAS, etc.

The 6 major activities in the 4 outcome areas of policy advocacy, public awareness, network/partnership, and capacity building performed by TAAS every year since its establishment in 2002 which may be considered for impact/influence assessment using tabular analysis are:

1. Symposia /Conferences /Workshops /Brainstorming Sessions /Stakeholder Dialogues /Expert Consultations organized
2. Foundation Day Lectures/Special Lectures
3. Strategy Papers/Policy Papers
4. Awards for Leadership in Agriculture to Eminent Scientists/Persons
5. Success Stories
6. Publications (excluding those that are listed under 1 to 4 above)

It is important to note that all the 6 activities generally have the potential to influence/impact 2 outcome areas which together capture all the actions stated above. Keeping this in view, the review finally retains only policy advocacy and public awareness as key outcome areas for TAAS outcome assessment purpose.

TAAS in its 2 major publications (TAAS, 2015 and TAAS, 2021) have comprehensively provided a gist of overall/major achievements and impact of TAAS activities since inception. These publications immensely helped to draft the present

study/review report on impact/influence assessment of TAAS activities. To get some more in-depth insights on demonstration of performance of TAAS, two case studies/success stories are undertaken in each of the 3-star activities of policy advocacy, public awareness and raising the voice beyond the border in science management issues.

3.4 Scheme of (Statistical) Analysis

The data were explored and analysed about the opinion of the respondents, using descriptive statistics/graphical analysis, factor analysis (SAS software), qualitative analysis, segmentation / cluster analysis (SAS software), text mining (SAS software) and word cloud (python). To bring much needed objectivity into analysis, results, and inferences/conclusions because of qualitative survey data on stakeholder responses/unfiltered information, multiple tools (as above) were used to cross check/ reconfirm/validate the key results for drawing meta/overall judgements on influence/impact of TAAS actions.

Descriptive statistics: The average and percentage of the key responses surveyed were calculated and visualized using bar charts (survey analysis), pie-charts and box plot (polarity).

Factor analysis: This technique was used to condense the larger number of questions into key influencing components or factors. The responses of stakeholders about TAAS and its performance were collected from different stakeholders of organizations across India using pre-defined questionnaire. To obtain the key factors among the 14-dimensions opined by the stakeholders (Annex 2 of Annexure V), factor analysis was carried out using all the variables included in the study. This enables the TAAS to gain an insight into what are the underlying dimensions that affect TAAS performance.

Text mining: It is a process of deriving high quality information from text. In this report, the method is used to derive key assessment, views, and thoughts from the surveyed data. The national, regional, and global senior thought leaders connected and concerned about TAAS were approached to give their opinion about its mandate, activities, continuation/reorientation, suggestions for better performance, and TAAS as a brand name (Annex1 of Annexure V). The responses obtained were very much diverse and different among respondents. Thus, to derive the most repeated or similar responses/topic groups from the responses obtained, text mining NLP technique was employed. The same technique was also adopted to study the responses obtained from the stakeholders across different organizations (Annex 2 of Annexure V).

Word Cloud: A word cloud is a collection, or cluster of words depicted in different sizes. The bigger and bolder the word appears, the more often it is mentioned within a given text and the more important it is. The senior leader's responses on whether they are aware of/ were associated with TAAS, its mission, mandate, objectives, and programs/activities were analysed using the word cloud technique.

4. Findings

4.1 TAAS Activities

Over 20 years since its establishment in 2002, TAAS has organized 48 National/International Consultations, Conferences/ Symposia/ Workshops/ Dialogues/ Brainstorming Sessions; published 81 publications on 14 major national/international issues confronting Agri-Food System; published 6 Policy Briefs; 20 Strategy Papers; organized 11 Foundation Day Lectures; 4 Special Lectures and conferred 11 Dr. M. S. Swaminathan Awards to science leaders/experts of global eminence (TAAS, 2015; TAAS, 2021). As can be seen later under stakeholders' response, though they hail the number and quality of multitude of activities, but some feel there is scope for striking synergy, reducing overlaps among programs/activities and across time periods to achieve greater efficiency and effectivity. Perhaps this issue may be resolved as pointed out under suggested strategy (Table 32) if Annual Program Planning is meticulously/systematically followed. The details of titles along with serial numbers of related topics in brackets, date and attendance in the events are provided below:

Table 2: Conferences /Symposia /Workshops /Brainstorming Sessions/ Dialogues Organized by TAAS (2002-2022)

S. No.	Title	Date	No of participants attended
1	Brainstorming Session on 'Enabling Regulatory Mechanisms for Release of Transgenic Crops' (Related: Sl. Nos. 6. 15, 27, 42, Strategy Paper 20, First Foundation Day Lecture)	October 18,2003	100
2	Brainstorming Session on 'Role of Science and Society towards Plant Genetic Resources Management - Emerging Issues' (Related: Sl.No.10, Special Lecture 1, Strategy Paper 6)	January 7 - 8, 2005	80
3	National Workshop on 'Role of Information Communication Technology in Taking Scientific Knowledge /Technologies to the End Users' (Related: 16, 26)	January 10 - 11, 2005	70
4	Brainstorming Session on 'Farmer-Led Innovations for Increased Productivity, Value Addition and Income Generation' (Related: 5, 7, 17)	October 17, 2005	40
5	'Farmer-Led Innovations Towards Plant Variety Improvement, Conservation and	November 12-13, 2006	24

	Protecting Farmers' Rights' (Related: 28, 33)		
6	Brainstorming Session on 'Models of Public-Private Partnership in Agricultural Biotechnology' (Related: 12, Policy Brief: 6, Second Foundation Day Lecture)	April 7, 2007	46
7	Symposium on 'Farmer-Led Innovations for Sustainable Agriculture'	December 14-15, 2007	100
8	National Symposium on 'Quality Protein Maize for Human Nutritional Security and Development of Poultry Sector in India' (Related: 23, 24, 3rd Foundation Day Lecture, Strategy Paper 12)	May 3, 2008	150
9	Brainstorming Workshop on 'Emerging Challenges before Indian Agriculture - The Way Forward' (Related: 14, 44, Strategy Paper 1, Special Lecture 3)	March 6, 2009	44
10	Brainstorming Workshop on 'Strategy for Conservation of Farm Animal Genetic Resources' (Related: 22)	April 10-12, 2009	50
11	Brainstorming Workshop on 'Climate Change, Soil Quality and Food Security' (Related: 31; 43, Policy Briefs: 1, 2, 3, Foundation Day Lecture 5)	August 11, 2009	51
12	National Seminar on 'Quality Seed for Food Security through Public-Private Partnership' (Related: 38, 2nd Foundation Day Lecture)	April 13-14, 2010	142
13	National Dialogue on 'Building Leadership in Agricultural Research Management'	August 27 - 28, 2010	50
14	Brainstorming Session on Prospects of Producing 100 million tons of Wheat by 2015 (Related: Foundation Day Lecture 9, Special Lecture 2)	December 18, 2010	91
15	'Stakeholders' Interface on GM Food Crops' (Related: Strategy Paper 20)	May 19, 2011	45
16	International Conference on 'Innovative Approaches for Agricultural Knowledge	November 9-12, 2011	250

	Management: Global Extension Experiences'		
17	'Farmers' Led-Innovation'	December 23-24, 2011	137
18	Global Conference on 'Women in Agriculture' (Related: Strategy Paper 16)	March 13-15, 2012	760
19	'Foresight and Future Pathways of Agricultural Research through Youth' (Related: 34, 36, 39, Strategy Paper 17)	March 1-2, 2013	300
20	Brainstorming on 'Achieving Inclusive Growth by linking Farmers to Markets' (Related: Special Lecture 4)	June 24, 2013	40
21	National Workshop on 'Out scaling Farm Innovation' (Related: Policy Brief 4, Foundation Day Lecture 7)	September 3-5,2013	267
22	Brainstorming Workshop on 'Strategy for Conservation and Productivity Enhancement of Farm Animal Genetic Resources'	January 10, 2014	45
23	Brainstorming Workshop on 'Soybean for Household Food and Nutrition Security'	March 21-22, 2014	78
24	Brainstorming Workshop on 'Up-scaling Quality Protein Maize (QPM) for Nutrition Security'	May 20-21, 2015	100
25	Regional Consultation on 'Agroforestry: The Way Forward'	October 8-10, 2015	50
26	National Dialogue on 'Innovation Extension Systems for Farmers Empowerment and Welfare- A Road Map' (Related 47)	December 17-19,2015	242
27	Round Table Discussion on 'Promoting Biotech Innovations in Agriculture and Related Issues'	August 4, 2016	50
28	Awareness-cum-Brainstorming Meeting on Access and Benefit Sharing –Striking the Right Balance	October 22, 2016	100
29	Delhi Declaration on Agrobiodiversity Management – Outcome of International Agrobiodiversity Congress 2016 (Related: 30, 35)	November 6-9, 2016	1000

30	Implementation of Delhi Declaration for Agrobiodiversity Management in India-A Strategies	August 28, 2017	97
31	National Conference on Sustainable Development Goals: India's Preparedness and Role of Agriculture (Related: 48, Policy Paper 5, Foundation Day Lecture 4, 6, 8, 11, Strategy Paper 2, 3,4, 11, 13)	May 11-12, 2017	160
32	Underutilized Crops for Food and Nutritional Security in Asia and the Pacific	November 13-15, 2017	54
33	Brainstorming Meeting on Harnessing Intellectual Property to Stimulate Agricultural Growth	July 27, 2018	51
34	Regional Conference on Motivating and Attracting Youth in Agriculture – A Road Map	August 30-31, 2018	227
35	Dryland Agrobiodiversity for Adaptation to Climate Change	February 13, 2019	50
36	Regional Workshop on Youth as Torch Bearers of Business Oriented Agriculture in South India	October 21-22, 2019	500
37	National Dialogue on Land Use for Integrated Livestock Development	November 1-2, 2019 (115)	115
38	Stakeholders Dialogue on Way Forward for the Indian Seed Sector-A Road Map (Related: Strategy Paper 5, 7)	February 22, 2020	65
39	Regional Workshop on Motivating and Attracting Youth in Agriculture (MAYA) in North India (in collaboration with PAU & ICAR-ATARI, Ludhiana)	February 28-29, 2020	282
40	Stakeholders Dialogue/Webinar on Current Challenges and Way Forward for Pesticides Management- A Road Map	July 24, 2020	80
41	Stakeholders Dialogue on Strategies for Safe and Sustainable Weed Management: A Way Forward	December 9, 2020	61
42	Stakeholders Dialogue on Enabling Policies for Harnessing the Potential of Genome Editing in Crop Improvement	17 March 2021	65

43	Regenerative Agriculture for Soil Health, Food and Environmental Security	26 June 2021	69
44	National Workshop on Bridging the Yield Gaps to Enhance Food-grain Production: A Way Forward	26 August 2021	119
45	Expert Consultation on Accelerating Export of Seed Spices: Challenges and Opportunities	22 November, 2021	91
46	Expert Consultation on Promoting Efficient Irrigation Technologies for Water Saving Across Scales and Sectors	25 February, 2022	82
47	National Dialogue on Innovations in Agricultural Extension: A Way Forward	8-9 April, 2022	115
48	National Symposium on Food, Nutrition, Health, and Environmental Security: Aiming to Achieve SDG 2	29-30 August 2022	102

Total participants in 48 events: 6887 which seem to be good (average of 143 per event) in general. There were also related events/publications which are indicated in Table 2 under Column 2 in bracket with serial numbers.

Table 3: Stakeholders Participation/Affiliation in TAAS Activities: 2002-2022

Key outcome /activity areas	Participants/Partners/Stakeholders										
	Public sector	Private sector	Donors	Intnl. Orgns.	Natnl. Orgns.	Res. Orgns.	Farmers	Adv. Res. Centres	Women	Youth	Rural Adv. Service Providers
Policy Advocacy	2,490	568	03	256	2,185	1,785	134	38	221	382	-
Public Awareness	2,580	616	8	78	1,112	1,079	672	24	687	614	-
Networking /Partnership	173	75	-	40	199	207	260	113	103	75	-
Capacity Building	392	158	-	01	216	233	105	05	50	70	

It is important to examine/analyze the composition of stakeholders for output generation to judge representation and quality of output as sound directions for advancement of science, policy making, and any other decisions. As seen in the Table 3, the participants were mostly (80 %) from public sector, national organizations (90 %), and research organizations (50 %). The representation of farmers & youth (17 % each) and women (15 %) is less than representative. Greater participation from private sector and international organizations also need attention to improve inclusivity, wider /comprehensive perspective, and relevance/need.

4.2 Desk Review of TAAS Activities (2001-2021)

Policy Advise

Table 4: Review of Impact of TAAS Policy Advice Activities

Purpose	Suggestion/s	Agency Targeted	Status
Effective co-ordination and convergence of all agrobiodiversity related matters	National Advisory Board on GRM	ICAR	Implemented
Raised the concern for establishment of PPV and FRA authority, creation of Gene fund	PPV and FRA established in 2006 and Gene fund functional	MOAFW, GOI	Established, fully functional, Registration is in full progress
Emphasized creation of Seed Mission to promote hybrids/HYV crops seeds, increase productivity and quality	Creation of National Seed Mission	Niti Aayog created it in 12th FYP	Operational
Suggestions to make seed bill 2020 further useful and farmer friendly and approved in parliament	Pass Seed bill 2020 with farmer friendly clauses/points	MOA & FW	Still to be approved
Suggestions to provide incentives to private seed sector on par with public sector especially for hybrid seed production	Provide incentives as in public sector	GOI (MOA & FW)	Under active consideration
Suggestions to pass Pesticides Management Bill 2020	To consider alternatives to chemical pesticides, proper regulatory system, promote botanicals etc., make the bill farmer/industry friendly	GOI (MOA & FW)	Still not approved
Inclusion of Maize in the food security mission	Promotion of Quality Protein Maize (QPM) to address nutrition security	GOI	Maize added in NFSM
Inclusion of Soya Milk and other products in the midday meal scheme of GOI	To address mal - nutrition problem	GOI	Receiving needed attention

Single window clearance of regulatory process relating to testing and release of GM crops	Single window Clearance	DBT(GOI)	DBT created BRAI, BRAI bill (2013) is still pending for approval
Suggestion to promote farm development activities (like bunding, field levelling etc.,)	Khet Ka Pani Khet Main through farm development activities for resource poor farmers under MGNARGA, RKVY etc.,	MOA&FW(GOI) & MORD(GOI)	Being implemented in existing schemes
TAAS "Ranchi Declaration" to prepare clear road map for preparation and implementation of a National Plan of Action on Management and Conservation of Farm Animal Genetic Resources	Special focus on valuable indigenous breeds for conservation and enhancement	ICAR/DAH D	A Road map is being prepared by ICAR/DAHD. National livestock mission created in 12th FYP. Rastriya Gokul Mission formed to ensure and develop indigenous bovine breeds including financial and technical support to Goshalas.
Suggestion to modify APMC Act to reform markets and link farmers with markets, delink F&Vs, flowers from APMC purview	To promote inclusive market- oriented development	GOI	Suggestion well received. Some states have delinked sale of vegetable through APMC mandis
Invest at least 1 per cent of Ag. GDP for/on ARI4D as against the present 0.4 percent. Threefold investment in Ag. Research for doubling farmers income needed	Enhance investment in ARI4D	GOI	Repeatedly made, improvement seen but still not a reality in full
To strengthen research management cadre, scientists have both EDP & MDP at NAARM	Accomplishing relevant leadership goal	ICAR	Implemented
Motivate and attract, retain youth in agriculture, emphasize capacity development, vocational training, funding, market reforms etc.,	To motivate youth towards entrepreneurship options in agriculture	GOI	Much appreciated as unique, much needed and timely initiative
Integrate and empower women for inclusive growth and	Action plan developed	GOI	Appreciated, TAAS is credited with distinction

development through global partnership program on gender in agriculture			to organize first ever Global conference on women in agriculture with 760 delegates from all over the globe (37 countries)
Harness potential of biotechnology through appropriate policy support, clear road map for prioritizing biotechnology for food and nutritional security, R&D priorities, biosafety regulatory and IP management and public awareness	Promote Biotechnology	GOI	Well received as other efforts in biotechnology where TAAS is a pioneer forum for its promotion
Strengthening livestock sector with a transformation from subsistence level to semi-commercial to futuristic commercial scale	Strengthening livestock sector with investment policy, support market development, HRD, credit, infrastructure etc.	GOI	Well received
Suggestion for a dedicated TV channel on agriculture to help farmers get much needed timely knowledge on all aspects from plough to plate	Information/Knowledge empowerment of farmers	GOI	Made effective

Public Awareness

TAAS has mastered the art of building awareness among stake holders and, general- public on important topical issues of current and emerging importance in SAD. After building awareness, it has actively engaged in policy advocacy to address all key issues and raise its voice and work for follow-up to see the suggestions are acted upon and results/reactions obtained. In some of the key issues where action is not clearly visible, it has again expressed its concern with new updates and pleaded for quick policy/administrative action. Thus, TAAS is/ has remained not only alive and alert by debating issues of concern in SAD but also repeatedly voiced them loudly for decision and action.

Public awareness is created through publications, meetings, conferences etc. In the last 2 decades, as mentioned already, it has published 81 publications, organized 41

meetings/seminars/conferences, 6 policy dialogues, 11 foundation day lectures, 4 special lectures, published 20 strategy papers and 2 success stories. All the publications are regularly posted in TAAS website besides circulating among all the key stakeholders (TAAS, 2015; TAAS, 2021). Through these publications public awareness/sensitization is created on the following diverse best science/management/policy practices among others for SAD:

- Conservation and sustainable use of natural resources of land, water and, agrobiodiversity
- Sustainable diversification of agriculture through reorientation towards "farming systems" mode by integrating crops, livestock, and fisheries
- Soil test-based use of fertilizers to overcome existing imbalance of nutrients/micronutrients in the soil
- Stress on out scaling proven innovations which save inputs and enhance income like CA, plastic mulching, DSR, alternate furrow irrigation, micro irrigation, fertigation, IPM, small farm mechanization
- Judicious use of water through required pricing of water, agri-diversification through scientific land use planning involving crops, horticulture, agroforestry, silvi-pasture, promotion of micro irrigation systems to replace flood irrigation to enhance WUE
- Organized first ever global conference on women in agriculture with 760 delegates from 37 countries, deliberated on specific problems of women engaged in agriculture and suggested to overcome them through empowerment-technology, capacity building, legal rights, supportive policies, and incentives
- Catalyzed NARS, particularly ICAR to help retain and productively engage youth in agriculture through NMYA (National Mission on Youth in Agriculture), progressive strategies, policies such as secondary/specialty agriculture by ensuring training, skill development, arranging bank credit make them technology agents/resource providers and or input/implement providers, entrepreneurs for value addition and primary processing and, also for linking farmers to market. Emphasized paradigm-shift from a narrow focus on youth as a farmer to youth for value chain development
- Sensitized researchers, policy makers and development officials to upscale and out-scale farmer led innovations which are cost effective, sustainable, and useful to them for increasing productivity and profitability. Impressed ICAR to create a National Innovation Fund which is under active consideration to validate and largescale adoption of useful technologies and train enterprising farmers
- Catalyzed states to form State Farmer Commissions and take progressive steps to address farmers' concerns and come out with farmer centric state agricultural policies
- To effectively address climate change effects/weather-based calamities, recommendations to promote climate smart agriculture, crops and livestock insurance, seed banks, credit at low interest, immediate compensation using GIS

based weather data and, on the spot quick assessment are made particularly to address the concerns of small farm holders

- For open access knowledge to farmers, National Agricultural Information System is created by ICAR through use of ICT, smart phones, and media. Long standing recommendation of TAAS to start a dedicated TV channel on agriculture is now made operational
- Road maps to increase Indian wheat production from 85.93MT in 2010 to 100MT by 2015 was prepared, recommended and India achieved 94MT in 2015-16
- Awareness about importance and relevance of GM crops for Indian agriculture has been created through national dialogues, publications, efforts to change the public perception about GM crops to farmers and consumers, need for efficient regulatory system, specific role of ICAR to conduct field trails and release of GM crops for general cultivation in the national interest made and emphasized. Needed steps are taken now by DBT & ICAR
- The process of PPP has been catalyzed to ensure quick delivery of results to end users. Steps are taken by NARS institutions to forge PPP in difference formats establishing technology parks in different regions for out scaling innovations
- Awareness to use soyabean as a food crop to overcome protein malnutrition is emphasized, its use through various food products (Flour, toffee, milk, Oil, puffs, biscuits, ice creams etc.,) through promotion of small -scale industry and producer companies is advocated, for which role of KVKs, SAUs, and other institutions are highlighted. Creation of a Soybean Board is recommended
- Besides above topics, general topics through 20 strategy papers and 2 success stories are also covered and published for creating public awareness, policy decisions, practices, and follow-up.
- To reduce heavy imports of Oil seeds, there is an urgent need to revive oil seeds mission
- In horticulture, initiatives like exploitation of genetic materials achieving sufficiency in supply of healthy planting materials, improving availability of horticulture produce, increasing productivity, reducing cost of production, risk management, improving quality providing alternate horticulture systems/Urban and peri-urban horticulture, pre and post-harvest management and value addition, horticulture for health and nutrition, emphasis on FPOs, improving technology transfer and skill development are recommended

Networking for harnessing science

The TAAS facilitates networking of various players and stakeholders, national and international organizations to organize various activities like consultations, BSSs, symposia, conferences, dialogues, workshops, foundation day/special lectures by leading scientists/social workers and bring out policy papers/strategy papers/success stories etc., conferring specific awards to encourage young scientists in different fields of agricultural sciences.

Conferring awards

TAAS also confers awards for outstanding achievements in Agriculture in the name of Dr. M. S. Swaminathan. The award is given annually to an eminent scientist across the world for his/her leadership qualities and outstanding contributions towards overall growth in agriculture in developing countries, especially in India. TAAS has conferred so far 10 awards.

TAAS Publications

TAAS has an impressive record of 81 publications classified in 11 important broad themes in the last 20 years (Table 5; TAAS, 2021). The main purpose of these publications is to enhance public awareness on contemporary and emerging issues facing agricultural science for further research and development to attain SDGs by 2030. Though publications cover all the 11 broad areas of ARI4D, out of 81 publications 18 (22 %) of them relate to biotechnology related, nine (11%) of them SDGs related, four (5 %) on youth and four (5 %) genetic resources. Further it may be seen that the pace of publishing publications has increased in the last 10 years by about 1.5 times as compared to first decade. As may be seen from stake-holders response later in the Report, TAAS has meticulously edited these publications and they are widely referred as quality publications brought out on time. Stakeholder's reflections on 2 important key publications as a sample are provided under Section 4.3 of the Review Report. From these reflections from eminent experts/thought leaders we may infer that how much they appreciated TAAS for publishing such quality and useful publications for promoting science for development. Some experts have also provided suggestions for further improvement of quality and content of publications. For example, they have suggested less print but more electronic short message/communication/publication/small handouts on policy suggestions not exceeding 2 pages for the policy makers. They have also suggested regular electronic newsletter, regular updating of TAAS website, etc.

TAAS Success Stories

Six case studies/success stories under policy advocacy, creation of public awareness and raising the voice beyond the border on science management activities of TAAS to demonstrate how selection of topics, issues identified for detailed debate by experts, preparation and wide circulation among likely participants of base paper on the topics along with issues for discussion, structured presentation and discussion by experts and relevant stakeholders, drawing proceedings /recommendations /action plan, professionally editing it subsequently, getting the feedback and communicating to the concerned researchers/policy makers and following it up for taking action has led to impact are attempted (TAAS, 2015; TAAS, 2021). The success story is a learning medium and opportunity to encourage others to make every activity a success story of the sort to earn name, fame besides being useful to science, education, policy formulation and society at large as demonstrated by TAAS.

Table 5: TAAS Publications over the years 2002-2022

Year	Biotech	General	Plant Protection	Livestock /Fishery	Plant Nutrition	Horti	SDGs	Youth	Women	Agri. Biodiversity	Ag Extension	Agroforestry	Agri /Animal GRs	ICT	Total
2021	1	1	1												3
2020	1	1	1	1											4
2019	1	1		1	1	1	2								7
2018	1	1		1			1	3	1						8
2017		3			1		2								6
2016	2									1					3
2015		2			1						1	1			5
2014	1	1					1					1			4
2013	2	4					1	1							8
2012		1							1				1		3
2011	1	2									1				4
2010	2	3					1								6
2009		4					1						1		6
2008	1														1
2007	1										1				2
2006	1	2													3
2005	1	2											1	1	5
2004													1		1
2003	2														2
Total	18	28	2	3	3	1	9	4	2	1	3	2	4	1	81

Policy Advocacy

Gene Editing

Genome editing is an advanced innovative tool for increasing productivity and production efficiency for providing solutions to the new and emerging challenges of climate change, nutritional security, post- harvest losses, nutritional quality and safety of food and adverse impact on food systems due to health crises like COVID pandemic. Genome editing enables both precise and efficient targeted modification of an organism's genome. CRISPR/Case 9 and other genome editing techniques are currently being used extensively by scientists all over the world to incorporate desirable traits in different crops. These include varieties requiring low inputs like fertilizers, water, insecticides, fungicides, or those that have better nutritional qualities. Since genome editing in plants has significant potential for breakthroughs in crop improvement in terms of speed, adaptation, resilience, and end use, DBT and many ICAR institutions are into use/application of CRISPR/Case9 technology for enhancing stress tolerance and nutritional quality in number of crops.

Along with use of technology, enabling policy including regulatory requirements for application of technology and use of products are to be well defined. In India, activities involving genetic engineering and new gene technologies are regulated under "Rules for Manufacture, Use, Import, Export and Storage of Hazardous Microorganisms/Genetically Engineered Organisms/Cells, 1989 (Rules 1989)" under the Environment (Protection) Act, 1986. These Rules are implemented by DBT and MoEFCC. Taking note of developments in Genome Editing, DBT has prepared draft regulatory framework and risk assessment guidelines for genome edited organisms in January 2020. NAAS with TAAS in high level consultation with stakeholders prepared a Policy Brief "Regulatory Framework for Genome Edited Plants". Key recommendations are: 1) Separate guidelines need to be developed for genome edited plants disaggregating them from those of other organisms, 2) Categorization of genome edited plants should be made into internationally acceptable SDN1, SDN2 and SDN3 categories, and 3) SDN1 and SDN2 product categories being free of foreign DNA and indistinguishable from those developed through conventional breeding, should be exempt from regulation and risk assessment. Realizing the need for defining policy direction to fully harness the potential of genome editing in crop plants, TAAS took the lead in organizing a stakeholder dialogue on "Enabling Policies for harnessing the Potential of Genome Editing in Crop Improvement" on 17th March 2021 with objectives of 1) to develop consensus on regulation of genome edited plants and catalyze approval of the regulatory policies, 2) to deliberate on mechanism of access to genome editing technologies, and 3) to discuss policy directions for promoting application of genome edited technologies for sustainable agriculture. The output of the dialogue was suggesting a roadmap for approval of regulatory guidelines, the infrastructure and human capacity needs for implementation of the guidelines and develop modalities for utilizing genome editing in crop improvement and technology transfer (TAAS, 2021).

The Guidelines need to be approved GEAC and by the Ministry, then only it can benefit farmers. Once approved, genome editing technology adoption will accelerate the process of plant breeding and provide enormous benefits as well as the nation. It will make international seed trade seam less and India can become a global seed hub. Public-private partnerships for acquisition of genome editing technologies need to be built. In a far-reaching move, the Central Government has issued notification on 22nd March 2022 exempting certain types of genome-edited crops (SDN1 and SDN2) from stringent regulations applicable on GM crops (Rules 7-11 of EPA 1989). Accordingly, DBT issued guidelines pending since 2020 on 25th May 2022. Thus, continued efforts of TAAS have contributed to a positive outcome in terms of much awaited policy support for boosting further research and development of crops badly needed to help farmers and nation. The following responses from Industry leaders/scientists are a testimony to the contribution of TAAS in this significant contribution to advances in science, policy making and society:

Genome editing is an advanced innovative tool for increasing productivity and production efficiency for providing solutions to the new and emerging challenges of climate change, nutritional security, post-harvest losses, nutritional quality and safety of food and adverse impact on food systems due to health crises like COVID pandemic. Genome editing enables both precise and efficient targeted modification of an organism's genome. The efforts of TAAS have contributed to a positive outcome in terms of much awaited policy support for boosting further research and development of crops badly needed to help farmers and nation. The following responses from Industry leaders/scientists are a testimony to the contribution of TAAS in this significant contribution to science and society:

-As the genome editing guidelines are announced and SDN1 and SDN2 are exempted from biosafety regulations it is time to recognize this milestone event and those who contributed towards making this possible. For the Agri-biotech industry, which has been on the death bed for last ten years, this is a shot of Oxygen. It gives a glimmer of hope that the country will finally use modern science and technology for the benefit of the farmer.

- *We know that TAAS has made significant contributions in convincing the government to come with these progressive guidelines. On behalf of FSII we would like to convey our gratitude to TAAS in general and to you for your personal contribution towards getting the progressive guidelines released by the Govt.*
- *It is now time to work quickly on methods to bring the varieties created using this technology to the farmers doorstep. We are working within the industry to bring out such products to the markets as soon as possible. It is also a right time for us to discuss some PPP projects with ICAR and IARI to undertake joint research projects in crops of national importance.*
- *Once again, we express our compliments and gratitude to you for the stupendous work you have undertaken to bring progressive regulatory guidelines for the genome editing technology. It is now time for us to work together to take the benefits of this technology to the doorstep of the farmer* - ***Ram Kaundinya Director General, FSII***

"I fully endorse the statement of Mr. Kaundinya. You are leading us from the front in every sphere"- ***Kuldeep, ICRISAT***

"We would like to thank you for your support for the exemption of genome edited plants falling under the categories of SDN1&SDN2 which are free of exogenous DNA from the provisions of Rules 1989.The exemption for SDN1&SDN2 type of edits will go a long way in encouraging agricultural innovation and inclusion of new medium &small enterprises to contribute towards farmers' benefits. We look forward to your continued support for biotechnology and innovation" ***-Shivendra Bajaj, Executive Director, FSSI***

Letter of Dr.R.S.Paroda to Dr.Pathak, Secretary DARE and DG, ICAR:

I am pleased to apprise you that the National Academy of Agricultural Sciences (NAAS) and the Trust for Advancement of Agricultural Sciences (TAAS) organised a Press Meet at NASC Complex on 31 October, 2022 concerning the approval by the Ministry of Environment, Forests and Climate Change (MoEF&CC), Government of India for environmental release of genetically modified (GM) mustard hybrid. The meet was highly successful and attended by about 50 press and media persons representing different newspapers and TV channels. This landmark decision has broken the ban on release of GM food crops. This is a progressive step towards Atmanirbhar Bharat. The interaction with the media persons was lively and their queries were all answered.

As you are aware, the GM technology for development of hybrids in mustard and other oilseed crops will play an important role in reducing the edible oil import burden considerably. This decision will also encourage scientists to evolve promising hybrids to reduce the environmental footprints of agriculture, develop climate resilient crops for achieving both food and nutritional security.

Now that GM mustard has been given environmental clearance, urgent efforts are needed to test DMH-11 hybrid at different locations in mustard belt by the ICAR and State Agricultural Universities (SAUs). This be better done in this growing season by ICAR-DRMR and the Department of Agriculture, MoA&FW. Using the available seed (about 10kg) with Dr Deepak Pental, around 50-100 demonstrations could easily be conducted in the current rabi season itself and more seed could be produced through public-private partnership so that larger area could be covered next year. Also, the scientists be directed to breed new high yielding disease and pest resistant hybrids in a mission mode.

It will be much appreciated if ICAR takes immediate steps to grab this opportunity and not let the current rabi season missed - ***Raj Paroda, 3rd, November 2022***

Current Challenges and Way Forward for Pesticides Management- A Road Map

Background

The Trust for Advancement in Agricultural Sciences (TAAS), in collaboration with the Society of Pesticide Science (SPS) India, the Indian Phyto-pathological Society (IPS), and the Entomological Society of India (ESI) organized a "Stakeholders Dialogue on Current Challenges and Way Forward for Pesticides Management" through webinar on 24th July 2020. It was attended by about 80 participants including eminent experts, senior research managers, government officials representing diverse stakeholder groups, viz., central and state governments, scientific societies and institutions, pesticide industry and farmers. The main objectives of the dialogue were: i) to discuss major constraints and explore solutions for phasing out banning of certain pesticides, ii) to seek views of stakeholders on proposed 'Pesticides Management Bill 2020' and suggest possible alternatives for accelerated growth of pesticides in India, and iii) to review and suggest reorientation of pesticides management, present regulatory system, existing policies and enabling environment for growth of pesticide industry to promote botanicals and agro-chemical R&D in the country (TAAS, 2021)

Major Issues Discussed

In-depth discussions were held around regulatory mechanisms for pesticides management including timeline for processing registration application, re-registration, 'Me-Too' registration, excessive jurisprudence, regulatory data protection, pricing, and bulk ban of 27 pesticides. Discussions were also held on rationality of alternatives, ecotoxicity, reasonable data requirements on bio efficacy and toxicity, and mandatory application of glyphosate by PCO.

Various issues relating to crop losses, pesticide registration system, current challenges, and way forward for pesticides management, sale of spurious pesticides, banning of pesticides, and an enabling environment for faster growth of pesticide industry were discussed. The discussion on issues of R&D and innovation centered around: i) development of new molecules-their search, synthesis, isolation, identification, bio-activity, product optimization, and physicochemical, preliminary safety information; ii) formulation for recipe development, product optimization (physicochemical parameters, bio efficacy, phyto-compatibility, toxicology, etc. and iii) safety aspects- mammalian, avian, environmental, non-target organisms safety / toxicology /compatibility, and transformations, metabolism, detoxification, etc.

The Road Map

During the dialogue, in-depth discussions were held on various aspects of pesticides management and a need was felt for developing a clear Road Map for disruptive innovation in the field of chemical pesticides and botanicals through greater investment in R&D, both by public and private sector, and through creation of centres of excellence to achieve desired goals. The outcome of the dialogue is the development of a clear Road Map with the following three-pronged recommendations:

Reorienting the Regulatory Mechanism

In the ambit of world trade order and domestic food and nutrition security, there is an urgent need to have a 'National Policy on Agrochemicals' with emphasis on use of safe pesticides. The National Policy should aim for gradual reduction of pesticides while considering the technological options like GM technology which redefines the relationship between seeds and pesticides. Hence, Government is urged to give high priority to constitute an expert group, involving different stakeholders, and seek the assistance of Think Tanks like TAAS and NAAS to put in place a forward-looking policy draft for consideration and approval of the Government.

Farmers need improved seed treatment practices which can help in increasing their crop yields. The Central Insecticides Board and Registration Committee (CIB&RC) should allow usage of custom seed treatment blends developed by seed companies to effectively manage local pests and diseases as allowed in some advanced countries for which necessary regulatory provisions need to be made. In this context, a national program in Mission Mode needs to be launched for safe and efficient on-farm seed treatment through 'Mobile Seed Treatment Operators' (mostly youth) in the villages especially at the time of seeding/planting. The rural youth could thus be trained as operators by the Krishi Vigyan Kendras (KVKs). For this, the funds available under corporate social responsibility (CSR) of private sector could be availed through commitment of pesticide industry.

There is need for fast-track transparent time-bound on-line registration system. It will be desirable to ensure participation of industry representative in the CIB&RC. The availability of novel green and safer pesticides would help both the environment and the farmers and would also support 'Make in India' program. Also, re-registration of pesticides

(a mandatory practice after 10 years of registration) be done to make sure that genuine producers continue producing good quality and safe pesticides. National expertise through outsourcing needs to be utilized for fast-track evaluation of registration applications.

The current registration system needs to be revamped based on the recommendations of a duly constituted independent Expert Committee. Registration should be granted on the criteria of safety risk assessment and efficacy. The duration of registration process be made time bound, not to exceed one year for the new molecules and six months for "me too" registration, provided all required data are submitted along with the application. For confidence building, the data generation for new molecules should preferably be through notified/accredited laboratories.

The sale and use of spurious pesticides are indeed a real problem which needs to be addressed on priority. Granting 'me too' registrations liberally without verifying the credentials of applicants could encourage malpractices, which need to be curbed through effective post monitoring inspections and requirement for submission of periodic data on production and sale of such approved pesticides. Production of low quality or spurious pesticides just by a few brings bad name to the industry. It also harms the farmers' income, health, and their safety, including the environmental health. Hence, it must be curbed at any cost and the defaulters be quickly penalized under the law.

For testing quality, there is need to create a chain of 'GLP compliant accredited pesticide testing laboratories' in each state where registrants can get the pesticide(s) tested and certified.

The in-country data for new molecules be generated preferably through notified GLP/NABL accredited laboratories only. A provision for data protection needs to be made for new molecules/formulations, introduced/developed in the country for the first time for a minimum of 5 years from the date of its registration in India.

The heavy workload of CIB&RC, currently with limited staff, has adversely impacted registration timelines for import of new molecules intended for import. The existing process leads to inordinate delays in scrutiny of dossiers requiring a multi-layered approval process. There is urgent need for a quick and transparent on-line registration system which is fully digitized allowing fast tracking of scrutiny status of dossiers as per global best practices.

The recent Government decision to ban 27 pesticides must be revisited which affect 134 formulations registered for use on 74 field and horticultural crops, household insects and vectors, and locust management affecting agricultural production. There appears no scientific basis/rationale for imposing ban and restricting these products from production without a thorough and scientific review. Decisions taken in other countries should not be an important basis for proposing such ban. On the contrary, performance of a pesticide under different edaphoclimatic conditions should be considered to adjudge the pattern of their behavior, residues, degradation pattern, persistence, etc. Moreover, the voice of farmers, scientists, industry, and other stakeholders should be heard before taking any such decision. As per Dr Anupam Varma Committee recommendation, the 27 pesticides notified for ban were the candidates that were supposed to "continue subject to review" based on

data to be submitted over time by the industry which apparently seems to have not been duly followed. Therefore, to ensure transparency, it will be desirable to review the data on priority, as generated by the concerned industry/licensee, through a technical committee and the CIB&RC before taking any final decision in the matter.

There is a serious concern about the proposed ban of Carbendazim, Mancozeb, Thiram and Deltamethrin which are inexpensive and most widely used. This would lead to a collapse of the seed treatment process. Besides, the available alternatives are too costly. Thus, the cost of seed treatment shall go up and will adversely affect the farmers.

As stated earlier, the Government Order (GO) for ban on pesticides minimizes the choice for the farmers and puts them obviously under disadvantage. Therefore, the Government must take a science-based decision, in consultation with, scientists, farmers, industry and other important stakeholders. For example, a recent ban on glyphosate being imposed in different states, a most studied and safe herbicide approved and used in 160 countries including India by paddy farmers and others including the tea growers for efficient weed control, will put farmers and the industry in dilemma, especially when no effective substitute is available and weed management is critical for assured crop production and higher productivity. Further, the mandatory application of glyphosate in the presence of PCOs as per the recent notification by GoI is not feasible since PCOs are not available in most of the villages. Moreover, any such requirement is expected to encourage malpractices thereby impacting farmers adversely.

It is important that we come out with a generic policy on the chemicals that has lasting impact and promotes the growth of agriculture in the country. A stable policy environment and supportive and progressive regulatory system will nurture innovations, offer sustainable solutions to the farmers, and will lead to realize “Discover in India and Make in India” objectives.

For any pragmatic and agriculture centric Pesticides Management Bill 2020, which is now placed in the Parliament for approval, there is an urgent need to consider the 46th Parliamentary Standing Committee Report that had deliberated extensively the earlier PMB-2008 (PMB 2020). In this context, the pragmatic science based recommendations made recently by the National Academy of Agricultural Sciences (NAAS) be the basis for discussing the Bill which include: encouraging indigenous R&D for newer technologies and molecules, removing bottlenecks in the registration process, data protection, establishing accredited laboratories for quality and phytotoxicity analysis, needed trained manpower, curbing spurious pesticides, provision of punishments for malpractices, worker’s safety, biopesticide quality, crop groupings and their importance in the context of pesticide choice for use, resistance management, etc.

To foster innovation and modernization, there is an urgent need to adopt and implement advanced technologies for better, efficient, and eco-friendly environment.

Enabling Environment for Growth of Pesticide Industry

To realize the goal of 'Make in India' initiative, indigenous manufacturing of pesticides, agrochemicals and their raw materials has to be enhanced a great deal for which special manufacturing zones need to be created with common, shared waste treatment facilities and all other support systems. This would not only make India self-sufficient but would help in reducing current imports of active ingredients as well as raw materials/ intermediates, mainly from China. For 'Atmanirbhar Bharat', enabling policies around efficient regulatory system, simplified guidelines, incentive through intellectual property (IP) protection and promotion of exports need to be put in place urgently. Also, there is need to create cluster areas for the agrochemical industry.

A 'National Council on Agricultural Development (NCAD)' on lines that of GST as recommended by Dr RS Paroda Committee, needs to be established urgently under the chairmanship of Prime Minister ensuring effective coordination and monitoring.

Urgent action is required to decriminalize the agro-input manufacturing sector without compromising the purity, biosafety, and quality of pesticides, since it can be counter-productive resulting in a negative investment climate.

Comparing global scenario, India has registered very few products (around 270) denying wider/better choice of options to farmers for insect-pest management. Protection of regulatory data (PRD) encourages innovators to discover, protect, register, and produce new solutions. In addition to manufacturing and R&D capabilities, this ensures India's position as an investor's hub. PRD will accelerate introduction of safer crop protection product, data generation for Maximum Residue Level (MRL) setting, ensure proper product use from discloser to prevent unfair use and setting up R&D facilities.

India lacks in the skill and practice of assessing unregistered pesticides in imported commodities. Hence, as per international norms, GoI needs to build its capability for the detection of pesticide residues in imported commodities and reject them based on presence of pesticide residues otherwise not registered in India. This shall protect India from non-tariff trade barriers otherwise imposed by many countries.

There is an urgency to alleviate trust, transparency and honesty deficits all along the value chain to create a level playing field and to establish effective collaboration between public and private sectors.

There is need for a clear policy direction and support to move forward to register and release biopesticides such as neem, Bt, Trichoderma, etc. Today, though the development of neem-based pesticides in India is satisfactory, the overall progress on biopesticide front is not encouraging due to lack of required industry support and enabling policy environment.

Strengthening Pesticide Research and Innovation for Development

There is an urgent need for intensifying research on design and discovery of new green molecules as a national priority in the spirit of 'Atmanirbhar Bharat' and 'Make-in-India' initiatives and investment in R&D of new molecules needs to be enhanced substantially. India must become a R&D and manufacturing hub for crop protection chemicals and try to become self-reliant.

A 'Centre of Excellence' on Agrochemicals with multifaceted wide spectrum and modern bio screening facilities needs to be established urgently at IARI, New Delhi, to be gradually elevated to a National Research Centre (NRC) on Agrochemicals, to lay high priority on developing new molecules and undertake related multifarious R&D activities using best techniques and the latest facilities.

Greater thrust needs to be given to develop low-cost technologies for mass production and bulk availability of biocontrol agents and biopesticides. Careful choice of potential candidates to be used as botanicals/microbials for investigation is essentially required.

There is a need to evaluate critically economics, performance, safety of the newer formulations, increased use of slow/CR products and to develop pesticide residue test kits to detect spurious pesticides.

To ensure safety measures, there is need for data generation under varying agroclimatic conditions, newer methodologies for validation in multiple GLP/accredited laboratories, conducting transformation and toxicity trails of products, and increased efforts on MIP for more precision, etc. The TAAS has played a significant role in spearheading this initiative as follows:

> *TAAS has spearheaded in giving recommendations to improve Pesticides Management Bill 2020 for the benefit of farmers and other stakeholders. The PMB 2020 was introduced in Rajya Sabha on March 23rd, 2020. Rajya Sabha referred it to the Standing Parliamentary Committee on Agriculture on June 3, 2020. Dr. R. S. Paroda as chairman TAAS and President Indian Society of Plant Genetic Resources pleaded before the Committee and insisted on relevant points emphatically. The Report of SPC has been submitted on December 21, 2021. When approved by Parliament, it will have greater impact on farmers, industry, and other stakeholders.*

Public Awareness

I. Motivating and Attracting Youth in Agriculture

The global population is expected to be 9 billion by 2050, and youth would represent around 20 per cent (FAO, 2014). Most young people (around 85 %) live in the developing countries. India has a comparative advantage over other countries in terms of its young population. As per India's census, the total youth population increased from 168 million in 1971 to 422 million in 2011. In 2017, 356 million, against China's 269 million. India's population is expected to remain young longer than that of China and Indonesia, the two major countries, that along with India determine the demographic features of the Asian continent. India also enjoys a demographic dividend with more than 60 per cent of its population of working age. According to a World Bank report, the working age population will outnumber the dependent population for at least more than two decades (until 2040) in India. As per the estimates of National Higher Education Commission (NHEC), the average age of the Indian population in 2020 will be 29, as against 40 in the USA, 46 in Europe and 47 in Japan. Still agriculture remains the key sector, providing livelihood and employment opportunities to more than 60 per cent of India's population living in rural areas. Overall, in the developing world, youth and agriculture are the twin pillars of progress and prosperity, especially for achieving sustainable development goals.

Major Challenges

In the recent past, retaining youth in agriculture has been one of the major challenges in the developing world. Youth do not find agriculture a creative, profitable and above all a respectable profession which can provide better living conditions. Thus, we see an exodus of youth from rural to urban areas in search of alternative employment. The challenges of retaining youth in agriculture include insufficient access to knowledge, information, and education; limited access to land; inadequate access to financial services; lack of formal and informal on-the-job training; limited access to markets; and limited involvement in decision-making and policy dialogues. Over the years, the farming community has become gradually poorer due to small land holdings, which comprise over 80 per cent of total farm households. Multiple risks associated with agriculture intensify the challenges owing to over-exploitation of natural resources linked with rapidly increasing globalization, soaring fuel and food prices, volatile markets and growing climatic volatility. Youth is a great resource, energetic, innovative, more receptive to new ideas/advanced technologies, have courage and risk taking, to be used for agricultural development not as job seekers but job providers. In the past few decades, because of rapid industrialization and urbanization, youth and agriculture are experiencing unprecedented transformation. Another major dilemma in the developing world is the poor social image of agriculture due to which, rural youth are moving towards the urban sector, looking for alternative and better basic amenities and opportunities. It is evident through successful business models of leading public and private sector organizations, as well as multinational companies (e.g., IT sector), that youth are more innovative and productive as well as receptive to new technologies and innovations. On the contrary, in the agriculture sector there is a wide gap between enthusiasm, energy (youth) and traditional wisdom, and experience (older people), which is a cause of backward nature of farming and slow adoption of innovations and new technology. There are significant losses in the technology dissemination process, delinking science with society and making farming non-remunerative, non-resilient and unattractive to youth.

Fully realizing the current and emerging critical role of youth in agriculture TAAS has organized 4 activities since 2013 to create public awareness and suggest roadmap for harnessing unlimited youth wealth of India and developing countries for promoting ARI4D, agri-business and SAD in general. The TAAS has thus sown the seed of transformative change in agriculture through harnessing youth wealth of the country.

Foresight and future pathways of ARI4D through Youth

Currently, the country has around 7,000 agricultural scientists in India's public sector, of which more than 35 per cent are below the age of 40. TAAS organized two days of deliberations in 2013 covering a wide range of disciplines and issues related to Indian agriculture, natural resource management, crop improvement and protection, horticulture, post-harvest technology, livestock and fisheries development, agricultural engineering and implements, information communication technology (ICT) and socioeconomics. The deliberations identified research needs across disciplines and regions where youth can play

a prominent role. The key recommendations of the deliberations included: the urgent need to reorient agricultural research towards a farming systems mode by ensuring inter-institutional and interdisciplinary collaboration; creating state-of-the-art research facilities; undertaking joint research with the private sector and international/ advanced research centres through the creation of excellent research infrastructure; provision of a seed grant (Rs.10-15 lakhs) encouraging scientists to initiate research; provision of special project for young scientists to be made through competitive research at the national level by ICAR, short to long-term training for young scientists at advanced research institutions; emphasizing greater involvement of young scientists, women in decision-making bodies; and greater emphasis on human resource development through special allocation of funds for skill development and institutional grant and administrative freedom to presentation of research work in international conferences and its publication in referred journals.

Attracting, motivating, and retaining youth in agriculture

In the context of global population expected to be around 8 billion by 2025, ageing rural population, better opportunities outside agriculture, declining natural resources, emerging climate challenges, question is raised as to who will feed the world tomorrow, how will we meet SDGs? In this case, the role of youth in accelerating agricultural growth cannot be underestimated. In fact, those countries have progressed much faster where youth has been motivated to get involved mainly in creative secondary and specialty agriculture-supported well by an enabling policy environment. Realizing this TAAS in association with ICAR, MSSRF, APAARI, YPARD, Skill India, ASCI and NABARD organized a regional conference in New Delhi in 2018 of South Asian Countries in which 227 participants attended.

The Road Map

For attaining the sustainable developmental goals (SDGs) faster, all nations in South Asia need to develop and promote a sound strategy around "Role of youth for accelerated growth in agriculture" for which the following 'Road Map' offering the youth many opportunities for economic, social, and agricultural development was proposed at the conference:

• There is an urgency to have a 'National Mission on Youth in Agriculture' with an aim to impart better knowledge and skill to youth on: i) sustainable, secondary and specialty agriculture, ii) efficient knowledge dissemination, including information communication technology (ICT), iii) technical backstopping for innovative farming, iv) new agribusiness models, and v) entrepreneurship as well as linking farmers to markets through value chain. Under the Mission, concerted efforts are needed to build new skills of youth for innovative agriculture through both formal and informal education. The best option for this is to impart agricultural education right from school level. In addition, the central and state agricultural universities and ICAR institutes must initiate entrepreneurship training through vocational and formal diploma programs. Also, the university curriculum needs to be revisited to address the emerging needs and aspirations of present-day youth and markets.

• Priority attention needs to be given to develop a new research agenda for 'Youth-Agriculture Nexus' which (i) delineates different contexts for youth-oriented agricultural

research, (ii) identifies opportunities for young people's engagement in agricultural research and innovation for development (ARI4D), and (iii) determines youth's future pathway for attaining sustainable agricultural growth and income.

• Involvement of youth in 'Plough-to-Plate' initiative can help in doubling farmers' income. Hence, their greater involvement as entrepreneurs will be the key to future growth and development. For this, networking for knowledge sharing/dissemination, participation of youth in out-scaling of innovations through their validation using technology parks/innovation platforms, use of ICT, creation of agri-clinics, much needed support for mentoring/handholding, and awareness regarding intellectual property rights (IPRs) need to be the essential components of the proposed mission on youth.

• There is need for a paradigm shift from narrow focus on 'youth as a farmer' to 'youth for value chain development'. To provide better economic opportunities for rural youth in the changing agricultural scenario, there is an obvious need to move beyond the plot/field level agriculture i.e., from production to post-production level and to link with market for better income opportunities. The combination of agricultural value chains, technology and entrepreneurship will unlock vast economic opportunities. Triggered by the idea of the dire need for giving attention to harness youth wealth for SAD by TAAS organized national workshop of 2013, a project on Attracting and Retaining Youth in Agriculture (ARYA) was initiated by the ICAR during 2015-16 and is being implemented successfully by the Krishi Vigyan Kendras (KVKs) in 25 states (one district from each state) of India. The overall objective of the project is to attract youth to agriculture and empower them. In the project youth are oriented to 21 agriculture and allied enterprises and they have established entrepreneurial units earning on an average about Rs. 10 to 12 thousand per month. To share the ideas, experiences of successes, challenges and opportunities under ARYA have been shared at a regional workshop organized/hosted in Hyderabad by PJTSAU in association with TAAS, APAARI, and ICAR-NAARM in 2019. The purpose was to discuss and suggest measures for solving problems, providing inputs for creating needed policies and most importantly a networking among the stakeholders. Several practical/useful recommendations from this workshop targeting Universities, Industries and Government are made to for making the farm a viable business enterprise. Yet another regional workshop on the same topic in north India with the same objective was jointly organized by PAU, TAAS, ICAR-ATARI at PAU, Ludhiana during 2020. Several very useful recommendations are made to promote ARYA/MAYA through vocational trainings, empowering youth with knowledge and upscaling skills in priority areas, promote farm mechanization through custom hiring services, creating venture capital, creating agri-clinics, providing institutional support to promote entrepreneurship, etc. The role of TAAS is as follows:

> *Fully realizing the current and emerging critical role of youth in agriculture TAAS has organized four activities since 2013 to create public awareness and suggest roadmap for harnessing unlimited youth wealth of India and developing countries for promoting ARI4D, agri-business and SAD in general. The TAAS has thus sown the seed of transformative change in agriculture through harnessing youth wealth of the country. In the context of global*

population expected to be around 8 billion by 2025, ageing rural population, better opportunities outside agriculture, declining natural resources, emerging climate challenges, question is raised as to who will feed the world tomorrow, how will we meet SDGs? In this case, the role of youth in accelerating agricultural growth cannot be underestimated. In fact, those countries have progressed much faster where youth has been motivated to get involved mainly in creative secondary and specialty agriculture-supported well by an enabling policy environment. Realizing this TAAS in association with ICAR, MSSRF, APAARI, YPARD, Skill India, ASCI and NABARD organized a regional conference in New Delhi in 2018 of South Asian Countries in which 227 participants attended. Thus, the role of TAAS in creating awareness in India and neighboring countries on the role of youth and the roadmap to involve them in a big way to promote SAD is significant (TAAS, 2021).

II. Women Empowerment for Agricultural Development

Agriculture is the backbone of Indian economy. Women do play a crucial role in building the economy. Over the years, there is gradual realization of the key role of women in agricultural development and their important contributions in the field of agriculture, food and nutritional security, horticulture, livestock, fisheries, processing, sericulture, and other allied sectors. Rural women are thus the most productive workforce in the economy of developing nations, like India. Their activities typically include producing agricultural crops, tending animals, processing, and preparing food, working for wages in agricultural and allied rural enterprises, collecting fuel and water, engaging in trade and marketing, caring for family members, and maintaining their homes. Many of these activities are not defined as 'economically active employment' in the national context but they are critical for the well-being of the rural households. Statistical data are available regarding their participation in the agriculture sector and allied activities but their impact on the home environment has not been accounted for. Variations in women's participation in agricultural work depend on supply and demand factors linked to economic growth and agricultural modernization. Farmwomen do have an impact on their children's education, as they often encourage them to be educated to have a better life. Women have different roles to play.

Empowering Women in Agriculture

India is at the forefront for acknowledging role of women in agriculture. India has established the World's First National Research Centre for Women in Agriculture (now ICAR-Central Institute for Women in Agriculture) in Bhubaneswar way back in 1996. The Institute has been engaged in developing methodologies for identification of gender implications in farming systems approach and developing women friendly technologies under different production systems. Empowerment process is strengthened through educational interventions, transfer of technologies, feasibility trials and knowledge-sharing. The Institute also emphasizes on undertaking vocational trainings to impart skills necessary to undertake different vocations and to relieve women from drudgery by providing time and laborsaving tools and equipment. Empirical evidence suggests that women have moved from beneficiaries to active partners in shaping empowerment. Recognizing the role of women in agriculture, Dr M.S. Swaminathan had proposed to move

the "Women Farmers' Entitlement Bill" 2011 in the Rajya Sabha that seeks, inter alia, access to water, credit and inputs, land ownership for women-farmers as a policy reform to create enabling environment.

First Global Conference on Women in Agriculture

Fully realizing that empowerment of women is a pre-requisite for inclusive growth, the Global Conference on Women in Agriculture was organized in 2012 by GFAR, APAARI, ICAR and TAAS in New Delhi, India (TAAS, 2021). It was well attended (760 participants) and more than 150 women experts from 37 countries participated. After deliberations, it was emphasized to develop an Action Plan to integrate and empower women for inclusive growth and development through an enduring global partnership program on gender in agriculture. Such Action Plan needs emphatic interventions by national and international agencies to ensure enhanced involvement and access of resources to women. It was felt that considering the urgency of addressing the gender- related issues in agriculture globally, a common knowledge sharing platform on gender 'Gender in Agriculture Platform for Gender in Agriculture Partnership (GAP4GAP) is needed, which can help in collaborative working at the national, regional, and global level. The platform should involve partnership from research and developmental organizations, national governments, regional and global fora, multilateral development agencies and donors and should act as knowledge repository and provide space for both policy research and advocacy on gender-related issues in farming systems and rural ecologies. The GAP4GAP can provide technical backstopping, guide for future investments, and facilitate effective networking and collaboration among partners and stakeholders. The gender-related initiatives would need generation and documentation of gender segregated data, linking women's role to health and nutritional security at the household level, enhanced visibility for role of women, generation of knowledge and evidence for support and contextualization of global issues to suit local needs. Such new programs on gender empowerment would require adequate resources for mobilizing women, forming groups, improving capacity and capability in technical, organizational, and commercial (business micro-enterprises) sector and support systems (credit, inputs, markets). These should be prepared jointly in consultation with women, other relevant organizations (public, private and voluntary), which can potentially complement and supplement the efforts of other stakeholders.

Women and Household Nutritional Security

Empirically a strong linkage among agriculture, nutrition and empowerment of women is well established. Malnutrition is a big problem in the developing countries, and especially in girls in rural areas. Nutritional insecurity is a complex issue and involves a multi-sectoral solution. Control of women over household income is linked invariably with improved nutrition, health, and education of children. For household nutritional security, efforts are needed to integrate scientific and socioeconomic aspects to empower women and form "nutrition umbrella base", which can help developing an integrated strategy. Enhanced government investment, awareness, capacity-building, and micro-enterprises

should supplement these endeavors. Scientific institutions should produce effective technologies, database, knowledge on nutrition-rich food, and value-addition by involvement of women groups for nutritional security. Agricultural research and Innovation for development (ARI4D) system should move towards innovations not only on nutritional aspects but also on increasing women farm-work efficiency and to reduce their drudgery in farm operations. This process would require reorientation towards more gender sensitive innovations with emphasis on empowerment of farmwomen, including their financial empowerment. The new business models and agricultural marketing strategies should encourage women-members as part of producers and marketing associations. Such efforts should be backed by overall strategy to improve market access through development of market infrastructure and better access to information through information communication technology (ICT). For this, there is a need to revisit our agricultural education system, to encourage innovations in research out-scaling-marketing pathways and to augment role of women in policy planning and decision-making.

Ensuring Visibility of Gender

Despite growing evidence of substantial role of women in agriculture and household food and nutritional security, many policymakers and agricultural scientists and development professionals are yet to recognize their important role in agriculture. As a result, agricultural policies and R&D programs in many countries continue to be gender-blind, ignoring importance of women's work, and complexity and sensitivity of many of the barriers that constrain farm-women's abilities to perform and contribute efficiently and effectively to improve economic status of their families and, also the society. Ironically, most of the rural women are not so conscious of the economic and social importance of their work, and hence hesitant to demand any recognition, or rights for their contribution

Way Forward

It has been amply justified women do play a vital role in wide range of agricultural activities, thus contributing to sustainable agricultural development. To achieve inclusive agricultural growth, empowering women for their greater participation, gender issues, drudgery and health and nutritional status is extremely necessary. Further, these issues are to be addressed through gender-friendly technology assessment, refinement, and extension methodologies. If we look at women's role in food production, we can notice enormous discrimination– women in the sector receive less than 10 per cent of credit offered to small-scale farmers. The Food and Agriculture Organization of the United Nations (FAO) has estimated that if women farmers had the same access as men, agricultural output in 34 developing countries would have risen by an estimated average of up to 4 per cent. This would have reduced the number of undernourished people in those countries by as much as 17 per cent, translating to up to 150 million fewer hungry people. Thus, investments in women and overcoming their drudgery are perhaps the best actions for future development. There is clear evidence that when women farmers have opportunity to earn and control home income, they are more likely to spend on their children's nutrition, education, and health. Improving the knowledge and status of women would, therefore, deliver significant outcomes in terms of agricultural production, food security, child nutrition, health, and

education, thus would be contributing significantly towards Sustainable Development Goals (SDGs). In view of this, urgent action is required at the national, regional, and international levels on the following:

• There is a need for collective advocacy to raise awareness of women's needs in agriculture and to ensure their visibility in terms of valuable contribution towards agricultural development

• Women need to be educated and empowered to make their own choices for better farming options and for responding to new opportunities for diversified agriculture and better living

• Women's ability needs to be increased to enable them to actively participate in the development processes by changing their perceptions and increasing awareness for greater social responsibilities

• There is a need for encouraging collective action and leadership among women to develop programs that directly address women's needs and to make agricultural support systems gender-sensitive

• Sincere efforts need to be made for removing drudgery of farm women by ensuring access to new tools and implements that increase efficiency and higher productivity. Also, reorient agricultural research for development (ARI4D) agenda to be gender-sensitive and pro-women

• An urgent attention is needed to address the discrimination through appropriate policies, legislation, enforcement mechanisms and establishing women's rights (e.g., access to markets, ownership of land)

• It must be ensured that the institutions and legal support mechanisms are in place to promote women's ownership and control of resources (e.g., land, bank accounts, farm implements)

• Social, educational, and cultural institutions also must change to create an environment where women realize their full potential. Engendering farmwomen thus is a high national priority. For this, investment in women's human capital through education and training for skill development is very critical for productive use of their abilities, time, and energy. The role of TAAS in this initiative is as follows:

> *India is at the forefront for acknowledging role of women in agriculture. India has established the World's First National Research Centre for Women in Agriculture (now ICAR-Central Institute for Women in Agriculture) in Bhubaneswar way back in 1996.Fully realizing that empowerment of women is a pre-requisite for inclusive growth, the Global Conference on Women in Agriculture was organized in 2012 by GFAR, APAARI, ICAR and TAAS in New Delhi, India. It was well attended (760 participants) and more than 150 women experts from 37 countries participated. After deliberations, it was emphasized to develop an Action Plan to integrate and empower women for inclusive growth and development through an enduring global partnership program on gender in agriculture. Such Action Plan needs emphatic interventions by national and international agencies to ensure enhanced involvement and access of resources to women. It was felt that considering the urgency of addressing the gender- related issues in agriculture globally, a common knowledge sharing platform on gender 'Gender in Agriculture Platform for Gender in Agriculture Partnership (GAP4GAP) is needed, which can help in collaborative working at the national, regional, and global level.*

Raising the Voice Beyond the Border

I. Concerns on One CGIAR Reform Process

Strong partnership for ARI4D is very critical for our food security. The strong partnership and working relationship between CG centers and the developing country NARS helped to achieve the green, white, and blue revolutions and food security. It is this strategic partnership that was the cradle of success during the last 5 decades and helped many nations achieve food self- sufficiency and address effectively both hunger and poverty. It was possible because all the CG Centers had the functional autonomy to work closely with the NARS. Also, the unrestricted funds provided by the donors had helped these Centers to respond effectively to the location specific research needs of respective partners, besides providing the required support for capacity building so critical to upscale and out scale innovations.

But the CG Centers got a big jolt when some major donors felt that autonomous function of Centers is not conducive for required administrative efficiency nor coherent for decision making. Consequently, the entire CGIAR system has been subjected to the One GIAR reform process with the expectation that donors would commit additional funding under non-restricted windows, also commit long term investments in One CGIAR.

As a reform process, the System Council was reconstituted with only the major donors as members having the voting rights and a System Board for all Centers was established with 8 members having inadequate representation from Global South. Further for each Center Board these 8 members with voting rights are common, besides the ex-officio members from the host country NARS surprisingly with no voting rights. This clearly reflects the fact that Global South has either been ignored or treated differently. Also contrary to expectations, despite 4 years of long drawn reform process, evidently no additional funding has become available reflecting the fact that there has not been any positive change in Funder's perception regarding the need for additional funding. On the contrary, a top-heavy bureaucratic system has been created between the Director Generals and the Program Directors for different eco-regions. There are many other distortions wrt strategic research planning, legal agreements with host country, and above all the impacts of the reform process without active, willing, ownership, involvement and representation of the global South may be highly challenging on the ground. Voice and consultation with the Global South completely ignored. Further, organizations such as FAO, IFAD, GFAR, Regional Fora, Heads of NARS are not heard as voting members of either System Council or System Board. The role of TAAS in addressing this issue is as follows:

> *In the backdrop of these concerns on the One CGIAR Reform process, on 8th March 2022, the President of AfDB made a statement for involving representatives of global South in the One CGIAR Reform process. Dr. R. S. Paroda, Chairman, TASS responding to this statement on 9th March 2022 itself while sharing the development with national and global leaders wondered how there would be real ownership and expected impact without the voice and involvement of those from South. Thus, the follow up on addressing the concern began in right earnest. On 10th March 2022, Dr. Paroda sent an email to Juergen Voegele, Chair, System Council, CGIAR about the concern and requesting for initiating corrective action immediately. Appreciating the stand and voice raised*

by Dr. Paroda, beginning 12th March 2022 itself many NARS and global leaders, experts wrote letters of support to Dr. Paroda. On 2nd April 2022, 75 very eminent agricultural experts all over the world have represented with the Chair, System Council for intervention and take corrective steps to make the process of reforms truly transparent and bottom up as well as inclusive. As a further a follow up, NAAS in association with TAAS organized a regional consultation on 2nd April 2022 with very senior national leaders along with South Asian leaders (Nepal, Bangladesh, and Sri Lanka) and resolved, represented that a process of stake holder consultation involving all stakeholders be initiated urgently by System Council and System Board to finalize research priorities for the region. This initiative be institutionalized as South Asia Agricultural Development Program (SAADP) similarly to CAADP adopted by political leaders in Africa. Further, Dr. R. S. Paroda on 22nd May 2022 while forwarding the address of President AfDB on 19th May 2022 to the leaders of Indian NARS expressed that it vindicates what the joint letter by them had communicated to the Chair, System Council on 2nd April 2022 and hoped that corrective measures are taken before it is too late.

It is somewhat satisfying that the Chair, System Council replied to Dr. Mohapatra, Secretary DARE & DG ICAR on 4th May 2022 to the representation/recommendation of the Regional Expert Consultation at New Delhi on 2nd April 2022 that he has read the summary points with interest and found many of them relevant for improving the transition to One CGIAR, deeper discussion with the stakeholders on the issues raised. He has passed on the summary points to Marco Ferroni, Elwyn Granger-Jones and Temina Lalani-Shariff and asked them to consider the Panel's recommendations and discuss them further with DG, ICAR. As a follow up, Marco Ferroni and Elwyn visited India and had a meeting with DG ICAR on the follow up plan on the issue. Thus, we can see the One CGIAR Reforms concerns are being addressed and TAAS is playing a pro-active role in monitoring the developments under the leadership of Dr. R. S. Paroda.

II.Concerns on One CGIAR System Board to exclude Gene Banks of CIFOR, ICRAF and ICRISAT from financial support and continue as a part of Gene Bank Network

After the Convention on Biological Diversity enter into force in 1994, the CGIAR Centers and FAO signed "in-trust" agreement requiring the Centers to maintain and freely distribute PGRs housed in their respective Gene Banks for Food and Agriculture (PGRFA). Subsequently in 2004, when International Treaty on PGRFA (ITPGRFA) entered into force, the 11 CGIAR Gene Banks signed MOA with the Governing Body of the Treaty under Article 15 for "ex-situ" conservation of collection of PGRFA held by the IARCs of CGIAR and other International Institutions.

The PGRFA collections are maintained by the 11 CGIAR Centers and 3 other International Centers' Gene Banks. These Centers are doing noble service to humanity by providing genetic resources freely for the development of high yielding, disease-resistant, climate resistant and highly nutritive varieties. These Centers hold more than 7 lakh germplasm accessions of crops, forages, and trees.

It is now known that 3 CGIAR Centers (CIFOR, ICRAF and ICRISAT) have opted out of One CGIAR system. It is also known that the CGIAR System Board has decided not to allocate any funding to these the Gene Banks of these three Centers despite that Article 15 agreement with the Plant Treaty's Governing Body remains in force. In fact, these Gene Banks are obliged to continue serving the international community. ICRISAT Gene Bank houses germplasm of millets which are so important for drylands in Africa and India where

77 per cent of the world population reside. The CIFOR and ICRAF Gene Bank is the only seed bank in the entire world exclusively dedicated to the conservation of diversity of a wide range of agroforestry tree species so important for ecosystem services and excellent source of food and fiber. As per the One CGIAR reform process, the control of genetic resources held in these three Gene Banks will be taken over by One CGIAR without seeking the consent of FAO and concerned countries. This will be a violation of host country agreements with CGIAR Centers and will have legal implications which need to be addressed appropriately.

Hence FAO must ensure that all the Article 15 Gene Banks continue to work as a network, since germplasm exchange, conservation, and use of PGRFA is extremely critical to safeguard future agriculture. The ICRISAT, ICFR-ICRAF Gene Bank should continue uninterrupted service for the cause of PGRFA exchange, conservation and use despite being now being independent of One CGIAR.

Accordingly, Dr. R. S. Paroda, Chair TAAS requested Dr.(Ms.) Yasmina Bahloul Chair, Bureau of 9th GB Session of the Treaty Secretariat on 22nd June 2022 to include the above concern as an important agenda item to be placed before GB9 scheduled to be held in September 2022 with an update on the status of all Article 15 Gene Banks for discussion, review and decision to ensure that these Gene Banks are operated and maintained as per international standards, if needed a separate MOU may be signed, the long term funding of all the Article 15 Gene Banks should be ensured possibly through GCDT or special funding support through FAO or through host country Government to avoid any kind of disruption in the efforts consistently made during past decades for SAD in global South.

***Responses**:*

*"Many thanks for raising these crucial issues and speaking truth to power. Since silence is complicity, and you are doing a great job championing the case for the real beneficiaries"-**Tony Simons, Executive Director, CIFOR-ICRAF; DG, ICRAF dated 22nd June 2022***

*"Thank you for sharing this and it could not be a time liner intervention! Very much appreciated."-**Hughes Jacqueline, DG, ICRISAT dated 22nd June 2022***

4.3 TAAS Engagement with Stakeholders

TAAS has a successful partnership and engagement with diverse stakeholders/thought leaders in India, region, and globe. Therefore, the review also assessed TAAS performance through opinion survey of stakeholders and thought leaders located in India, region, and the globe. The results are presented under Key Responses, Bright Ideas on Key Programs/Activities for the future, Reflections of Stakeholders on Key Publications, TAAS in Media and finally TAAS Outcome. From the responses received through Survey Annexure 1&2 (in Annexure V) key responses are culled out after suitably editing and presented below under 4 questions. As can be seen, the responses are frank and clear about the activities, working and performance of TAAS during last 20 years and suggestions for future. The responses also cover 40 specific bright ideas for TAAS to plan and organize activities keeping in view emerging and anticipated complex challenges of AFSN and SAD

2030. The reflections of stakeholders on 2 key publications are also provided to highlight how useful they were on the subject and their appreciation for TAAS for publishing such valuable publications to create public awareness in science and innovations for policy making and development.

4.3.1 Key Responses

1. What do you think is working well in TAAS? Which activities of TAAS made maximum impact?

- TAAS has served well as a peer of ARI4D and social role as a watch dog for right action by all the concerned. It has raised the stature of agriculture and its importance in economic growth, provided pride to agricultural science, scientists, educators, agri. industries, farmers, helped to get respect from other professionals
- TAAS by virtue of its vision, hard work and commitment has already emerged as an effective think tank to promote Agri sciences not only in India, but also regionally in south Asia and globally.
- Symposium and seminars on emerging/contemporary issues and new developments in science by creating multistakeholder interfaces impacted/influenced scientific community/all stakeholders with increased knowledge/ facilitating cross learning, collective thinking/networking of knowledge dissemination agencies/awareness raising/information dissemination (both science as well as how science can contribute to informed decision making) and policy makers with science behind development issues. The regional dialogues played critical role in bringing relevant key stakeholders together to discuss transboundary challenges and needed strategies and actions.
- All activities are purposeful, paid rich dividends and in many instances very impressive, walk the talk on the recommendations and not just reports as is often the case. This should continue. Biotechnology, regulatory mechanism for gene editing in plants, policy papers/briefs made maximum impact. TAAS has been able to fill gaps between academic research and policy making.
- Provided unbiased (functioning independently without Govt influence) policy advocacy/guidance on key issues of national and global importance in agriculture. Policy briefs are good learning materials. The most significant contribution is in the form of neutral platform for interdisciplinary work and multi-stakeholder discussion, created scientific temper on important issues through its activities
- Recognition of global leaders with Dr. M. S.S awards has contributed to global visibility of TAAS.
- The stature of Dr. Paroda helps in putting across the combined views of different stakeholders to the policy makers on many matters of national importance. This is the greatest strength and contribution of TAAS. Dr. Paroda through his own work, publications and lectures, establishment of APAARI, GFAR and creating network/s of regional and national NARS associations commands respect of one and all and

it is necessary to list all these activities of TAAS under his leadership, formally and informally.

- TAAS serves as a model of providing evidence-based, science- based solutions for policy impact on priority topics in Indian agriculture is extremely important and should continue with focus. Its inclusive model of engaging stakeholders from across the ARD sector including the NGOs and private sector is laudable.
- The TAAS interactions have brought a positive change in science based agricultural production system and overall growth of NARS
- Direct communication with key policy makers on critical issues made big impact
- TAAS's major impact has been as a convener and provider of a platform for meaningful exchange of views among various stakeholders in the field of agriculture and allied activities, rural development, NRM, women and youth empowerment, India's international commitment in terms of SDGs, climate change, biodiversity etc.
- TAAS has made a major contribution in providing the bridge between academic community, development professionals, private sector, civil-society, and policy makers. It has added significant value to the process of making policies and providing feedback of implementation
- It has demonstrated, being a pioneer in the field, the usefulness of a quality think tank in the field of agriculture and rural development. Through its meticulous record keeping and documentation, it has been able to communicate through its policy briefs and garner attention of policy makers as well as the scientific community and other stakeholders the outcomes of its various activities, national and international.
- TAAS has institutionalized a culture of healthy dialogue between the academia and policy makers which has now become the norm.
- The Chairman of TAAS, R.S. Paroda due to his own position as a former Secretary DARE and DG, ICAR as well as his eminence in the international scientific community and the UN Organizations has been able to impart visibility and network TAAS into a highly recognized and credible think tank. TAAS's strength is huge and long experienced leadership.
- All activities especially in the international context along with the lectures, publications, and informal lobbying have had the most impact.
- The outreach and the series of BSSs on high priority policy and technology issues have made huge impact on the stakeholders, policy makers, donors, and industry, brought to focus international perspective.
- TAAS has been publishing high quality policy papers and documents based on outputs of high-level discussions and debates, worth reading and recording. These two activities are closely linked and contribute towards favorable outcome. TAAS should keep following this approach

- TAAS unifies/converges the voice of the globe for concerns on great leadership, inclusive and transparent partnership/networking to make the global system efficient, inclusive, and transparent

2. What do you think is not working well in TAAS?

- Did well in good and timely publications, mostly good in creating public awareness but the change made is not known.
- Since most of the convening platforms have had ICAR as an active partner, it might be difficult to assess to what extent final policy outcome has been influenced by the recommendations emerging from the exercise convened by TAAS and to what extent the internal processes of ICAR already came to the same position (attribution problem). In any case, the Policy Briefs, and other inputs to Govt provided by TAAS is rarely publicly acknowledged.
- Follow up of TAAS advisories is less, there exists gap between what is recommended and followed by Govt., even 40 per cent adoption by Govt is creditable
- TAAS need to be bit more proactive, it appears now as a science event management organization/company
- Scope exists for professionalizing/streamlining activities/work streams of TAAS
- Inhouse capability to undertake multiple activities is most inadequate. Some minimum critical mass of core staff strength in key areas of work and support system is a must
- If TAAS is receiving funding from GoI/ICAR/MoA&FW, then it may pose some limits/hesitations on TAAS's objectivity and independence.
- Limited specific activities have been organized in livestock sector, not decentralized, younger and women scientists not much involved

3. Do you suggest TAAS to continue with existing activities or change for even better performance?

- Since all activities are important and TAAS has performed them exceedingly well, they should continue but with change to take care of some gaps observed earlier (immediately to be addressed), address emerging challenges (medium run) and anticipated challenges (long run) so that TAAS will always remain at the cutting-edge level of excellence as a credible think tank of global reputation. It may think of filling up gaps immediately, incremental changes in the medium run (next 4-5 years) and radical changes in the long run (after 5 years, beyond 2030).
- Involve more scientists from other fields. Go beyond crop activities, cover animal, fisheries, insects, microbes, etc. emphasize exports. involve retired scientists to reach to farmers, prepare a directory of retired scientists who are actively connected and contributing to help farmers through some projects. Involve more government authorities in policy and development related activities to help making impact and implementation. Number and frequency of TAAS activities should be increased.

Initiate new programs in Diversity, Equity, and Inclusion (DEI) in agricultural systems and programs to enhance engagement of NRIs living abroad-engagement of Indian Diaspora

- For next decade, focus on enhancing scientific rigor and quality in education. Should provide greater support to ICAR to strengthen NARS to meet the new, emerging challenges and needed deployment of new tools/technologies/products.
- TAAS may consider yearly recognition conferred on deserving young researcher, women researcher through facilitating an international fellowship program
- Focus more on reform and restructuring of Agri-sector including Govt funded support services such as agricultural education, research, extension, administration of institutions. Strengthening institutions to cope with newer challenges in agriculture production and post-production system. TAAS should add to the process of forecasting the future needs of AR4D. Third party, independent objective evaluation and social auditing of projects and 100s of recommendations of TAAS necessary. TAAS should create a mechanism of follow up/monitor of its recommendations at the policy making level and publish how many of them have been implemented. It will be an important contribution. Region/state specific BSSs/workshops may be organized involving all the concerned to trigger policy implementation
- Now it is right time to expand activities in livestock, and allied sectors so that visibility of TAAS will be enhanced.
- Keeping in view increasing population, TAAS should fill the gap between supply and demand for advanced technology to the farmers which will benefit farmers and the nation. TAAS should give priority to climate change and its challenges in farming, one health issue, scientific communication, vibrant innovative extension system establishment, and better education policy matching with NEP 2020
- There are many NGOs/CSOs engaged in implementation of projects at grassroot level. TAAS can partner or collaborate with them but not get involved in implementation at the grassroot level. TAAS should work on strategies that will encourage and enable enhanced participation of grassroot level organizations/workers in the activities of TAAS.
- The appeal of the technical publications could be enhanced by adopting a system of manuscript refereeing and professional editing for which appropriate monetary compensation may be provided as an incentive.
- TAAS may elucidate scientific efficacy of some of the recommendations of the Govt and other stakeholders which seem to be devoid of scientific evidence such as blanket recommendation on adoption of natural farming
- TAAS is already a recognized credible body. It can now take up some interface extension activities to promote lab to field transfers and connecting farmers with high end science and research organizations once or twice a year to identify key

research gaps which can be addressed by high end research institutes so that local farmer's problems can be solved through high technology solutions

- Increasing number of national/international dialogues on agricultural development for changing situations and guiding, supporting, and motivating Agri-startups as a strategy to retain rural youth
- Holding an annual national event in different parts of India in association with other Academies/societies/organizations may help in developing a wider presence/platform. Introduce an annual one- or two-days global dialogue -Dr. R. S. Paroda Global Dialogue in Transforming Institutions for Sustainable Development to continue legacy of Dr. Paroda and show case India's leadership in institutional innovations for SAD
- Talent search and grooming of young researchers through linking with overseas universities/organizations of repute may help TAAS in building brand name with wider outreach
- TAAS should continue to focus on providing communication targeting PMO, etc. with clarity on cutting edge technologies in agriculture
- Engagement with SAUs/States in helping them on developing Vision, policy/policy papers, monitoring, impact assessment, etc.
- Vigorously voice farmer's issues in free and fair manner. Sensitize farmers on all well intended Government policies/programs
- Focus more on acting as a catalyst and influencer between the key national and international policy making bodies using its organizational strength as well as the voice of experts who are closely associated with TAAS
- Facilitate/encourage leadership among young agricultural scientists/educators through awards established in some major fields. Mobilize/provide/explore participation of young scientists (students, post-docs, young faculties) in various activities of TAAS including leadership roles.
- Some serious thinking and developing action plan on attracting bright minds to agricultural sciences
- Institute competitive fellowships for research in transboundary areas that generally get missed by conventional programs/schemes of AUs
- Organize joint Think Tank workshops on emerging topics with other leading authorities
- Encourage active dialogues with NAAS, relevant professional societies, SAUs, NGOs, politicians, government agencies, private sector, and south-east Asian organizations to encourage awareness and partnership for developing science-based strategy for SAD
- Creating/enhancing visibility of TAAS should be a priority. TAAS should have a small unit in the capital cities of all states/State Chapters (agriculture is a state subject and each agro-climatic zone has its own specific agronomic practices and

socio-economic milieu) for shaping, guiding the State Govts' agricultural performance thereby improving the respect of agricultural profession. Decentralize activities at regional/state level (have regional chapters, north, south, east, west/different ecosystem level). Involve younger scientists/women scientists/researchers as Associate Members of TAAS. Create/hire senior researchers/Visiting Fellowships/consultants/Science and Policy Fellows to write policy briefs/policy papers. TAAS may consider identifying area specific subject matter specialists who for a period of 3-4 years would advise on the conduct of specific events and the required follow up action. TAAS should offer TAAS Fellows like other Academies. TAAS should transform from documentation Centre to policy influencing Centre. The presence of corporate members gives lots of visibility to TAAS. The Science and Policy fellows would be world renowned/policy makers including Noble Laureates. WFP laureates/researchers who will spend a minimum of one year with TAAS at a time in preparing policy papers and/or technical reports.

- TAAS should expand their reach among the young scientists, entrepreneurs, children of farmers who are quitting agriculture. Try to tag young boys and girls trained even IITs who are getting into building startups on AI/ML based solutions to solve problems of agriculture, provide them with overall vision and need of agriculture in the country.
- Vigorously involving farmers should be the next brand building activity of TAAS. It should be a very effective channel to help the voice of smallholder farmers reach policy makers. TAAS may deliberate on how to make/modify Farm Bills to be acceptable to the stakeholders. TAAS should undertake joint activities with state farmers commissions. TAAS should give more focus on farmers welfare, give more technology innovations, and strengthen online presence. Greater interaction with media, public through TV discussions, popular articles, direct interaction with politicians, policy makers, planners, less informed activists is required. Less print but more electronic short messages/ communication/publications/small handouts on policy suggestions not exceeding 2 pages for the policy makers. Hire one IT expert, policy documentation/communication expert. Create an interactive website to inform about its programs and activities to all and for scientists, farmers, traders, policy makers to place their opinion/queries which could get attention without delay. Regular electronic Newsletter may be published. Use of Metadata and AI may be considered in arriving at best course and conclusions. TAAS activities and its achievements should extensively be published at national and international levels, Conference outcomes and recommendations could further be sharpened and focused, made more granular, actionable, and specific presented in easily digestible manner thereby increasing chances of uptake using IT

- TAAS should hold regular Annual Events with a brand name, TAAS-Dialogs/Workshops. For different areas, TAAS may have an executive with the help of 2-3 research fellows/associates on contract basis collect, analyze grassroot level information to plan issues for BSSs/workshops and other activities of TAAS to do regular scans and areas of interventions by TAAS. TAAS may consider a wider consultative process to identify topics for expert consultations/BSSs etc. by an annual expert meeting. They may deliberate to discuss a strategy as to how to make TAAS a brand name in one of the BSSs. It should establish emotional connect with the stakeholders to stand out. TAAS should specialize in larger policy issues, not petty ones. Policy advocacy should be priority, but occasional alerts to NARS to safeguard scientific rigor and education quality/standard. Umbrella link issue/bottom line for all policy issues and implementation may be SDGs, targets, and indicators as this will to provide global visibility to TAAS. Focus on holistic Agri-Food Systems' approach. Repeatedly reminding GoI and State Govts about India's commitment to SDGs.
- Enhance institutional and corporate members and members from outside NARS. Adds visibility, brings diverse ideas and funding to TAAS to take up many activities.
- TAAS may function as a documentation centre for collecting, storing, processing, and disseminating information on subjects related to agricultural development. TAAS should increase quality publications and distribute world- wide to show how the rich experiences of India in strengthening ARI4D could influence and lead to Sustainable Economic Development
- Instituting an annual award for best farmer, young entrepreneurs in agriculture. May think of awarding one doctoral fellowship based on merit and synopsis in each of agri, horti, animal husbandry, PHM including marketing, value addition, exports
- Continue efforts on increasing TAAS membership and sustained funding to support/sustain the present and future activities
- Lots of lessons from experiences of ARI4D from India to be learned. TAAS can share these lessons both regionally and globally to benefit developing countries. TAAS is already a brand name as Global Think Tank
- Besides MSS award, institute some more awards for sectoral excellence for inspiring science and farmer leaders, best students of AUs/Institutions and facilitate further networking.
- It should be a critical voice against the current trends such as natural farming and zero-based farming. It should be a strong voice for modern science and technology
- TAAS should make climate change as its top priority and leadership, lobbying aggressively as a leading voice in bringing all relevant sectors of the economy into discussion to address it comprehensively, both domestically and international players. Self -indulgent, international organizations may be able to amass data and

raise concerns but seem ineffective at instigating the broad, largescale changes that are needed. Honest, inspired organizations like TAAS can probably be more effective at bringing about political attention and initiatives at the highest levels of national leadership.

- TAAS can further strengthen international relations and partnerships. It should also work more with Govt specially agencies like NITI Aayog etc. to facilitate position papers and white paper preparations.
- TAAS should enhance its media approach with wider publicity to the issues and recommendations included in its publications.
- TAAS should hold their interactions with farmers on one hand and policy makers on the other so that it can rightly guide scientists in NARS to plan for building a sustainable agricultural production system in the country

4. What are your suggestions to make TAAS a brand name?

- Create/institutionalize a robust mechanism of follow up of recommendations besides emphasis on publication. Institutionalize regular impact assessment of TAAS activities/recommendations. Should chalk out the Road Map to rigorously pursue all the proposed strategies and policies for strict compliance. Special units for each major activity to prepare for the event and its impact.
- Agriculture is facing difficulties in other countries, GoI has to take/taken humanitarian role now. TAAS should come forward and involve in such humanitarian service
- Identify 3 medium term and 2 short term objectives to be pursued by TAAS in next 3 years
- Explore foreign collaboration. Issues are now national, regional, even global, need cross-country partnership and learning. Make presence in SAARC countries/Sub-Saharan Africa. Have more regional and global activities based on the lessons learned from India on the revolutions in SAD that achieved food security. Some of the BSSs be planned as a side event of important international conferences/symposium/congress being organized by various science academies/universities to get more visibility. TAAS can play an advisory role through different stakeholders in guiding/influencing such initiatives not only for their programs and approaches but also the donor community for their investment to help national/regional/global level organizations/efforts like CGIAR to plan for not short term but long-term strategies to deliver their fruits to the society efficiently, economically, and timely. Refocus on activities which are more common in south-Asian agriculture and sharing good and bad experiences across countries is badly needed.
- TAAS officials should be engaged in international conferences/meetings and provide way forward at global level. TAAS may consider tie-ups with the private sector for pilot projects to demonstrate proof of concept on frontier cutting edge

technologies especially in the sphere of IT, Nanotechnology and others which are upending agriculture. TAAS could then demonstrate how the benefits of frontier technologies can flow to smallholder farmers. Tying with private sector and farmers/farm commissions is helpful to understand policy constraints.

- TAAS should provide consultancy service to various agricultural development programs. In addition to existing activities, TAAS may expand its capacity at research (policy research, research on several aspects of current agricultural situation, future trends, etc.) by expanding the team and activity. They can get projects from interested parties for conducting research on specific subjects in agriculture which will help them to increase their footprint.
- TAAS can also have active joint work with collaborative think tanks in different parts of India. This will help TAAS to make its impact at state level, increase its visibility and brand name at state level benefitting the farmer eventually. TAAS should broaden its objectives and activities specifically for Policy Research and Agri-Food system think tank at national, regional, and global level. TAAS may also consider establishing a Regional Agri-Food System Platform with annual conference on Agri-Food Systems in South Asia/Asia. TAAS can develop a network or consortia of policy advisors and policy professionals for providing solutions for inclusive and sustainable agriculture in south Asia.
- TAAS should play a more proactive role in addressing some of the global challenges for the Global Environmental Benefits (GEB). It should promote South-South cooperation, particularly programs committed under various south-south cooperation in agriculture. TAAS may bring all such programs under one umbrella and suggest mechanism for effective implementation of such agreement and commitments of GoI under various Ministries.
- TAAS has been in existence for 2 decades. If it is to continue for next 2 decades, it will need to find a bigger role for itself. At present its role is mainly that of a convenor and skillful and efficacious chronicler and documenter of the proceedings of the various discussion platforms. It has over the years acquired a high degree of proficiency

4.3.2 Some Bright Ideas on New Programs/Activities for the future

1. Discuss and raise/pursue farmer's issues (technology and policy) more vigorously in free and fair manner

2. Institute some competitive Fellowships for research in transboundary areas for educating and inspiring new generation of scientists

3. Strengthening science communication-public engagement

4. Organize more activities on climate change-carbon-nitrogen dilemma, nutritional security, IFS, Agro-forestry, Biodiversity conservation, pre- and post- harvest losses, nutri-cereals, precision farming, micro-irrigation, hydroponics, genome editing, tillage

revolution, controlled environment vegetable production, building SOM, urban-rural nutrient recycling systems, combined agricultural and solar farming, total electrification of agriculture from renewable sources and more hydroelectric projects for energy, irrigation, flood control and drought management, sustainable land management and restoration of degraded land scape including grass lands, addressing the issue of ecosystem restoration

5. Engage more of youth, women, students, and retired scientists/development personnel in TAAS activities

6. Greater focus on reform and restructuring agricultural sector including the public funded support services like agricultural education, research, extension, and institutions

7. Discuss, develop, and replicate success stories in science and policy in large scale

8. Identify areas for startups for women and youth and provide/facilitate handholding

9. Take up study on gender equity in ARI4D during last 25 years, identify gaps and suggest effective measures to bridge gaps

10. Focus more on acting as a catalyst and influencer between key national and international policy making bodies

11. Debate on inclusion of nutrition in schools and agricultural syllabus to appraise agricultural scientists about importance of human nutrition

12. Validate/elucidate scientific efficacy of some blanket policy recommendations of the Government and other stakeholders like natural farming/organic farming which seem to be devoid of scientific evidence

13. Retrain researchers including PG students to formulate good projects with robust impact assessment

14. Biodiversity conservation on insects, microbes, fish genetic resources

15. Conference on totally involving the national youth in agriculture to understand the aspirational-attainment gap

16. Policy advocacy to emphasize Integrated Farming System by bringing together agriculture, animal husbandry and food processing ministries

17. Periodically update inventory of pending Bills/policy decisions in the Government and repeatedly pursue them particularly dealing with germplasm, GM crops, seed, agrochemicals, etc.

18. Debate and exert pressure for making research collaboration with foreign universities/Labs be made more liberal, easy, and faster in NARS as prevailing in traditional universities/private universities

19. TAAS Fellowships may be introduced like in other Academies

20. TAAS should take policy advocacy and outreach programs at State levels for policy prioritization and effective, faster implementation and impact of central and state programs

21. TAAS may consider updating the Book on History of Indian Agriculture written by Dr. M. S. Randhawa particularly post green revolution period

22. Debate on how the environmental/soil/livestock/human health could be improved through agricultural activities so that an appropriate nutritionally dense diet could be designed to improve human health and work performance
23. Explore rural employment opportunities for village girls, women folks, school and college dropouts and skill development imparting agricultural education from primary school and colleges in rural areas. Similarly for school and college dropouts in urban areas
24. TAAS may consider constituting expert groups on major themes. It may also consider establishing a 'Regional Agri-Food System Platform' with annual conference on Agri-Food Systems in South Asia/Asia
25. Evolve a wider consultation process to identify topics for activities, may be an annual expert consultation, involve area specific experts to advice, plan and help execute/follow up the activities
26. The TAAS publications should be after thorough manuscript reviewing/refereeing and professional editing
27. Expand capacity of TAAS at research (policy research, research on several aspects of current agricultural situation, future trends, etc.) by expanding the TAAS team and activity
28. Organize a BSS soon after the Independent Review to discuss the Review Report may be organized specially to develop the strategy for "Positioning the TAAS"
29. Organize activities in collaboration with leading foreign agricultural universities, CG Centers, SAUs, towards capacity building and implementation of NEP 2020, research partnerships etc.
30. TAAS should become a global entity now and serve the entire South Asia Region by creating "Science and Policy Fellows" program in preparing scientific and Policy Reports on issues related to agriculture education, research, biodiversity, hunger reduction, nutritional security, climate change impacts on water and energy availability and use for agriculture etc. These Fellows would be world endowed researchers/policy makers (including Noble Laureates, WFP Laureates, etc.) who will spend an, year or two with TAAS at a time in preparing Policy Papers/Technical Reports
31. TAAS should expand its award programs among best students of AUs/Institutions to inspire-new generation of scientists
32. TASS should come out frequently with small handouts of not more than 2 pages on policy suggestions to effectively connect with policy makers and the general public as they do not have time to read a lengthy policy paper
33. TAAS can play an effective role in in defining standards of agricultural research, education, and extension in private universities/institutions
34. TAAS may work with Government bodies like NITI Aayog to develop/facilitate position- papers and white papers
35. TAAS should work on forecasting the future needs of ARI4D and develop strategy to meet those future needs

36. Organize more seminars to debate on linkages among field productivity with storage, market, economics in all crops, vegetables, fruits, etc.
37. TAAS can play a significant role in promoting South-South cooperation. There are many programs GOI has committed under various South-South cooperation agreements, however these are working in silos. TAAS jointly working with RIS can bring all such programs under one umbrella and suggest mechanism for effective implementation of such agreements and commitments of GOI under various Ministries
38. Initiate programs related to Diversity, Equity, and Inclusion (DEI) in Agri-Food Systems, programs related to entrepreneurship and Innovations in Food, Agriculture and Natural Resources and, also program to enhance engagement of NRIs living abroad – Engagement of Indian Diaspora
39. TAAS may establish an International Steering Committee or International Advisory Group to strengthen global linkages, collaborations, and partnerships
40. Introduce an annual one- or two-days global dialogue- "Dr. R. S. Paroda Global Dialogue in Transforming Institutions for Sustainable Agricultural Development" to continue the legacy of Dr. Paroda and showcasing India's leadership in institutional innovations for SAD.

4.3.3 Reflections of Stakeholders on some Key TAAS Publications (TAAS, 2021)

1. Accelerating Science-Led Growth in Agriculture: Two Decades of TAAS, May 2021

Name	Date	Reflections/Comment
Prof (Dr) S M Paul KHURANA Retd Director, CPRI, Shimla & Former Vice Chancellor, RDVV, Jabalpur Founder Director, Amity Institute of Biotechnology, AUH Dean, Faculty of Science, Engineering & Technology, Prof of Biotechnology, AIB & Head-Univ. Science Instrumentation Centre, Amity University, Haryana, Gurgaon, Manesar-122413 Mob: 09650663197	25 May 2021	Received your mail about TAAS publications and thank you very much. It has come up so beautifully with many lovely pictures, including your portrait. I have always been appreciative of your thinking & working for Indian Agriculture. The very development of NASC is a 'living' creation by you without which many things would have never happened at all, like in the last two decades. TAAS is the most vibrant example of your selfless services to motherland. I do not have suitable words to express the limelight you gave to ICAR & accelerating science-led agricultural growth in India on so many facets. Congrats to you & your team. Let me also add that these words are genuine & very true expressions of my feelings.
Dr. Robynne Anderson President +1-204-227-4611 robynne@emergingag.com	24 May, 2021	First, congratulations for extraordinary work over the past two decades. This report shows how much you have done at TAAS. This is a stray, thought, but I wonder if some of this could be adapted to be a Food Systems Summit Dialogue as the UN is discussing the future of agriculture and food? https://www.un.org/en/food-systems-summit/dialogues/independent
Dr Suri suri76@aol.com	24 May, 2021	Many thanks for the TAAS publication. It is an impressive compilation of symposia and conference organized under the banner of TAAS by you. I glanced through it just now. I plan

		to read it more closely over the next few months. There is much material to read and digest.
Dr. Padmanaban Govindarajan Professor geepee@alumni.iisc.ac.in	24 May 2021	Thank you very much for sending me a soft copy of the TAAS publication, describing two decades of its contribution to Science-Led Growth in Agriculture. We are all aware of your outstanding contribution to science and technology-based future for Indian Agriculture. I do hope the country will benefit by your wisdom and vision. I will go through the TAAS publication, which you have been using as a Think Tank. I am doing OK, although age is catching up. I do hope you are keeping well in this terrible time of pandemic, and I wish your effort all success and good health to sustain all your goals.
Dr. Mohammad Roozitalab mroozitalab@gmail.com	24 May 2021	Thanks a lot for sending this very nice and comprehensive publication titled "Accelerating Science-Led Growth in Agriculture: Two Decades of TAAS". This publication provides a very good example of how a national think tank and devoted scientists could advise the policy makers and contribute to sustainable development of agriculture in a country. Please take care
Dr. Prabhakar Tamboli pmtamboli@verizon.net	21 May 2021	I know that TAAS and NAAS are trying to their best to help the country. I do have a very special admiration and respect for you, because you have fought the system and made monumental contribution during your tenure as D.G. ICAR, and then working tirelessly for over 20 years after retirement by establishing TAAS and making it a great success. This act of patriotism is unique and worth recognition. You did not leave the country looking for greener pastures, unlike NRIs like me-who left the battle- field. It is very easy to criticize India sitting outside the system. But to work your way out through the system is very difficult. Requires dedication and determination. I am proud of you and pray to God for your good health, peace and all the best in life. Your dedicated patriotism for the country comes first, next comes support, cooperation, and good wishes from colleagues, which you had earned due to your modesty and most friendly behavior. You are God's gift to India and to humanity at large. God bless you and your loved ones. Very happy to know that you have postponed your departure to India. Please do not go back until the storm is over.
Dr.T Ramasami former secretary. department of Science, GoI dstsec@yahoo.co.in	22 May 2021	Thank you very much for the mail and a copy of the exhaustive report of TASS covering a period of 20 years since its inception. I have only browsed through the report. It does present a coherent story of the work of the think tank and its diverse contributions. The work done is not only mammoth but also deep and all encompassing. I convey my very best wishes to TASS and all those associated with you. I will certainly read it carefully at a later date. Thank you again for spring a copy of the valuable report.
Mr. Siraj Hussain Visiting Senior Fellow, ICRIER, New Delhi. shussain@icrier.res.in	23-May-2021	, Thanks a lot for sharing this report by NAAS. I am looking at NBS for an article I have written for Down to Earth. You have covered entire gamut of agriculture sector and I need time to go through the report. Sir is a printed version also available. If yes, please share.
Dr. Rudy Rabbinge rudy.rabbinge@kpnmail.nl	23 May 2021	Thank you for the extensive publication. Very informative and impressive to see what you have achieved. Congratulations. I would be very interested to discuss the next steps in your

		activities and the way we may use that in the collaborative activities between TAAS and IFDC. Please let me know when I may call you at what number?
Dr. Nawab Ali alinawab11@gmail.com	23 May 2021	, Thank you very much for the Publication- Two Decades of TASS. It contains very appropriate and relevant recommendations related to the Indian Agriculture. Wish you all the best in life including the safety from COVID-19.
Dr. Joachim von Braun jvonbraun@uni-bonn.de	22 May, 2021	Thank you for this excellent publication. With TAAS and elsewhere you were leading change and development in agriculture with big lasting effects. **United Nations Food Systems Summit 2021** Chair of the Scientific Group, Prof. Joachim von Braun https://www.un.org/food-systems-summit and Scientific Group https://www.sc-fss2021.org Professor for Economic and Technological Change and Director, Center for Development Research (ZEF), Bonn University Genscherallee 3, 53113 Bonn, Germany jvonbraun@uni-bonn.de www.zef.de
Dr. Ghazanfar Abbas guzniabbas@gmail.com	22 May, 2021	Thank you for sharing a very valuable document. Let us join hands and pray that the current pandemic diminishes ASAP, and we start enjoying our *NORMAL LIFE* once again. Dr. Syed Ghazanfar Abbas National Consultant (Innovation, E-Agriculture & E-Learning) Food and Agriculture Organization of the United Nations NARC Premises, Park Road, Shahzad Town, Islamabad, Pakistan Email(s): guzniabbas@gmail.com / Ghazanfar.Abbas@fao.org Skype: guzniabbas1
Dr. Thambiayya Marimuthu *M. Sc. (Ag.)., Ph.D., FNABS., FISNS*. **Secretary, National Academy of Biological Sciences** Chennai – 600 025, Tamil Nadu, secretarynabs@gmail.com	22 May, 2021	Greetings from NABS. Hope, everyone in your family is safe and fine. I thankfully acknowledge the receipt of your mail along with the publication entitled "Accelerating Science-Led Growth in Agriculture: Two Decades of TAAS". Congratulations sir for thoughtfully bringing out the achievements of TAAS over two decades. I will be circulating this soft copy to our EC members.
Dr. David Hemming Commissioning Editor CABI, Nosworthy Way Wllingford, Oxfordshire, OX10 8DE United Kingdom d.hemming@cabi.org	28 May 2021	Thank you very much for forwarding the TAAS publication and the comments. It would be great to see your work being the focus of a UN summit dialogue and this is excellent. Of course, we would be interested in publishing the output of the summit, if appropriate, and please do let us know if we can help further.
Dr. M. S. Swaminathan	28 August 2021	Thank you very much for your kind letter. You built up TAAS to international standards. I look forward to discussing with you the further development of TAAS. I hope all the members of your family are keeping well.
Dr. Kirti Singh kirtisinghwnrf2013@gmail.com	1 September 2021	Thank you for sending me a copy of the document "Accelerating Science-Led Growth in Agriculture: Two Decades of TAAS". I have gone through each page of this publication, and I find it most useful. In a short period, TAAS has done remarkable work under your dynamic leadership. I congratulate you and your wonderful team for the dedicated service to the nation.

		I congratulate you and your team for the great achievement and wish you with my blessings to continue with the same spirit and dedication.
Dr.Salil Singhal sls@piind.com	28 August 2021	Many thanks for sharing the excellent work presentation done by TAAS in the last two decades. There is so much knowledge and experience available with TAAS under your leadership based on which excellent suggestions for agriculture growth are made. However, my biggest concern remains whether the Babus of Krishi Bhawan really understand these suggestions and give serious thought for their implementation.
Dr. Prem Lal Gautam plgautam47@gmail.com	7 September 2021	I very gratefully acknowledge the receipt of the aforesaid publication. It is very informative and handy referral material. Congratulations to you and team TAAS for the progress and excellent work done during the decade.
Dr.E.A.Siddiq easiddiq@gmail.com	8 September, 2021	I am thankful to you for favoring me with a copy of TAAS Publication 'Accelerating Science Led Growth of Indian Agriculture' narrating in just 12 chapters the genesis, objectives, activities and achievement in two decades of its founding. Though I wished to share my feedback on TAAS's achievements, it is not possible because of my deteriorating health condition. Yet, I wish to congratulate you for bringing out this informative publication. Under your leadership and commitment, TAAS can do many more of value to Indian Agriculture.

2.Bridging the Yield Gaps to Enhance Food Production: A Way Forward, Jan 2022

Name	Date	Reflections/Comment
Baldev Singh Dhillon dhillonbaldevsingh@gmail.com	Jan 28, 2022	Thanks for sending me a copy. It has come up well. Moreover, it (the recommendations therein) is going to serve as a useful repository to those who are concerned and are working on the development of a road map for sustainable progress. I CONGRATULATE and THANK you and TAAS for this,
Prakash Vish prakashvish@gmail.com	Feb 16, 2022	Thanks for the speed post, Copy of the Proceedings of the National workshop on Bridging the Yield Gaps to Enhance Food grain Production: A Way forward. I appreciate it indeed. This is indeed a distilled wisdom of agricultural Scientists World Over to increase Productivity and Production. I congratulate TAAS and other Organizations as organizers of this Discussion and the Publication with your Leadership. I immensely liked your Concluding remarks on page 28 and of Course the Key Recommendations. The whole document is very Professionally brought out especially the collage in Cover pages says it all. The real gap is also the Postharvest losses which are perhaps the Fifth Take home lesson as unless that is minimized any amount of production will only result in more losses due to storage and in the whole chain. That's where Infrastructure has to Double in capacity in the next ten years. The government is doing but requires a war footing

		with Public-Private partnerships. It is possible. Mega Technologies must change the way Food grains and Agri commodities are handled, and the model is milk in a practical way for India. India has shown the way to the world in many crops. The food losses not only are a loss of the hard labor of farmers but also energy, economy, nutrition loss, etc., to the national bowl. Unless Prevention of Post-harvest losses in the Chain and in markets at the terminal end including cooked food being wasted is addressed and in toto, this bane will be looming large. The word FOOD LOSSES and WASTES PREVENTION must be a movement of its own like the Vaccination movement. I am sure I have sent this document (as in the attachment) to you earlier. Even though it is about 7 Years old on CFS and HLPE which I Steered as Team leader, it gives some of the practical solutions for the Prevention of Food Losses and Wastes which different Countries can adopt by a minor recalibration. Once again, my Congratulations on this Document Dr. Paroda with your steering especially and coming from you is always a pleasure to read and learn for me.
Ram Badan Singh rbsingh40@gmail.com	28 January 2022	Thanks for sharing the Proceedings and Recommendations on Bridging Yield Gaps. These have come out extremely well. Congratulations to you and to Dr Bhag Mal for a great job done. I am grateful to you for having me associated with this exercise.
HS Gupta hsgupta.53@gmail.com	Jan 27, 2022	Hearty greetings to team TAAS for bringing out the Proceedings and Recommendations of the 'National Workshop ……Yield Gaps' held in August last year. I would also like to congratulate Dr Paroda, President, TAAS for his guidance without which it would not have been possible to bring out such an outstanding publication. I am confident that this publication will be a guiding force in maintaining food security of the country in time to come.
Manohar Maddipatla manohar.maddipatla@gmail.com	Jan 27, 2022	Dear Dr Bhag Mal, Thank you for the soft copy of the Proceedings and Recommendations of "National Workshop on Bridging the Yield Gaps to Enhance Food grain Production: A Way Forward" recently published by TAAS. I had gone through the Proceedings quickly and I find it very useful and could be guidelines for further action in this regard.

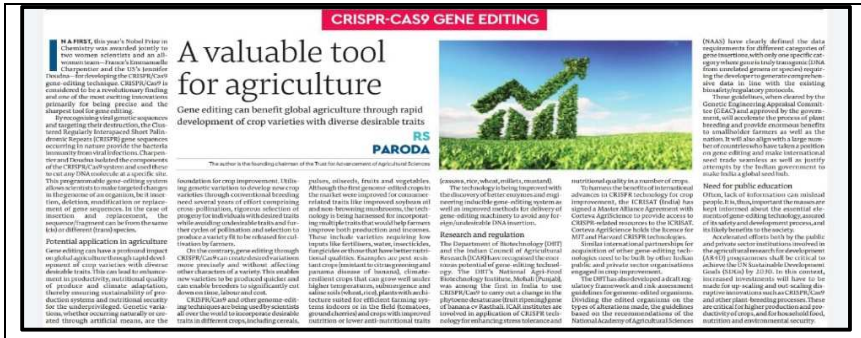
		I shall read it again in detail for my own information. I am taking the liberty of forwarding it to the Members of RICAREA.
Dr. M.P. Yadav yadav_mp@hotmail.com	Jan 28, 2022	Thanks for sending the soft copy of the Proceedings and Recommendations of "National Workshop on Bridging the Yield Gaps" to Enhance Food grain Production: A Way Forward", published by TAAS. As yield gaps due to lower yields by farmers than the anticipated ones, are one of the handicaps in our agriculture, this publication will be very useful to address this issue.
Prof SK Sharma skspbg@yahoo.co.in	Jan 28, 2022	Thanks for the document so prepared by the TAAS under the leadership of Respected Dr RS Paroda. It would be very helpful to the scientists and policy workers alike. Congratulations to the TAAS family.
Mariappan Velayutham velayutham42@yahoo.co.in	Feb 5, 2022	I thank you for the mail of 27th Jan.22 enclosing the soft copy of the proc and recommendations of the workshop Organized by TAAS on "Bridging the yield gaps to enhance food grain production: A way forward" held during Aug.2021. The well pointed recommendations are a blueprint and Road Map for the Researchers and Extension personnel in the NAR&ES for achieving the required Food grain Targets at the National level and for realizing the aspiring and expected crop yield Target at the individual Farmer's fields at large. M. Velayutham
Prof. Anil Gupta anilgb@gmail.com	Feb 13, 2022	Excellent report A few suggestions: A) we know the direct relationship between yield increase & micronutrient deficiency in soil and in turn in food; would it not be useful to estimate nutrient gap (macro/micro) along with field gap closing strategy B) given government's stress on natural farming, implications for bridging yield gap(by) may be drawn C) should we not evaluate strategy of expanding minor millets for closing nutrition gap vis a vis increasing nutrient content of major crops. There is a steep rise in demand fr these millets in processed foods as well as in direct consumption in the recent times D) shelf life of millets/ sorghum grains was given a short shrift during breeding Priorities, i recall a discussion with Dr Mangesha of ICRISAT on not including this parameter in descriptors of these crops. We know that demand for MSP backed by provident is emerging fr non rice/ wheat crops too, a special focus on shelf life is must if we want

	industry to procure improved varieties (local varieties have very long shelf life) E) many of the Dryland crop are used as sources of folder as mentioned in the report: but during late eighties we discovered that barring one or two places; early segregating generations were not screened for suitability for livestock, this gap may be filled in the report and suitable emphasis on palatability of fodder may also be given F) need for climate resilience is very rightly mentioned. You know sir that sorghum generally gets better soil and more favorable climatic conditions than millets; there for BGP strategies should be tailored to these differences: the report refers to horizontal strategies which I assume refer to this dimension as well G) I have been pleading with NBPGR for a long time, Dr Dhillon will recall, that we should screen varieties for food processing or animal feed attributes if industry has to be got interested. A section may be added on that. Sometimes instead of yield increase, farmers will benefit by attributional gains H) from diversification point of view, which attributes will help close cost/ income gap may be another lens to look at this challenge Once again, I appreciate the very timely & important report May be another discussion is needed to strategize it since not all goals might appear equally important everywhere
Kanwar, Rameshwar S [A&BE] Jan 28, 2022 rskanwar@iastate.edu	Excellent set of recommendations to follow. I enjoyed reading these proceedings and recommendations.

4.3.4 TAAS in News/Media

Public relation is a great way to build branding. It is a fact that an organization remains alive due to its relationship with the public. Strengthening public relations means strengthening institution's visibility and reputation. Public relation is about sharing the right information to right places and right people. As can be seen by stakeholder responses and their analysis, TAAS is low in publicity and communication initiatives. Paying enough attention to strengthen PR should be one of the priority suggestions to TAAS recommended under strategy 2&3.

TAAS in Media/News


CRISPR-CAS9 GENE EDITING

A valuable tool for agriculture

Gene editing can benefit global agriculture through rapid development of crop varieties with diverse desirable traits

RS PARODA

Newspaper article


WAY FORWARD FOR INDIAN SEED SECTOR

Agriculture Today April 2020


STAKEHOLDERS' DIALOGUE

WAY FORWARD FOR INDIAN SEED SECTOR

OFFICE BLOCK

Agriculture Today Nov 2020


YOUTH IN AGRICULTURE

ADVISORY AGENTS, INPUT PROVIDERS, ENTREPRENEURS

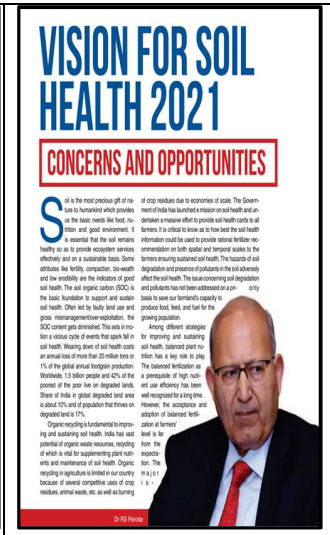
YOUTH CAN LINK FARMERS TO MARKETS MORE EFFECTIVELY

Agriculture Today Jan 2021


APO-news

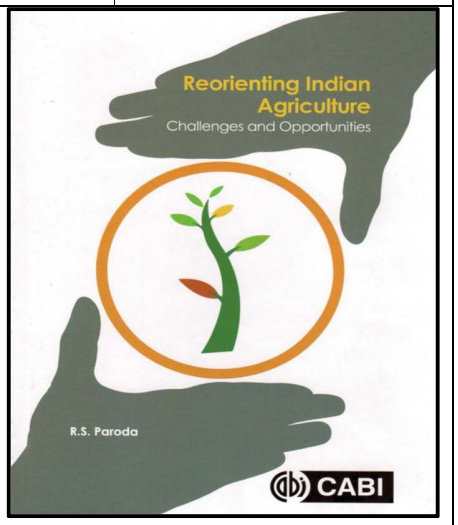
Raj Paroda: A genebank 'guru' *(Up Close)*

Newsletter No. 55 Biodiversity International


VISION FOR SOIL HEALTH 2021

CONCERNS AND OPPORTUNITIES

Agriculture Today July 2021


Reorienting Indian Agriculture

Challenges and Opportunities

R.S. Paroda

CABI

Book Publication ISBN 9781786395177

Plate 1: TAAS in news/media photo sheet 1

BIOTECH #FOODHEROES: RAJENDRA PARODA

RAJENDRA PARODA

(https://croplife.org/wp-content/uploads/2020/08/Paroda04.jpg)Rajendra Paroda views agriculture as a noble profession.

But that doesn't mean the chairman of the India-based Trust for Advancement of Agricultural Sciences (TAAS) believes that farming should remain in the past. Instead, Paroda champions the institutional reforms, policy reorientations and scientific innovations that have facilitated what he describes as India's "much-needed" continued progression.

"This has led to resilience and increased productivity," he explains. "I am glad I have had an opportunity to serve society and work towards better food, nutrition and environmental security."

Paroda engages in "out-of-the-box" thinking to help increase public awareness about the role of science in agriculture, particularly the use of new breeding technologies that can accelerate the process of developing crops with useful traits.

"I am glad I have had an opportunity to serve society and work towards better food, nutrition and environmental security. I was drawn towards genetics, plant breeding, genetic resource management and biotechnology, because I felt that these were the most exciting areas to improve productivity and resistance to biotic and abiotic stresses."

CropLife International 5/11/22

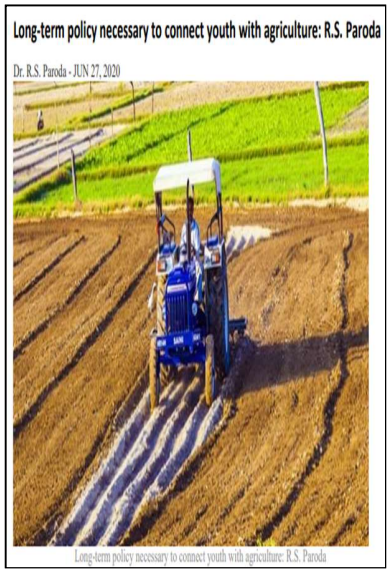
Six decades and counting

Asian Seed Magazine **recently had the honor to sit down with the celebrated Dr Raj S. Paroda, for an enlightening online chat. A highly accomplished Indian agricultural scientist and research manager, now 78, he played a pivotal role in the establishment of both the Asia and Pacific Seed Association (APSA) and the Asia Pacific Association of Agricultural Research Institutions (APAARI).**

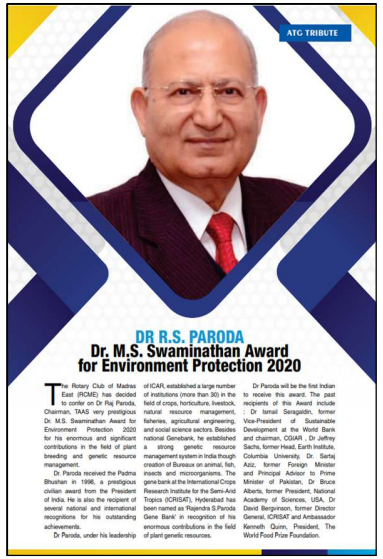
Dr RS Paroda has had a seasoned career in the seed industry, spanning more than six decades.

Asian Seed Vol. 26 No. 4 Oct-Dec 20

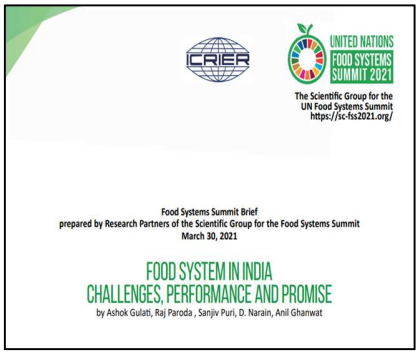
Outlook Jun 27, 2020



Agriculture Today Aug 2020



UN Food systems summit Mar 30 2021



GM Mustard: A win for science and the farmer

To meet the existing deficit in edible oils (about 55-60 per cent), India is currently importing around 13 million tonnes at a cost of Rs 1.17 lakh crore to the exchequer. (File Photo)

Online article Jul 6 2021

The "slow magic" of agricultural research must accelerate

The Prime Minister has envisioned making India a USD 5-trillion economy by 2024-25. The agriculture sector should aim to contribute at least USD 1 trillion. Technologies arising from enhanced investments in agriculture research will have the potential for providing the needed momentum. The "slow magic" character of agricultural research needs to accelerate.

Dr RS Paroda

Rita Sharma

Published: Jul 6, 2021 - 11:41 Updated: Jul 7, 2021 - 06:15

Plate 2: TAAS in news/media photo sheet 2

4.3.5 TAAS Opinion Survey: Statistical Analysis

The statistical analysis of organizational features covering structure, process, performance and relationships using only strongly agreeing responses to 14 questions (Annexure 2 in Annexure V) with respect to stakeholders mostly from ICAR, northern India, senior age groups and research managers (Table 6) suggest that TAAS is strong in clarity of purpose and goals, staff are knowledgeable, credible and accountable organization; moderate in independence in working, consulting and communicating with stakeholders; and low in transparency, planning, and overall relationships with stakeholders. To get deeper/wider insights from the responses with respect to same 14 questions, we used Likert 5- point scale (agree, disagree, strongly agree, strongly disagree, neutral) of representation of stakeholders and the results further confirm (Fig. 2) that TAAS is strong in clarity of purpose, knowledgeable, credible, and accountable; moderate in planning, consulting and communication, transparency, independence; and low in effectiveness, relationships, technology, and skilling its staff. From the results of the above analysis of stakeholder responses (Table 6), we infer that TAAS is rated as strong by stakeholders/thought leaders in clarity of purpose and goal, knowledgeable in the business, and credible and accountable organization. With respect to other organizational features like planning, communication, technology, skilling, effectiveness, relationships, etc., scope exists for improvement to perform still better.

Fig 2: Likert scale representation of stakeholder's responses

Table 6: Organizational Analysis of TAAS based on stakeholders' responses on structure, process, performance, and relationships

Questions	Frequency %) of strongly agree stakeholders			
	Institute Type	Zone	Age groups	Profession
Structural				
TAAS has a clear vision, mission, goals	79.32	78.57	78.57	79.32
Do you know TAAS is independently working?	55.18	57.14	53.57	55.18
Process				
Do you rate the accountability and transparency of TAAS high	44.83	46.42	42.85	44.84
Do you think the Members/Staff of TAAS are knowledgeable about the problems and prospects of Indian Agriculture	67.85	67.86	66.66	67.85
Do the TAAS Members/staff plan and perform actions to solve problems and enhance prospects of Indian Agriculture	41.38	67.85	39.29	41.38
Is TAAS technology driven?	41.38	39.28	39.28	41.38
Performance				
Do you think TAAS is a credible and accountable organization?	65.51	82.72	68.28	65.63
Does TAAS assess effectiveness and results of its activities	44.83	46.42	42.85	44.84
Relationships				
Like to explore more about TAAS?	44.30	42.70	40.80	38.00
Do you understand your role in TAAS?	23.80	25.10	24.60	23.70
Do you feel the work of TAAS is related to your work?	41.40	42.60	41.40	41.20
Does TAAS consult/communicate enough with stakeholders	55.18	57.14	53.56	55.18
Do you get any benefit/s from working with TAAS	27.59	28.57	25.00	27.59

Graphical analysis is attempted below to get insights on the pattern of distribution of stakeholders in terms of diversity of institutions, geographic location, professional groups, and age of respondents against answering important questions relating to 9 important organizational features like credibility and accountability, communication ability, independent working, etc. It may be seen that most of the respondents are from ICAR institutions, northern India, research management professionals and from senior age groups. As can be seen by the analysis of responses, TAAS may have to widen/extend the constituency of stakeholders/members by decentralizing for involvement in TAAS activities to reach beyond NARS, all parts of India including region and globe, other related professionals, development agencies, NGOs, farmers, young scientists, and women scientists. Results of Table 3 also reiterate this need.

Descriptive (Graphical) representation of stakeholder's responses towards TAAS and its operations

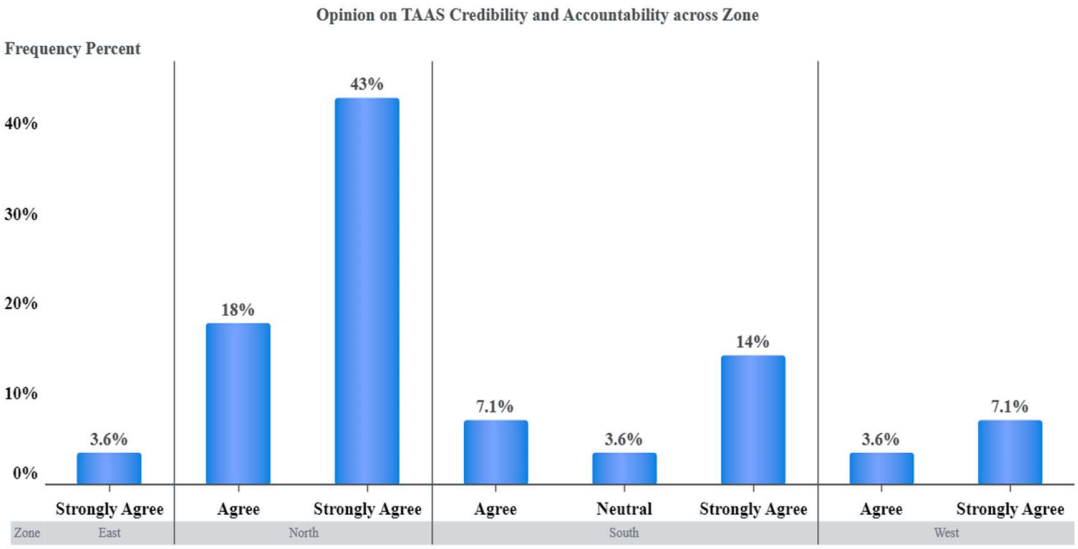


Fig 3: Zone-wise Frequency (%) of Stakeholders opinions on TAAS Credibility and Accountability

The opinions on credibility and accountability of TAAS organization were quantified and plotted into graph (Fig 3). The results indicated that TAAS has high credibility and accountability.

The scores in percentage indicate that 71 per cent strongly agree of which most of the stakeholders belong to Northern India (43 %) and other regions have awareness about TAAS credibility and accountability. The stakeholders with neutral opinion were also seen. This response maybe due to lack of their involvement with TAAS and its activities.

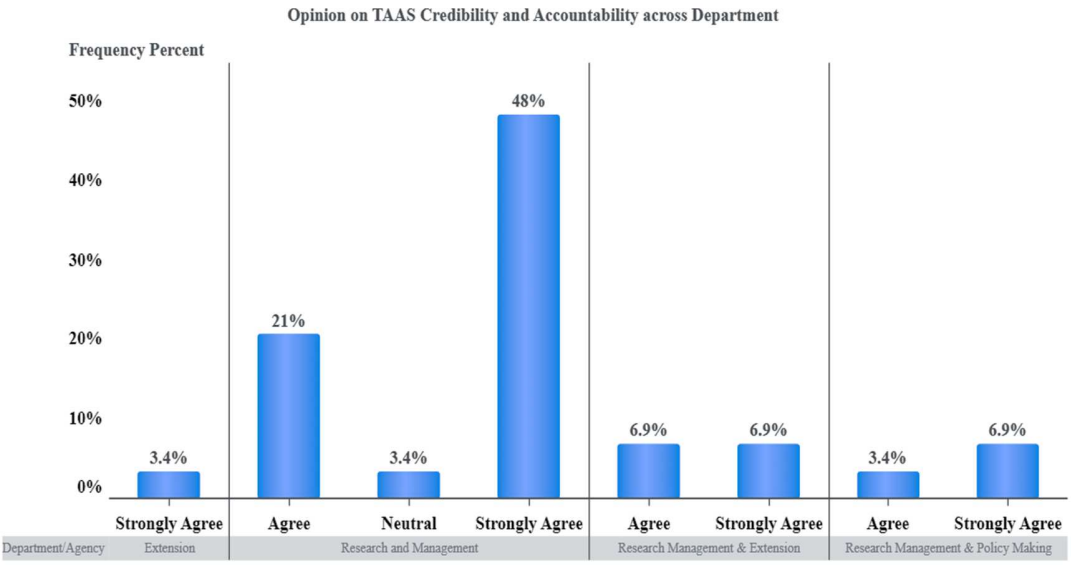


Fig 4: Profession-wise Frequency (%) of Stakeholders opinions on TAAS Credibility and Accountability

Forty-eight per cent of Research Management professionals felt that TAAS has high credibility and accountability, followed by Research Management and Extension professionals and Research Management and Policy professionals (6.9 % each) and 3.4 per cent exclusively extension professionals. The rest 30 per cent opined “agree” with TAAS credibility and accountability question. (Fig.4)

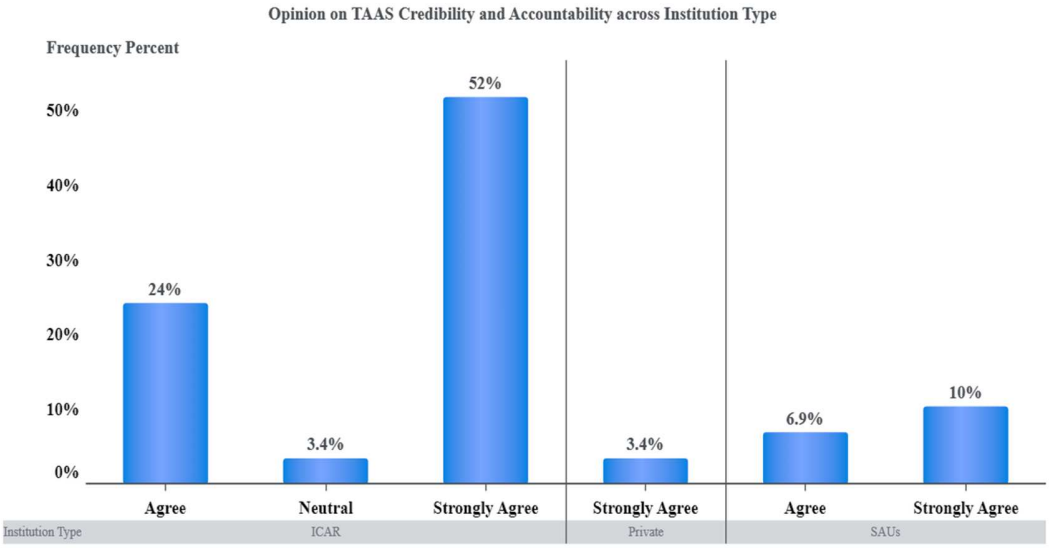


Fig 5: Institution-wise Frequency (%) of Stakeholders opinions on TAAS Credibility and Accountability

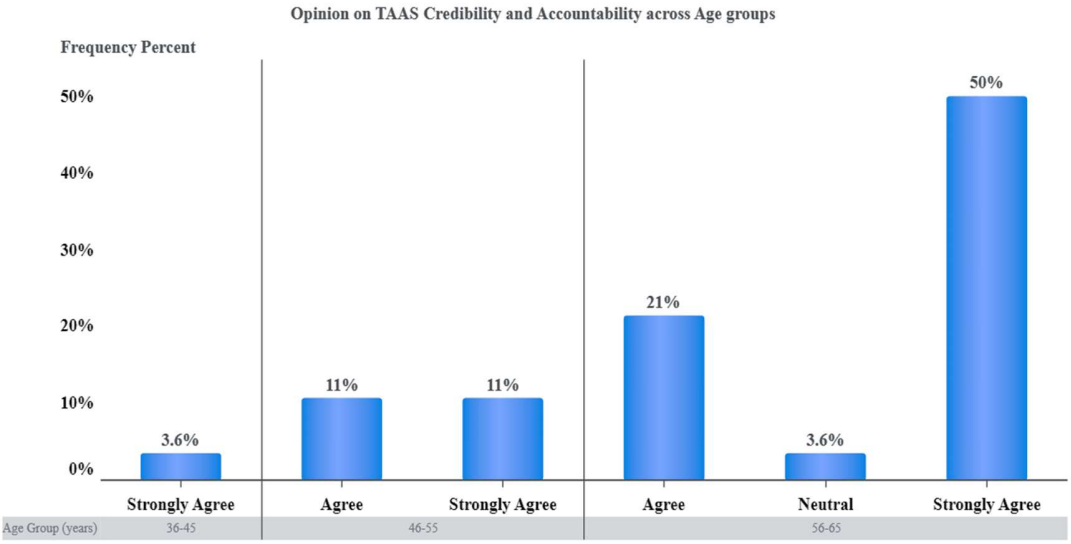


Fig 6: Age-wise Frequency (%) of Stakeholders opinions on TAAS Credibility and Accountability

The opinions across age and institution type were gathered and analyzed (Fig 5 & Fig 6 respectively). The results indicated a similar response to the results of zone and profession, respectively, where most of the respondents (52 % of ICAR, 10 % of SAUs and 3.4 % of Private and 48 % of 55-65 years of age, 10 % of 45-55 years age and 3.4 % of 35-45 years of age and 25-35 years age each) has regarded that TAAS has high credibility and accountability.

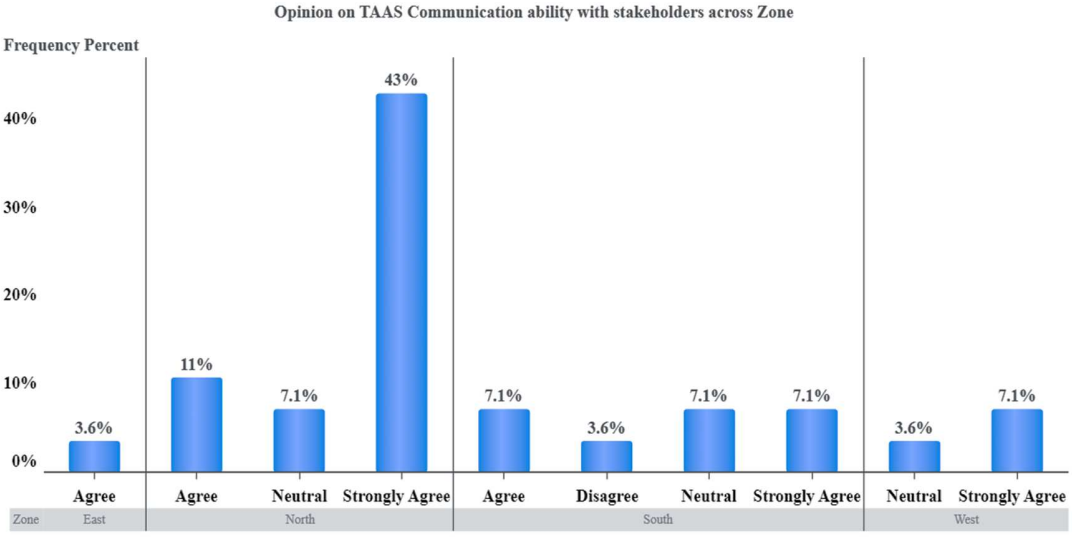


Fig 7: Zone-wise Frequency (%) of respondent's opinion on TAAS communication ability with diverse stakeholders and organizations

Communication plays a major role in performance and development of any organization. Hence the opinions of the different stakeholders across zone (Fig 7), institution

type (Fig 8), profession (Fig 9) and age groups (Fig 10) in relation to TAAS communication with them and their organization was scaled, analysed, and depicted as bar graphs.

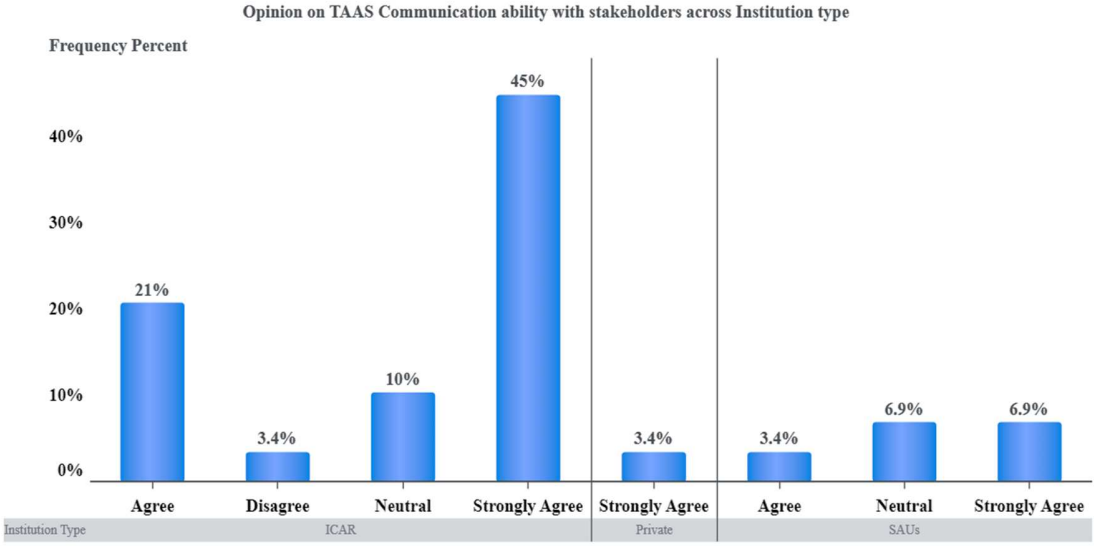


Fig 8: Institution-wise Frequency (%) of Stakeholders opinions on TAAS communication ability with diverse stakeholders and organizations

The results indicated that more than half of the respondents (> 50 %) strongly agree that TAAS maintains good communication with the stakeholders and their organizations with respect to the activities and progress it makes.

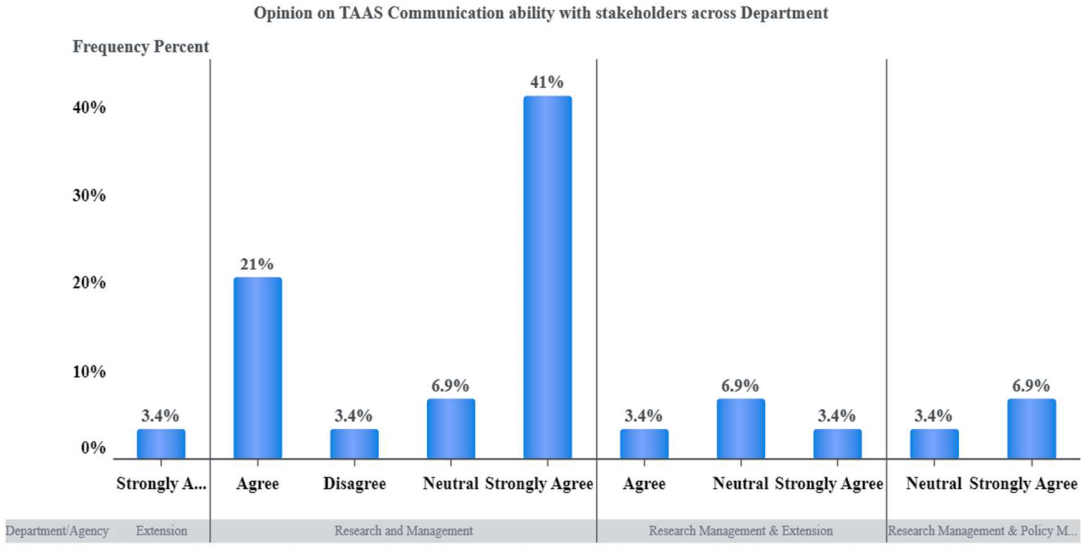


Fig 9: Profession-wise Frequency (%) of Stakeholders opinions on TAAS communication ability with diverse stakeholders and organizations

Only 3.4 per cent of the respondents from each group disagree as they have very less interaction with the organization, and they do not have any access to the sessions and other activities organized by TAAS. (Fig 7 to Fig 10)

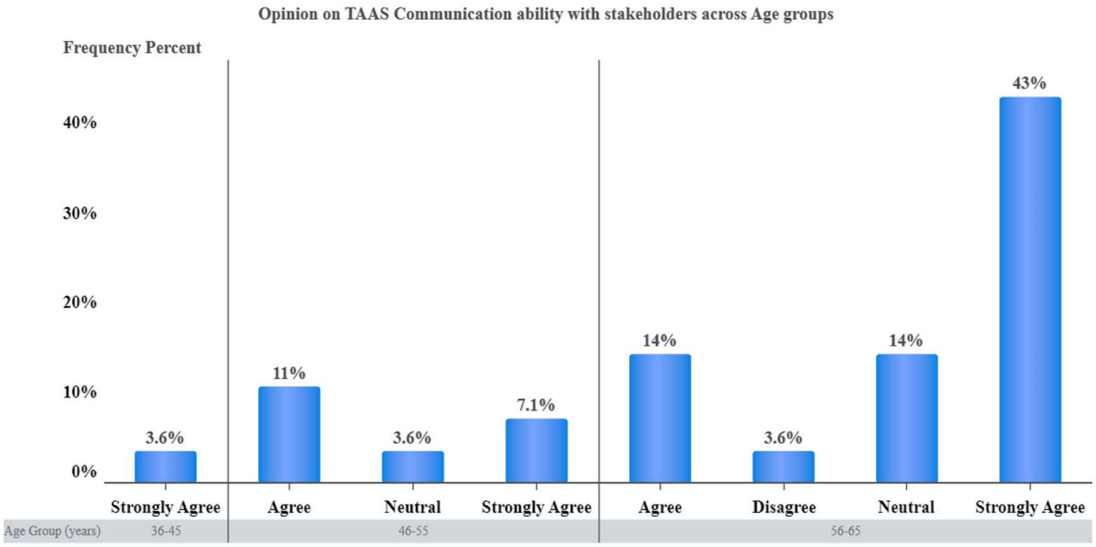


Fig 10: Age-wise Frequency (%) of Stakeholders opinions on TAAS communication ability with diverse stakeholders and organizations

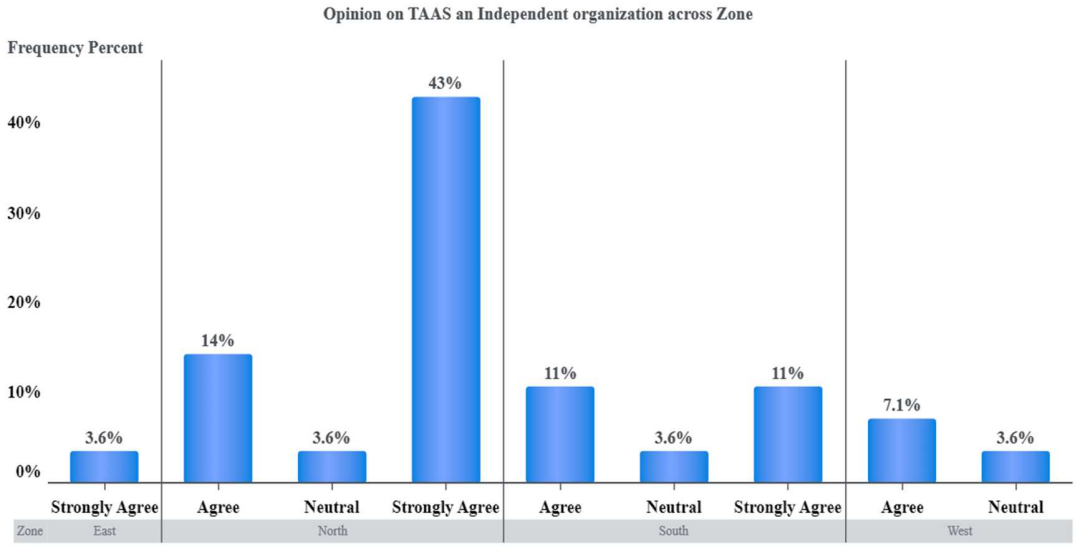


Fig 11: Zone-wise Frequency (%) of Stakeholders opinions on TAAS working as an independent agency

The position of TAAS acting as an independent agency was opined by different stakeholders across different categories such as zone (Fig 11), Institution type (Fig 12), profession type (Fig 13) and Age group (Fig 14). The opinions are positively skewed i.e., all the respondent's opinions were strongly agreeing (60 % in zone, 54 % each in Institution Type and profession and 58 % in Age groups), agree (32 % in zone, 35 % each in Institution Type and profession and 34 % in Age groups) and neutral (4 % in zone, 11 % each in Institution Type and profession and 8 % in Age groups) towards TAAS working as an independent organization.

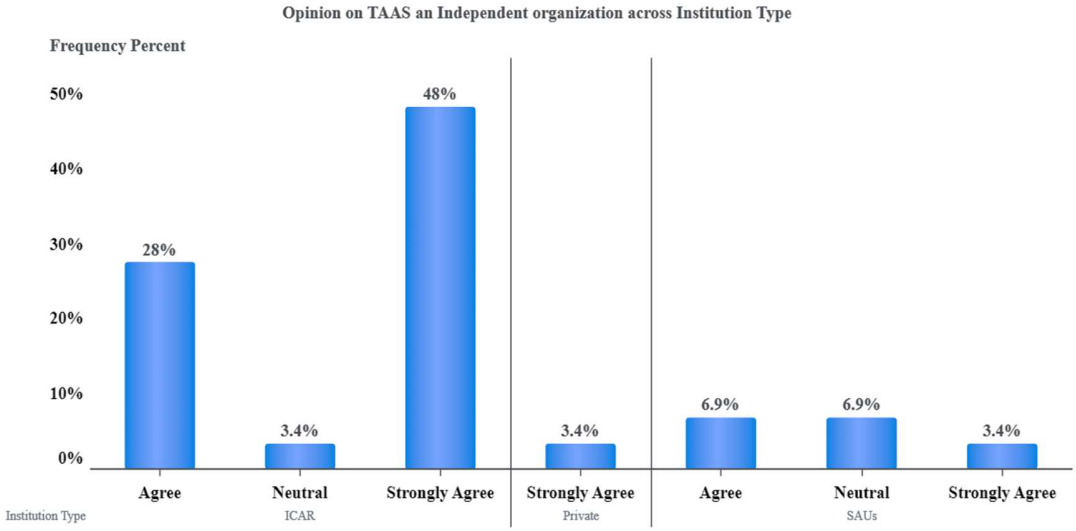


Fig 12: Institution-wise Frequency (%) of Stakeholders opinions on TAAS working as an independent agency

The stakeholders in organizations in northern and southern India had stronger opinions compared to east and west. This imbalance exists due to lower importance given to institutions located in east and western India along with greater coverage of north zone.

The results in Fig 13 depict that most of the stakeholders opined that the TAAS is an independently working organization since its establishment and attained greater success in performing activities and achieving its goals.

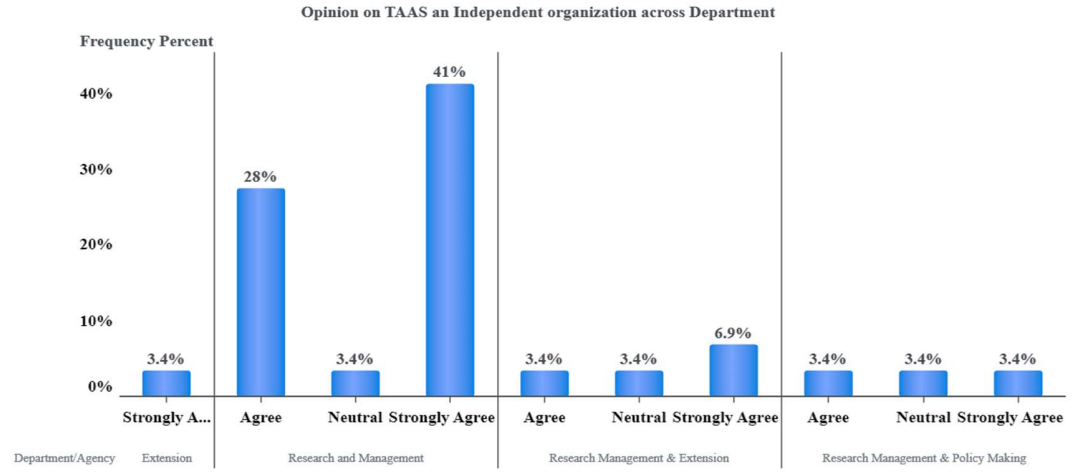


Fig 13: Profession-wise Frequency (%) of Stakeholders opinions on TAAS working as an independent agency

Most of the respondents, profession, and age wise, opined that they strongly agree with the TAAS communication with them and their organizations with respect to the activities they perform. They opined that TAAS is very considerate in terms of taking up actions/

activities based on the prevailing needs and issues researchers and stakeholders are facing in the present agricultural context.

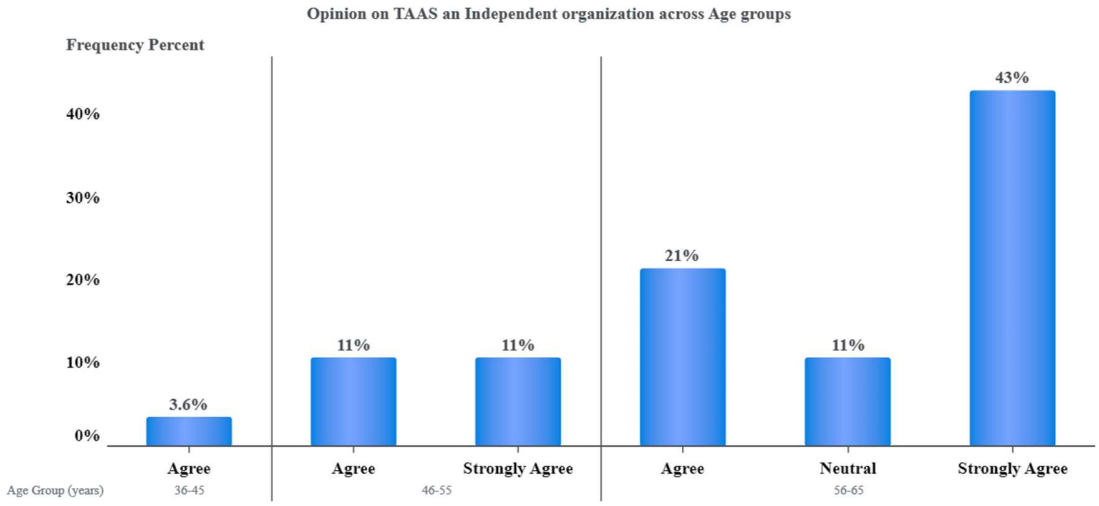


Fig 14: Age-wise Frequency (%) of Stakeholders opinions on TAAS working as an independent agency

TAAS undertake many activities such as brain storming sessions, symposiums, workshops etc., on current and latest advances and developments in the agricultural sciences which will have significant impact on the enrichment of knowledge and performance of its stakeholders and their organizations. In this context, the perceptions of respondents on TAAS activities were reviewed and the results are compiled into scenic visualization across different categories.

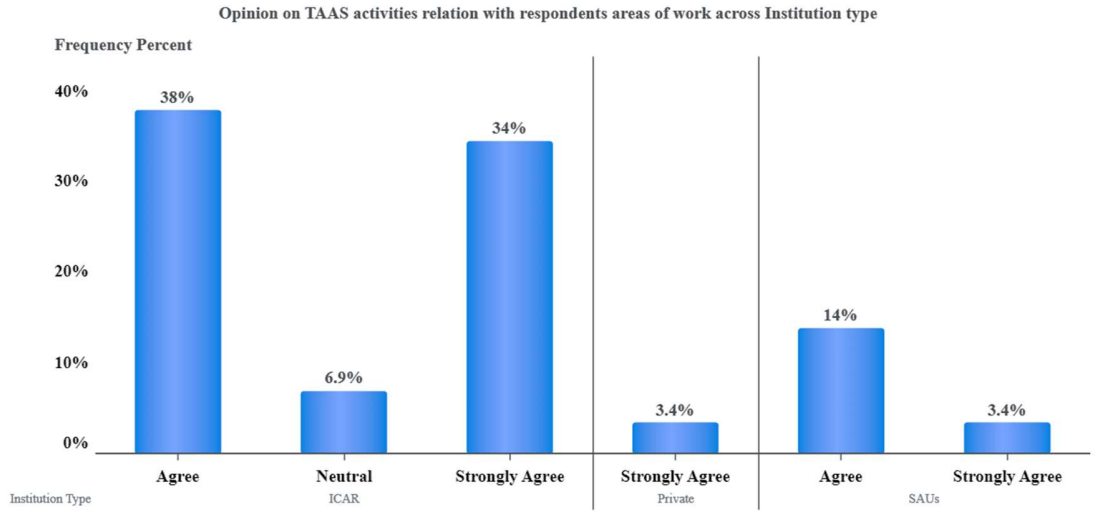


Fig 15: Institution-wise Frequency (%) of Stakeholders opinions on impact of TAAS activities on areas of work of stakeholders and their organizations

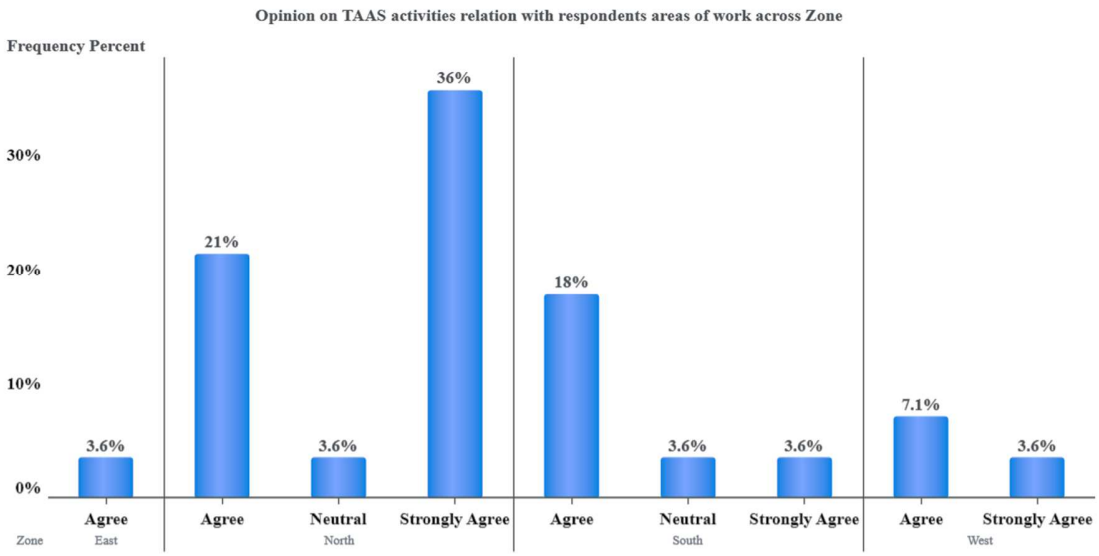


Fig 16: Zone-wise Frequency (%) of Stakeholders opinions on impact of TAAS activities on areas of work of stakeholders and their organizations

Among the categories of Institutions (Fig 15), ICAR institutes agree (38 %) and strongly agree (34 %) followed by SAUs 14 per cent agree and 3.4 per cent strongly agree and Private institutions (3.4 % strongly agree).

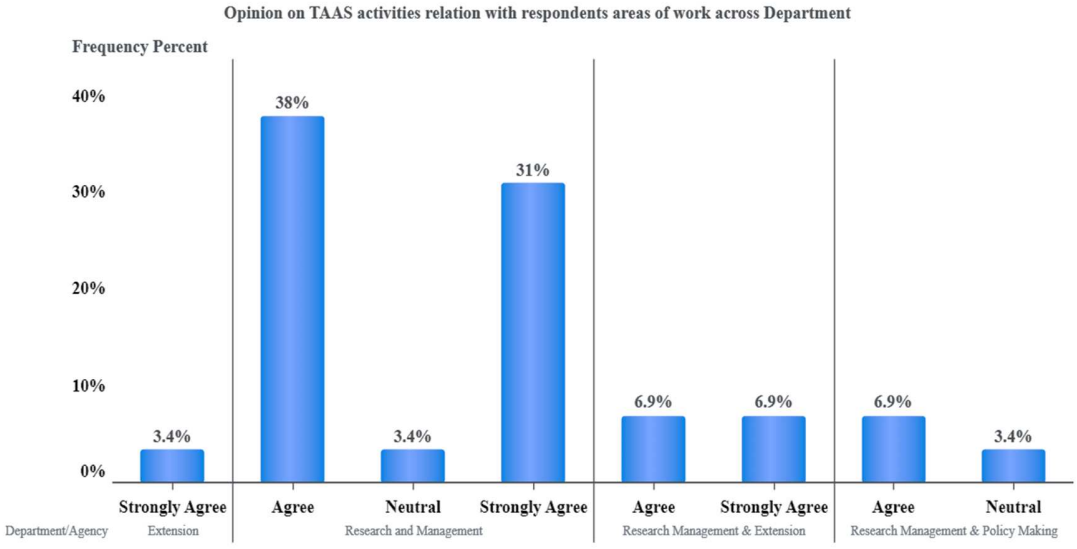


Fig 17: Profession-wise Frequency (%) of Stakeholders opinions on impact of TAAS activities on areas of work of stakeholders and their organizations

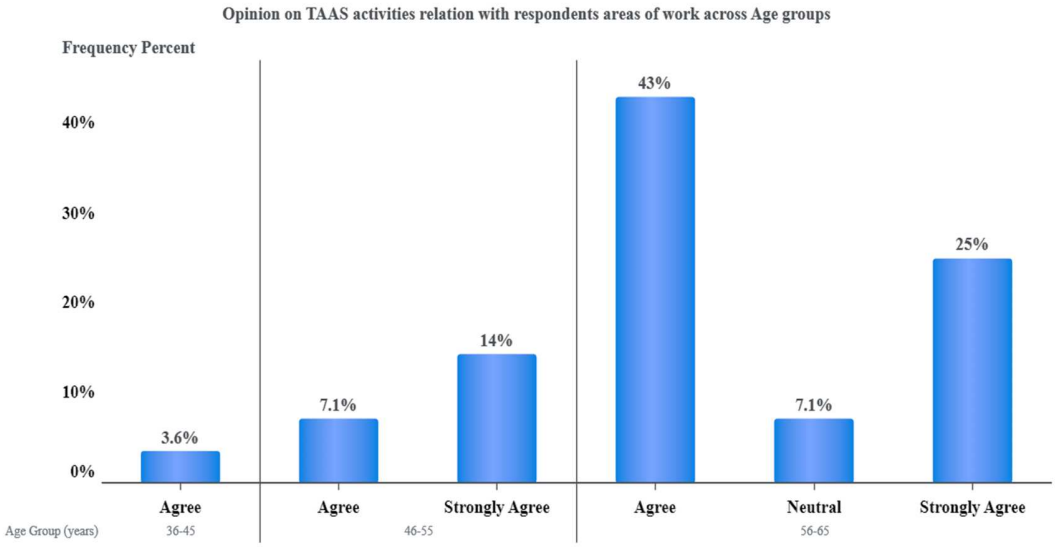


Fig 18: Age-wise Frequency (%) of Stakeholders opinions on impact of TAAS activities on areas of work of stakeholders and their organizations

The opinions across zone and profession are shown in the Fig 16 and Fig 17, respectively. North zone respondents strongly agree (36 %) with the impact of TAAS activities whereas South zone respondents agree with the TAAS activities (18 %). Though the results of east and west indicate the agree opinion but their percentage is very less as compared to that of north and south.

The Fig 18 indicates that age group of 56-65 years strongly agree (43 %) and agree (43 %) compared to 46-55 age group (14 % of strongly agree and 7.1 % agree) and 36-45 age group only (3.6 %).

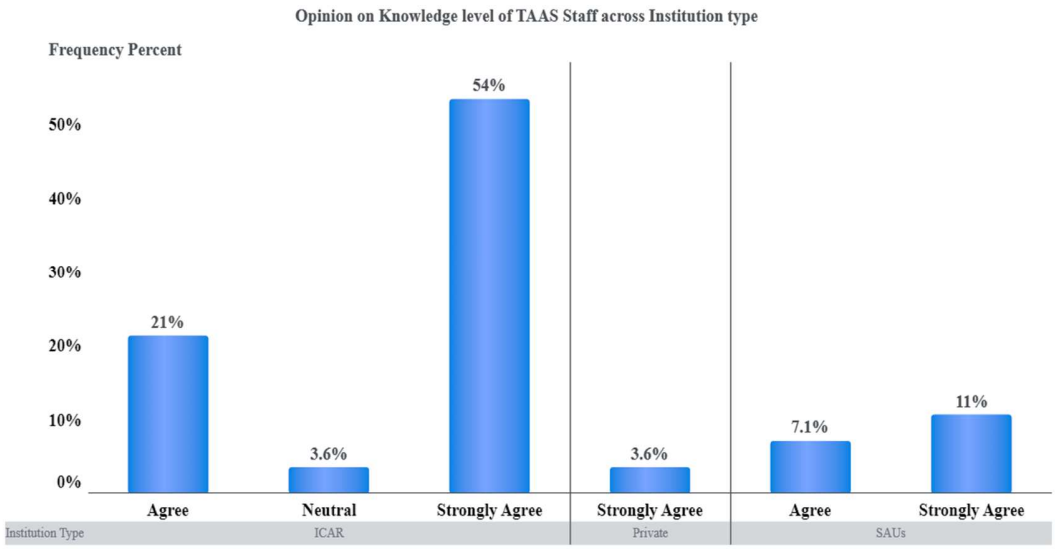


Fig 19: Institution-wise Frequency (%) of Stakeholders opinions on knowledge level of TAAS staff

The quality of output of any activity or session is directly related with the knowledge level of the participants or delegates discussing/giving feedback on them. The extent of the knowledge and its level of influence on the respondents were asked to rate from 1 to 5 and using frequency percentages across various categories were analyzed and depicted as graphs.

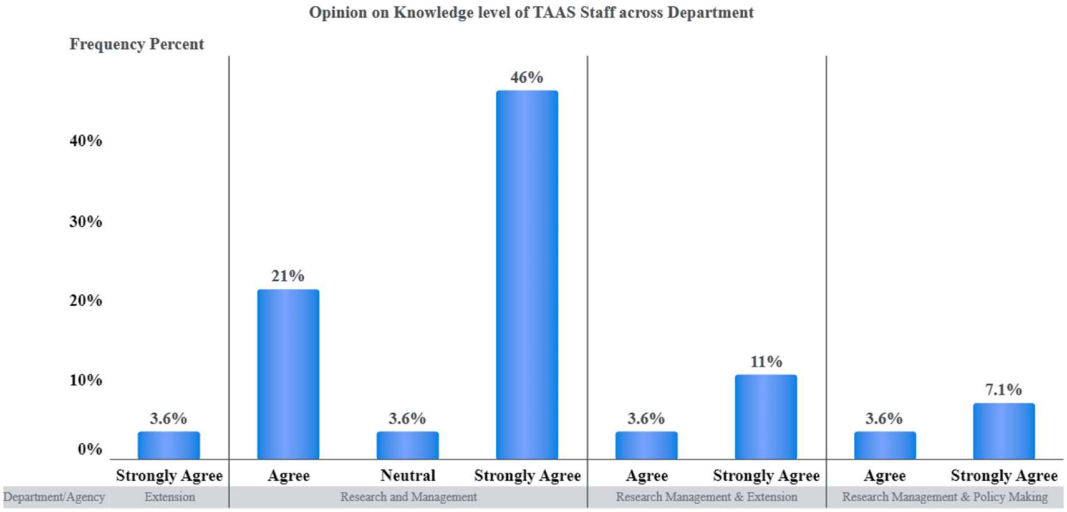


Fig 20: Profession-wise Frequency (%) of Stakeholders opinions on knowledge level of TAAS staff

The institute (Fig 19) and profession wise (Fig 20) response on knowledge of TAAS staff clearly indicate that the TAAS staff have greater knowledge level and has positive influence on the respondents. The percentage respondents strongly agreeing with the point in zone and profession wise were 70 per cent and 67 per cent, respectively.

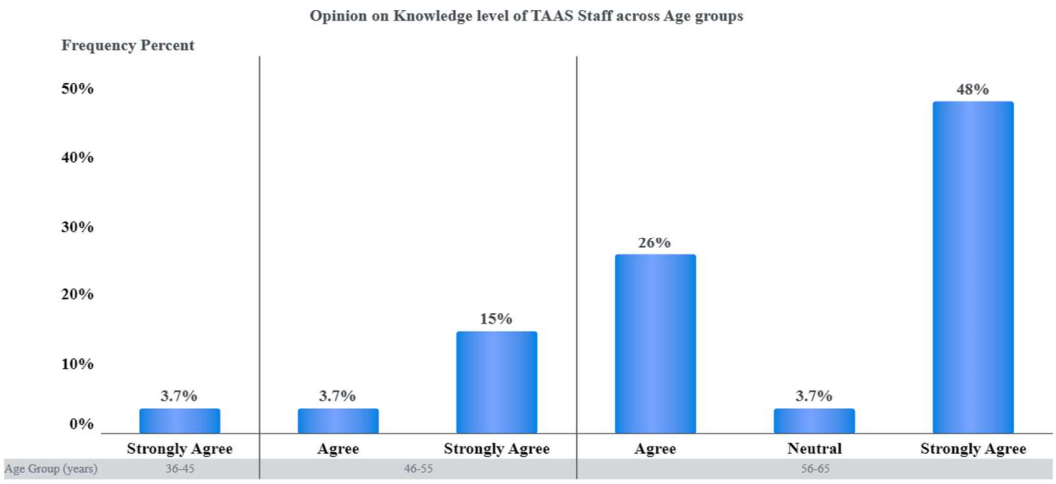


Fig 21: Age-wise Frequency (%) of Stakeholders opinions on knowledge level of TAAS staff

The opinion of different age groups on the knowledge level of TAAS staff was analyzed and the results show that the 46-65 age group have strong opinion such as strongly agree (48 %), agree (26 %) and neutral (3.7 %) followed by 46-65 age group with strongly agree (15 %) and agree (3.7 %). Only 3.7 per cent of 36-45 age group accept this position. None of the respondents disagree or strongly disagree with this position of TAAS (Fig 21).

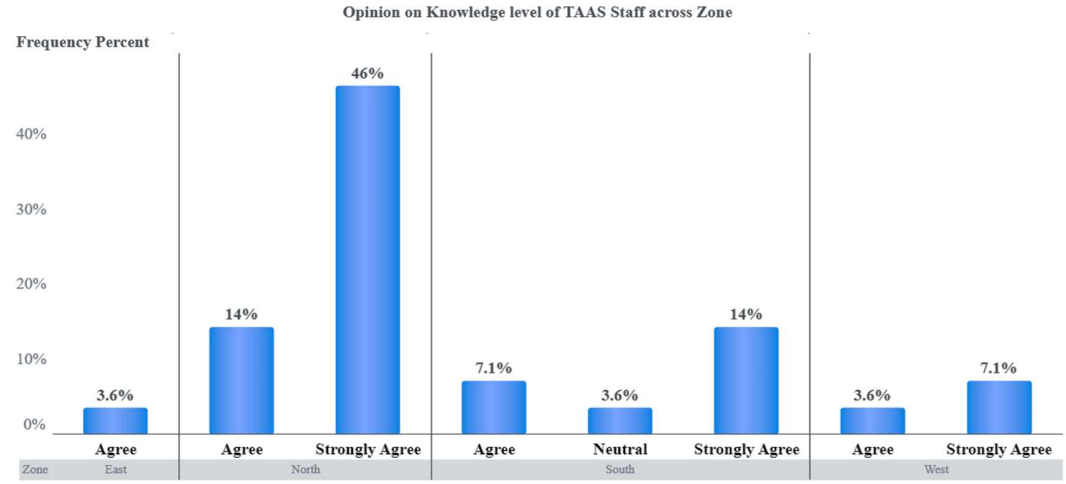


Fig 22: Zone-wise Frequency (%) of Stakeholders opinions on knowledge level of TAAS staff

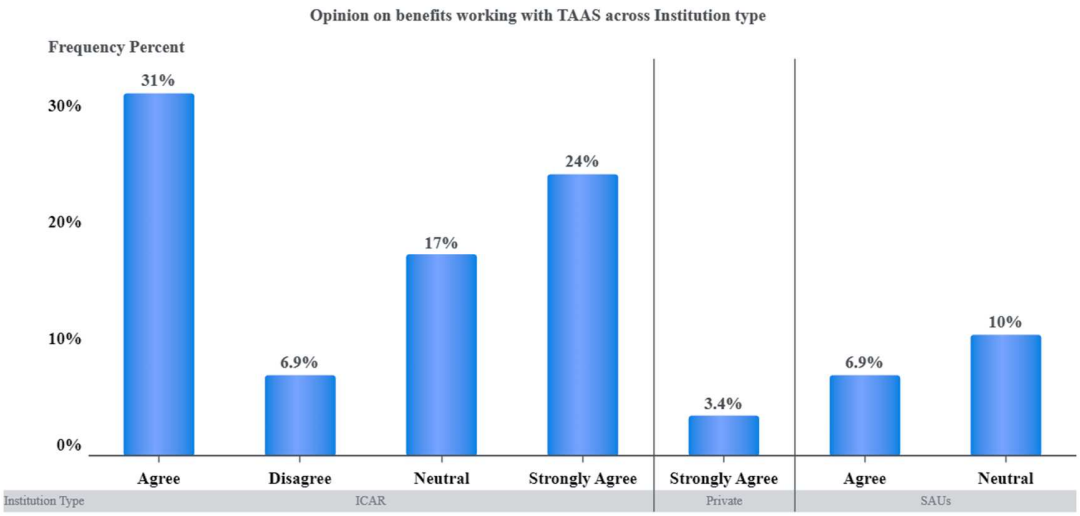


Fig 23: Institution-wise Frequency (%) of Stakeholders opinions on benefits by working with TAAS

The opinions of respondents on benefits by working with TAAS has been scaled and described. The responses portrayed both positive and negative results with high distribution towards agree and low towards disagree. The institution-wise scattering was found that more than 80 per cent respondents strongly agree and agree that they are benefitted and only 10 per cent and 6.9 per cent respondents opined neutral and disagree

(Fig 23). The respondents who disagreed were found only in ICAR institutes not in SAUs and private agencies.

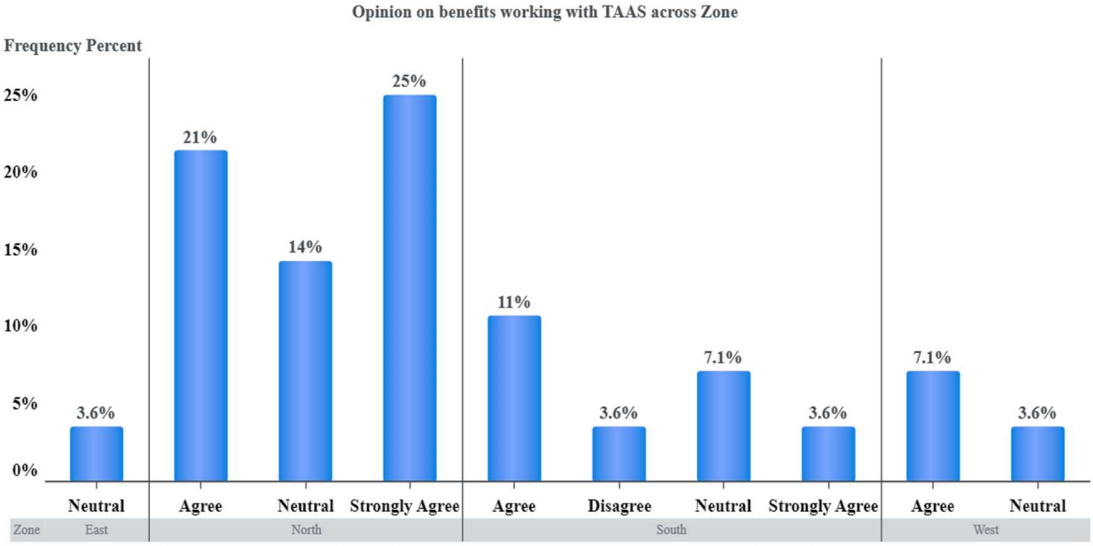


Fig 24: Zone-wise Frequency (%) of Stakeholders opinions on benefits by working with TAAS

The Zonal distribution (Fig 24) illustrates favorable response except 3.6 per cent of south zone respondents whose opinion was pessimistic. The rest of the respondents i.e., 96 per cent of respondents were satisfied with working with TAAS.

The Fig 24 shows the professional level results. The opinions indicated the same results as at zonal where, 93.1 per cent were positive and 6.9 per cent indicate negative.

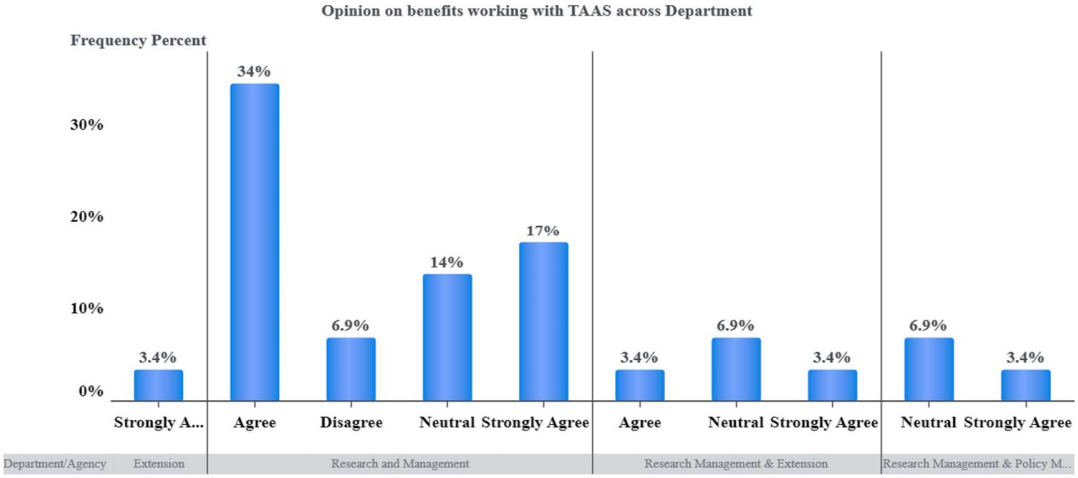


Fig 25: Profession-wise Frequency (%) of Stakeholders opinions on benefits by working with TAAS

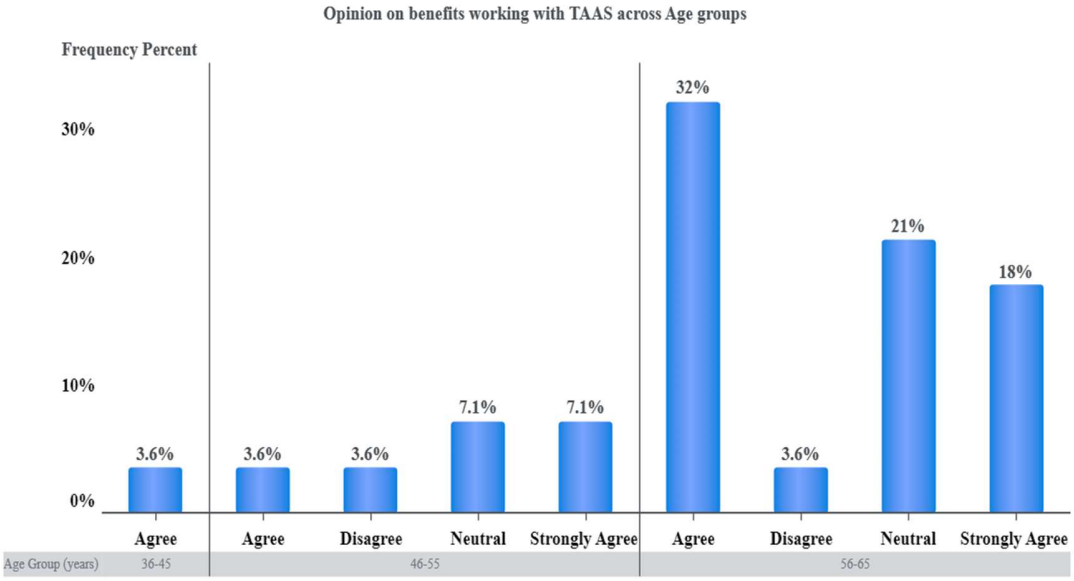


Fig 26: Age-wise Frequency (%) of Stakeholders opinions on benefits by working with TAAS

The graph (Fig 26) depicts the opinions of respondents on TAAS benefitting them across different age groups. The results have both positive and negative responses where 93 per cent were skewed right (benefitted) and seven per cent skewed left (not benefitted).

The institution-wise stakeholders' opinions on TAAS clarity in vision, mission and goals were analyzed and depicted in the Fig 27. The results indicate that all the respondents have positive opinion towards TAAS vision, mission, and goals and want TAAS to be continued with the same in future.

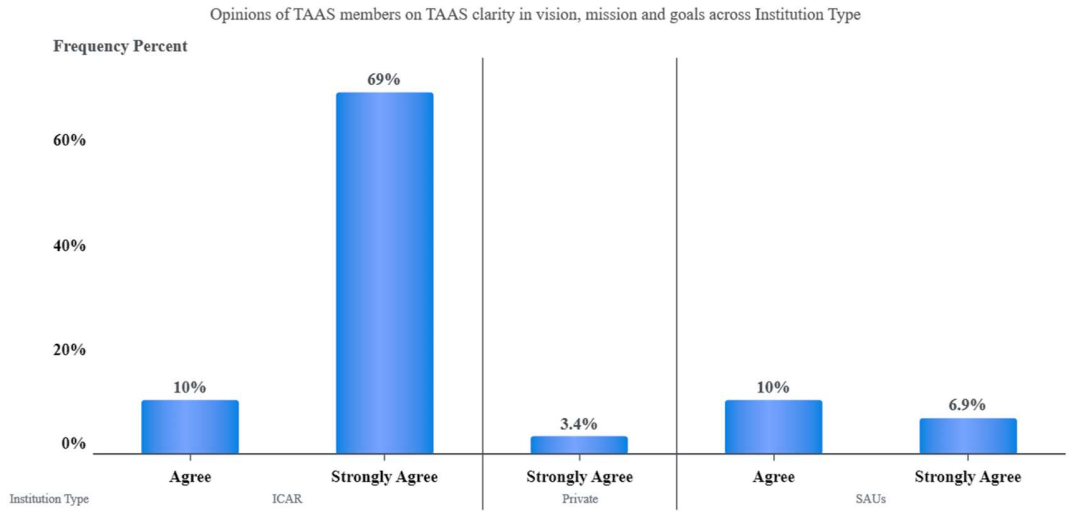


Fig 27: Institution-wise Frequency (%) of Stakeholders opinions on TAAS clarity on mission, vision, and goals

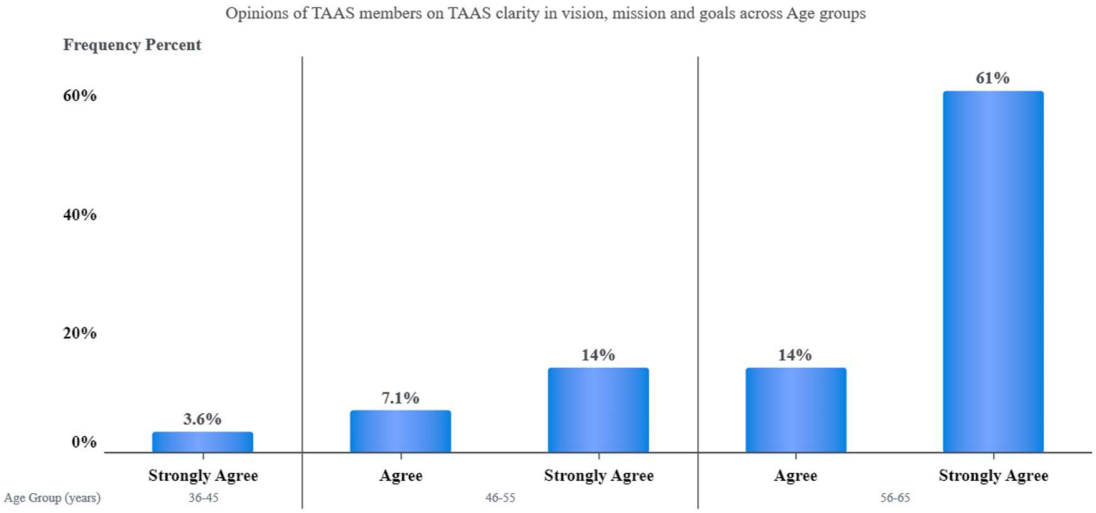


Fig 28: Age-wise Frequency (%) of Stakeholders opinions on TAAS clarity on mission, vision, and goals

Among the stakeholders, 80 per cent (69 % of ICAR, 3.4 % of Private and 6.9 % of SAUs) strongly agree and 20 per cent (10 % of ICAR and 10 % of SAUs) agree with the TAAS clarity in vision, mission, and goals (Fig 27).

It may be inferred from the fig 28 that all respondents of different age groups agreed with the TAAS vision, mission and goals indicates that TAAS has performed according to the purpose for which it was established and achieving its goal.

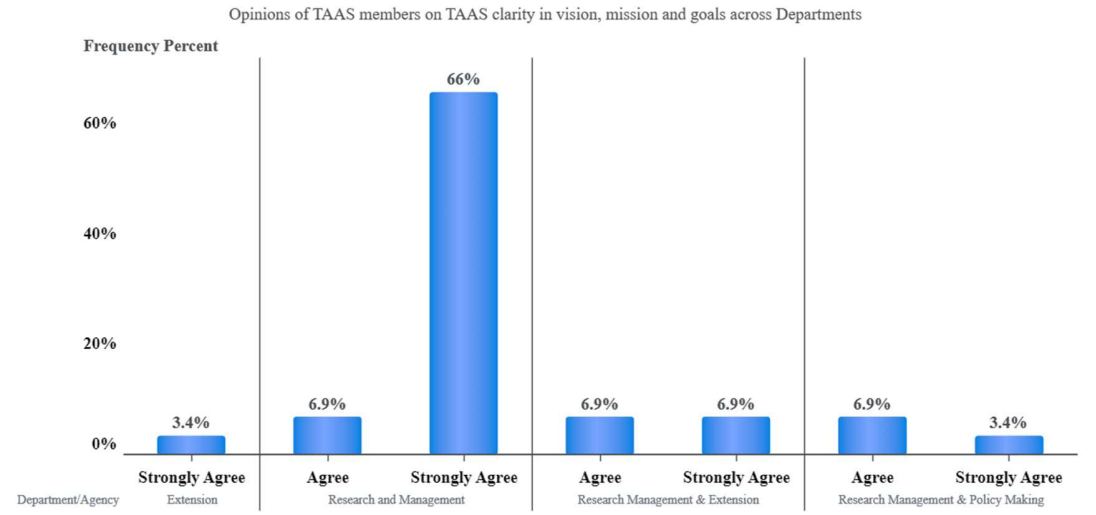


Fig 29: Profession-wise Frequency (%) of Stakeholders opinions on TAAS clarity on mission, vision, and goals

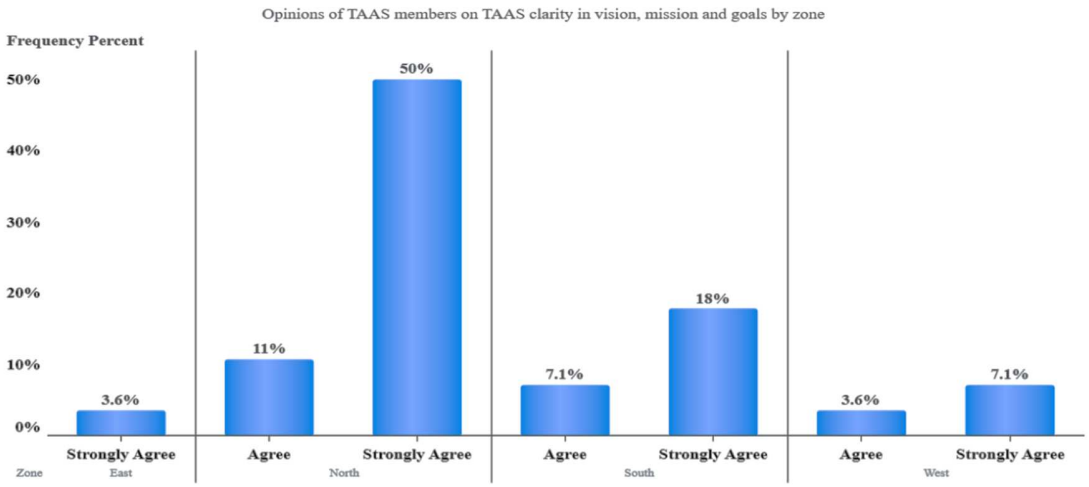


Fig 30: Zone-wise Frequency (%) of Stakeholders opinions on TAAS clarity on mission, vision, and goals

The organization or agency should be smart and work hard to achieve the vision, mission, and goals for which it is established. To access the extent to which the goals, mission and vision has been achieved was obtained by analyzing the respondent's opinion across profession (Fig 29) and zone (Fig 30). The opinions were positively skewed towards agree category and no negative skewness was seen indicating that the TAAS mission, vision, and goals were right and needed for addressing the real-world situation. The TAAS being successful in achieving its goals, now it can continue with same for still better performance in future.

Technology advancement enables organization to attain a greater success and reach. The post-pandemic brought greater changes in educational organizations as well by moving online and reaching more areas and people.

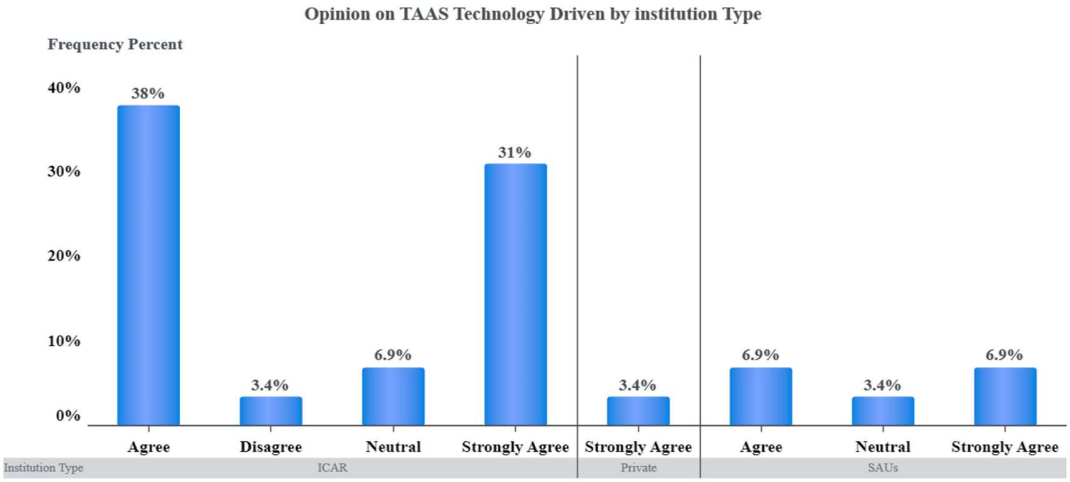


Fig 31: Institution-wise Frequency (%) of Stakeholders opinions on extent of Technology adoption in TAAS

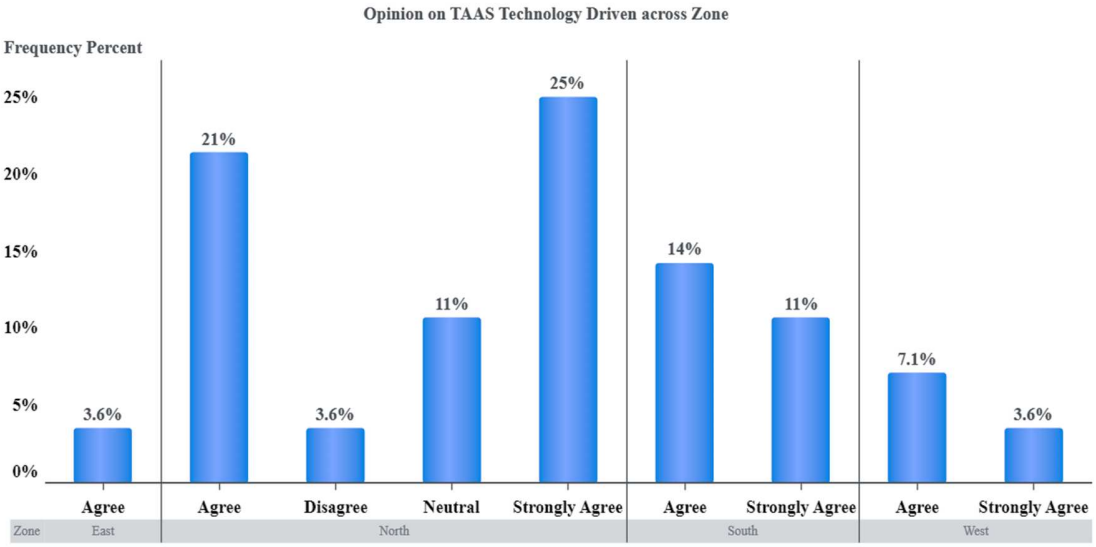


Fig 32: Zone-wise Frequency (%) of Stakeholders opinions on extent of Technology adoption in TAAS

The results on how best TAAS was adopting the new technological advances in performing its activities such as organizing symposiums, conferring awards, brain storming session, lectures, and preparation of publications, communicating them to the concerned, etc., were compiled using SAS visualization techniques. They were analyzed and depicted according to study categories in figs 31 to fig 34.

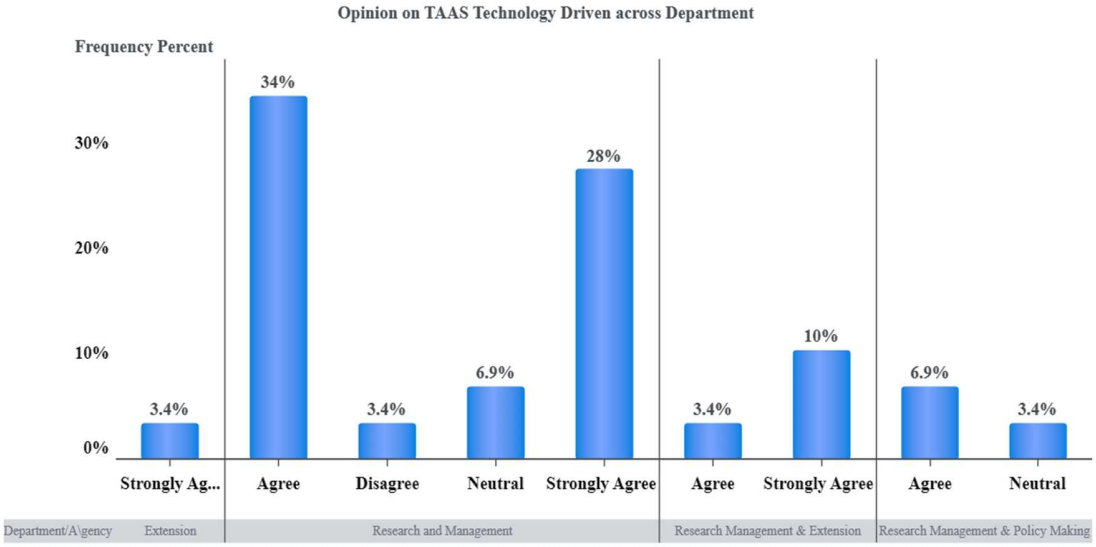


Fig 33: Profession-wise Frequency (%) of Stakeholders opinions on extent of Technology adoption in TAAS

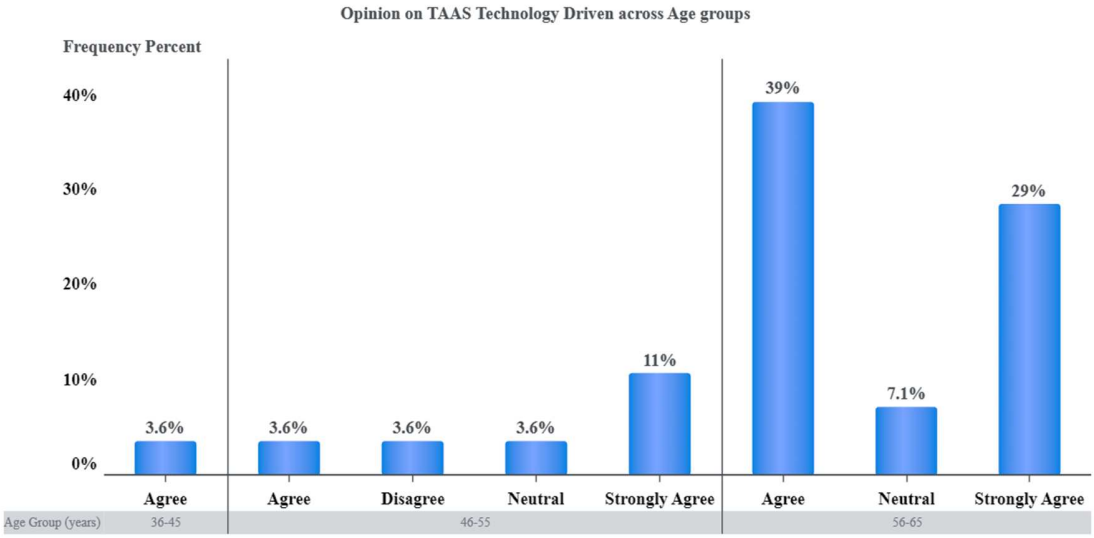


Fig 34: Age-wise Frequency (%) of Stakeholders opinions on extent of Technology adoption in TAAS

The results show both left tail and right tail distribution where most of the respondents opined positive i.e., strongly agree (> 40 % in all categories), agree (>42 % in all respective categories) and nearly 10 per cent felt neutral (Fig 31 to Fig 34). Only meagre per cent of 3.6 per cent respondents opined that the TAAS is not up to mark in making use of technological advances.

The age group categories from the Fig 34 were 36-45 years (only 3.57 % agree), 46-55 where 10.57 per cent strongly agree and 3.57 per cent each agree, disagree and neutral indicating that most of the stakeholders working for and attached with TAAS were of age 46-55 group followed by 56-65 years and 36-45 years, respectively.

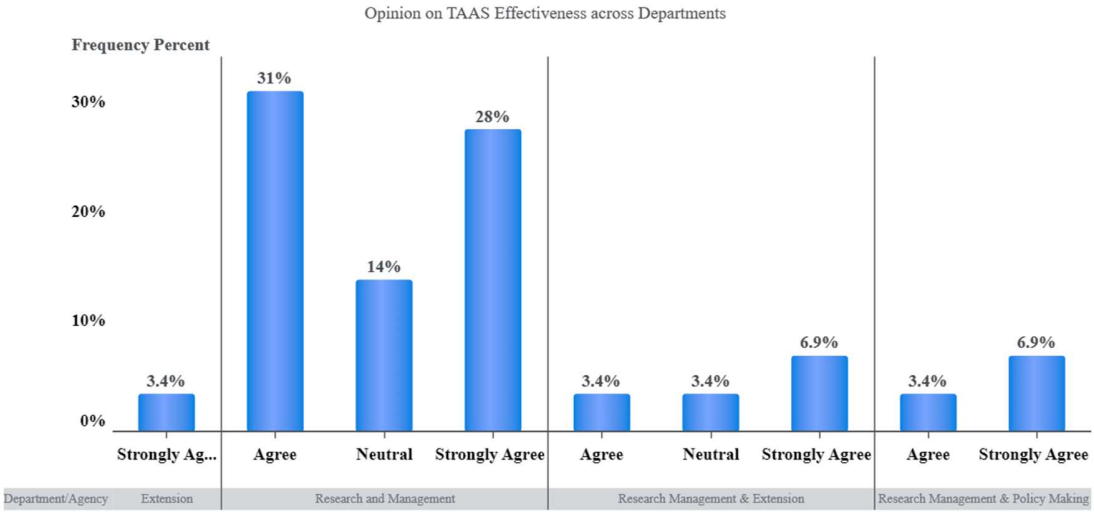


Fig 35: Profession-wise Frequency (%) of Stakeholders opinions on effectiveness of TAAS

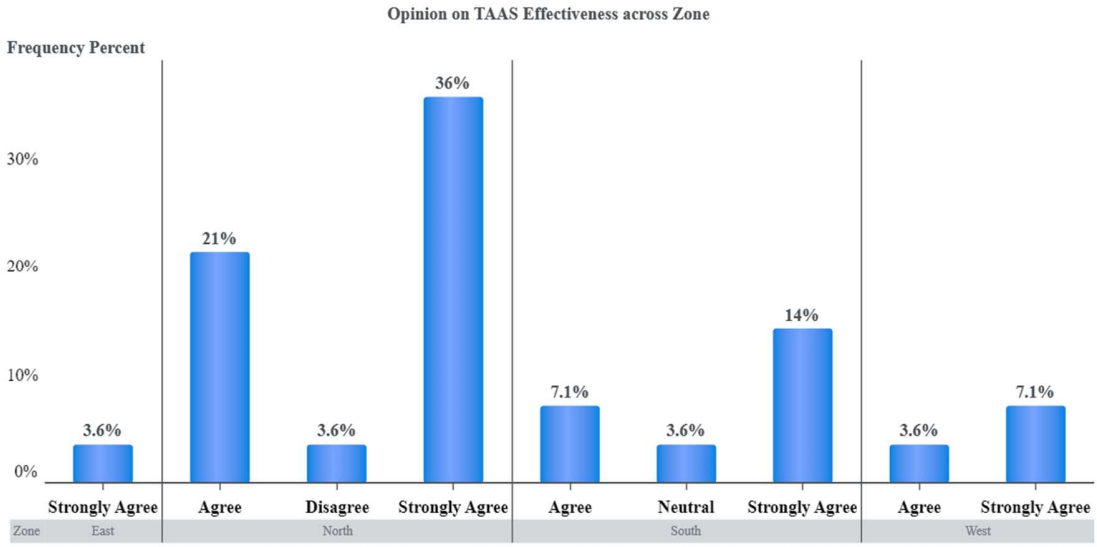


Fig 36: Zone-wise Frequency (%) of Stakeholders opinions on effectiveness of TAAS

The feedback on effectiveness of an organization has critical role in progress and sustainability of any organization as it provides the true impact of the activities or operations on the users or participants. The effectiveness of TAAS in performing its activities and attaining its objectives was opined by the different stakeholders across various sub- categories.

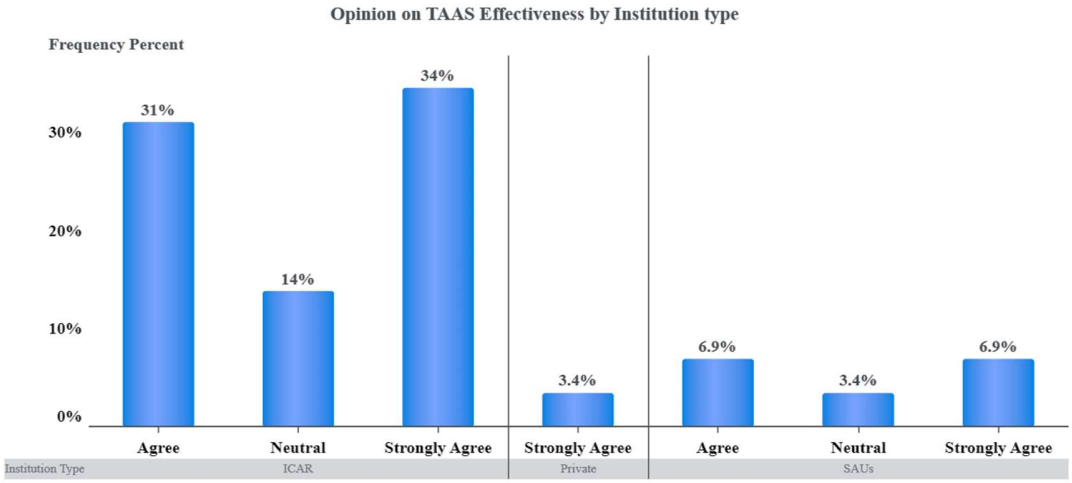


Fig 37: Institution-wise Frequency (%) of Stakeholders opinions on effectiveness of TAAS

The results were depicted into bar visualizations across categories such as profession (Fig 35), Zone (Fig 36), Institution type (Fig 37) and Age group (Fig 38). The opinions were positive indicating that TAAS was successful in implementation of its activities and operations according to the expectation of the participants and stakeholders.

The results form Fig 37 indicated that ICAR organizations have more stakeholders compared to SAUs and Private. Among them, 44.83 per cent strongly agree, 37.93 per cent agree and 17.24 per cent were neutral with TAAS effectiveness in its activities and mandates.

The graphs (Fig 34 to Fig 38) indicated that most of the respondents strongly agree (approximately 43 % and above in each group), agree (ranging from 35 % to 40 % in all groups) and neutral (3 % to 5 % in the groups developed).

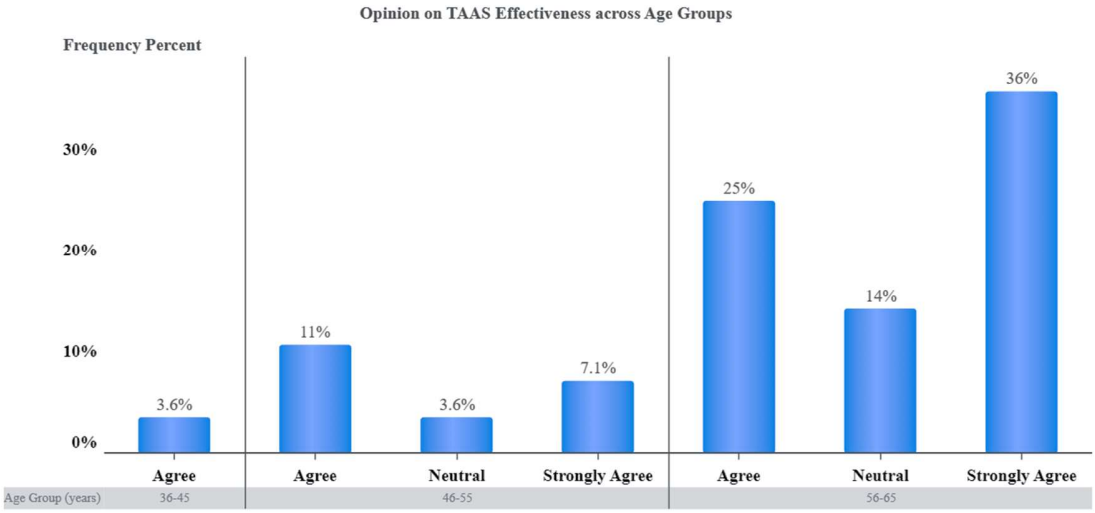


Fig 38: Age-wise Frequency (%) of Stakeholders opinions on effectiveness of TAAS

Factor Analysis

The responses about TAAS and its performance were collected from different stakeholders of organizations across India using pre-defined questionnaire. To obtain the key factors/dimensions among the 14-dimensions opined by the stakeholders, factor analysis was carried out using all the variables included in the study. The results of factor analysis enable the TAAS to gain an insight into what are the underlying dimensions that affect its performance. Further these factor loadings are used to develop a composite score to rank them into high, medium, and low category. Exploratory factor analysis (EFA) was employed, and the results are presented in Table 7. The, eigen values which identify the important factors was used as a basis for selecting the number of factors. This gives an insight into the dimensions of data. The table reveals that first component of eigen value of 6.59 was most important which was followed by eigen value of 1.18 (11.65 %) and 0.99 (9.80 %), the first component alone accounted for 64.85 per cent of the total variations in the dataset. This implies that seven out of 14 variables were captured in the first component alone. The important underlying relationship depicted by component one (factor 1) can be understood by examining the factor loadings which is presented in the Table 8. Though one component alone is enough to study the relationship between the variables, the second (factor 2) and third (factor 3) component were also retained to know what they indicate.

Table 7: Summary Statistics of Exploratory Factor Analysis

Sl No.	Eigenvalue	Difference	Proportion	Cumulative
1	6.59609	5.41136	0.6485	0.6485
2	1.18474	0.18805	0.1165	0.765
3	0.99669	0.22503	0.098	0.863
4	0.77165	0.25531	0.0759	0.9388
5	0.51635	0.14235	0.0508	0.9896
6	0.37399	0.24119	0.0368	1.0264
7	0.1328	0.06366	0.0131	1.0394
8	0.06914	0.02213	0.0068	1.0462
9	0.04701	0.08913	0.0046	1.0509
10	-0.0421	0.028	-0.0041	1.0467
11	-0.0701	0.0464	-0.0069	1.0398
12	-0.1165	0.01502	-0.0115	1.0284
13	-0.1315	0.02539	-0.0129	1.0154
14	-0.1569		-0.0154	1

Scree plots are created by plotting the number of factors against their respective eigen value (Hackett and Foxall, 1994). It is a graph of the eigen values against all the factors. The graph is useful for determining how many factors to be retained.

According to the Figure 39, the plot looks like the side of a mountain, and "scree" refers to the debris fallen from a mountain and lying at its base. Therefore, the scree plot proposes to stop analysis at the point where the mountain ends, and the debris (error) begins. In this instance, that point coincides with the eigenvalue criterion.

Though it may not be necessary to explain each loading separately, the dimension they represent can be understood by studying the variables in each component in Table 8. This led to the identification of three clear dimension in descending order of their importance. The first component brought together the variables related to Independence/Accountability/Goals. This component shows that respondents were very affirmative towards the way TAAS is performing its activities. Hence, TAAS should keep its activities similarly and should work as an independent organisation.

Second component though of much lesser importance compared to first brought together variables associated with Role/Activities/Effectiveness. Role of TAAS staff being important aspect in TAAS performance must be addressed very often. Activities of TAAS in all fields of agricultural research is very important, keeping in view the long-term effectiveness for ensuring sustainable agriculture addressing changing climate challenges.

The final component was named Technology / Prospects as the variables in the component point towards future role of TAAS in sustainability aspect of Agriculture as a whole.

Table 8: Factor Loadings of variables and Dimensions of TAAS Stakeholders

Variables	Independence/ Accountability/ Goals	Role/Activities/ Effectiveness	Technology / Prospects
TAAS has a clear vision, mission, goals	0.74178	0.08925	0.00252
Does TAAS consult/communicate enough with stakeholders	0.71861	0.51421	0.05066
Do you think TAAS is a credible and accountable organization?	0.71018	0.2893	0.2166
Do you think that TAAS helps its staff to perform well?	0.70628	0.43791	0.26009
Do you rate the accountability and transparency of TAAS high	0.69546	0.27001	0.50532
Do you know TAAS is independently working?	0.63914	0.15245	0.18046
Do you think the Members/ Staff of TAAS are knowledgeable about the problems and prospects of Indian Agriculture	0.57594	0.20664	0.56828
Do you understand your role in TAAS?	0.1373	0.89024	0.23872
Does TAAS assess effectiveness and results of its activities	0.3689	0.7306	0.18083
Do you get any benefit/s from working with TAAS	0.29655	0.70924	0.2505
Do the TAAS Members/ staff plan and perform actions to solve problems and enhance prospects of Indian Agriculture	0.08913	0.20574	0.76215
Is TAAS technology driven?	0.04534	0.09242	0.73379
Do you feel the work of TAAS is related to your work?	0.34008	0.2113	0.41478
Like to explore more about TAAS?	0.33802	0.25948	0.38779

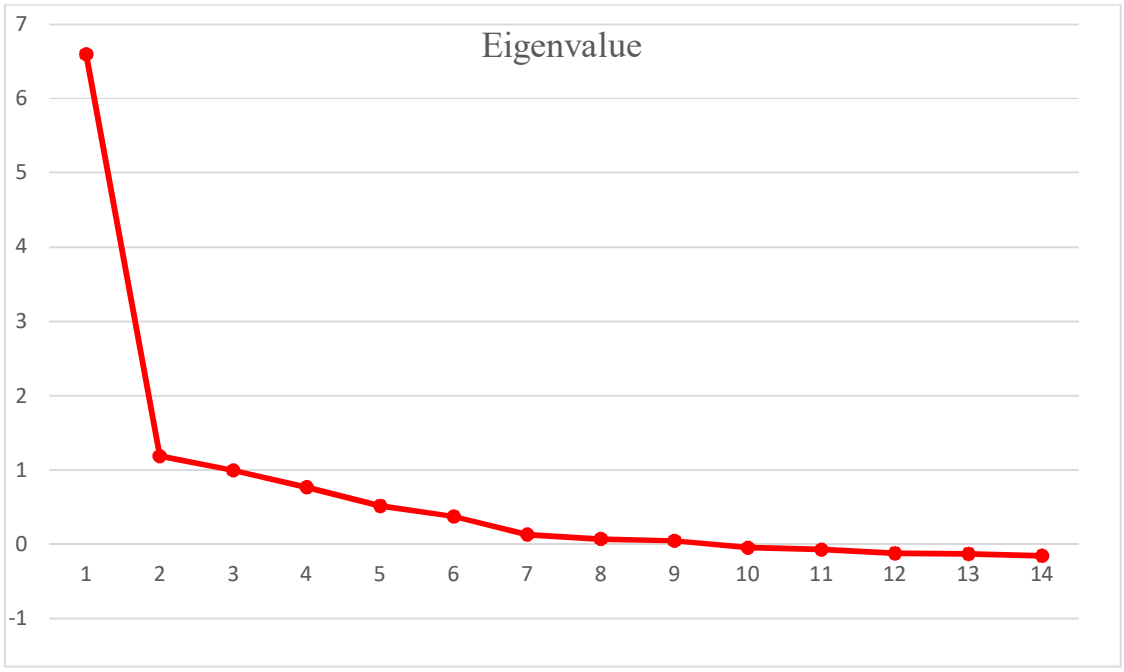


Figure 39: Plot of the Eigen values

Thus, we have seen that the results of factor analysis further support the view that TAAS is strong in clarity of purpose, consult and communicate well with stakeholders, credible and accountable organization, helps its staff to perform well, accountability and transparency, independently working, knowledgeable organization to undertake the mandated job; moderate in assessing the impact of its activities, involving and taking stakeholders into confidence/sensitizing about their role and what benefits they will get by involving in TAAS activities, and low in planning, technology use, and communication, marketing/publicity of TAAS in general.

Segmentation or Cluster Analysis

Segmentation of stakeholders (29) from different organizations was done based on response given by them on 14 questions into Segment 1, Segment 2, and Segment 3 (Table 9) to understand whether stakeholders are affirmative or not affirmative towards the TAAS and its activities (w.r.t 14 questions of Annexure 2 in Annexure V) dealing with the TAAS structure, process, performance, and relationship). The results indicate that Segment 1 consists of 17.24 per cent of total stakeholders who were affirmative to all the questions, except for the question on whether TAAS help its staff to perform well. The segment 1 stakeholders were having good opinion about the TAAS, but they were not fully satisfied with TAAS in reaching to and involving them enough in its activities. Segment 2 consists of 72.41 per cent of total respondents who were affirmative to all the questions and are satisfied with TAAS activities and its performance. Segment 3 consists of 10.3 per cent of total respondents who were affirmative to all questions except that they were unsure about their role in TAAS, benefits they get from TAAS and the effectiveness/results of TAAS activities.

Table 9. Segmentation of Respondents

Cluster	Frequency percent	Characteristics of the Cluster
Segment 1 (S1)	5 (17.24)	Stakeholders who were neutral, but they have good opinion except for the question on whether TAAS help its staff to perform well
Segment 2 (S2)	21 (72.41)	Stakeholders who were affirmative to all questions
Segment 3 (S3)	3 (10.34)	Stakeholders who were affirmative to all questions except they were unsure about their role, benefits they get from TAAS and the effectiveness and results of TAAS activities.

Figures in parentheses in column 2 indicate the per cent of respondents lying in that Segment

The segment-wise average scores were analysed and obtained for the stakeholder's response towards TAAS structure, process, performance, and relationships. The results were compiled in the Table 10 where the value near to one indicate positive opinion i.e., agree with all the operations of TAAS, two indicates neutrality of the stakeholders and three indicates negative or disagreement of the stakeholders. The segment 1 average scores depict that the respondents of this segment were mostly neutral as values were nearer to two except on TAAS vision, mission, and goal (1.60 implying agree) and communication/relationship (3.00 implying disagree). The stakeholders of the segment two were fully agreed and satisfied with the TAAS and its working efficiency as the values were ranging between one and two. The segment 3 stakeholders were normally distributed among all the opinions where most of them fall under agree and satisfied category followed by neutral and negative.

Table 9 and table 10 clearly indicated the general picture of the stakeholder's opinion towards TAAS activities and its performance. To get deeper insights, classification of respondents across zones, type of institutions, professional groups, and age group was done which enables us to know the category-wise effectiveness of the TAAS and its operations. Table 11 shows the classification of stakeholders across zone and institution type. The segment level stakeholder distribution results reveal that, among all the zones the stakeholder's engagement was highest in North region (17) followed by South (8), West (3) and East (1), respectively.

Table 10. Average Scores given by respondents for questions on TAAS performance (by Segments)

Questions	Segments (Average Score)		
	S1	S2	S3
Do you think TAAS has a clear vision, mission, and goals?	1.60	1.10	1.33
Do you like to explore more about TAAS?	2.20	1.48	1.67
Do you understand your role in TAAS?	2.60	1.76	3.33
Do you feel the work of TAAS is related to your work?	2.20	1.52	1.67
Do you think that TAAS helps its staff to perform well?	2.80	1.43	2.33
Do you know TAAS is independently working?	2.20	1.33	2.00
Do you think TAAS is a credible and accountable organization?	2.20	1.14	1.67
Does TAAS consult/communicate enough with stakeholders	3.00	1.24	2.67
Do you get any benefit/s from working with TAAS	2.60	1.81	3.67
Do you rate the accountability and transparency of TAAS high	2.60	1.29	1.67
Do you think the Members/Staff of TAAS are knowledgeable about the problems and prospects of Indian Agriculture	2.20	1.19	1.33
Do the TAAS Members/staff plan and perform actions to solve problems and enhance prospects of Indian Agriculture	2.20	1.38	1.33
Does TAAS assess the effectiveness and results of its activities	2.20	1.43	3.00
Is TAAS technology driven?	2.40	1.71	1.00

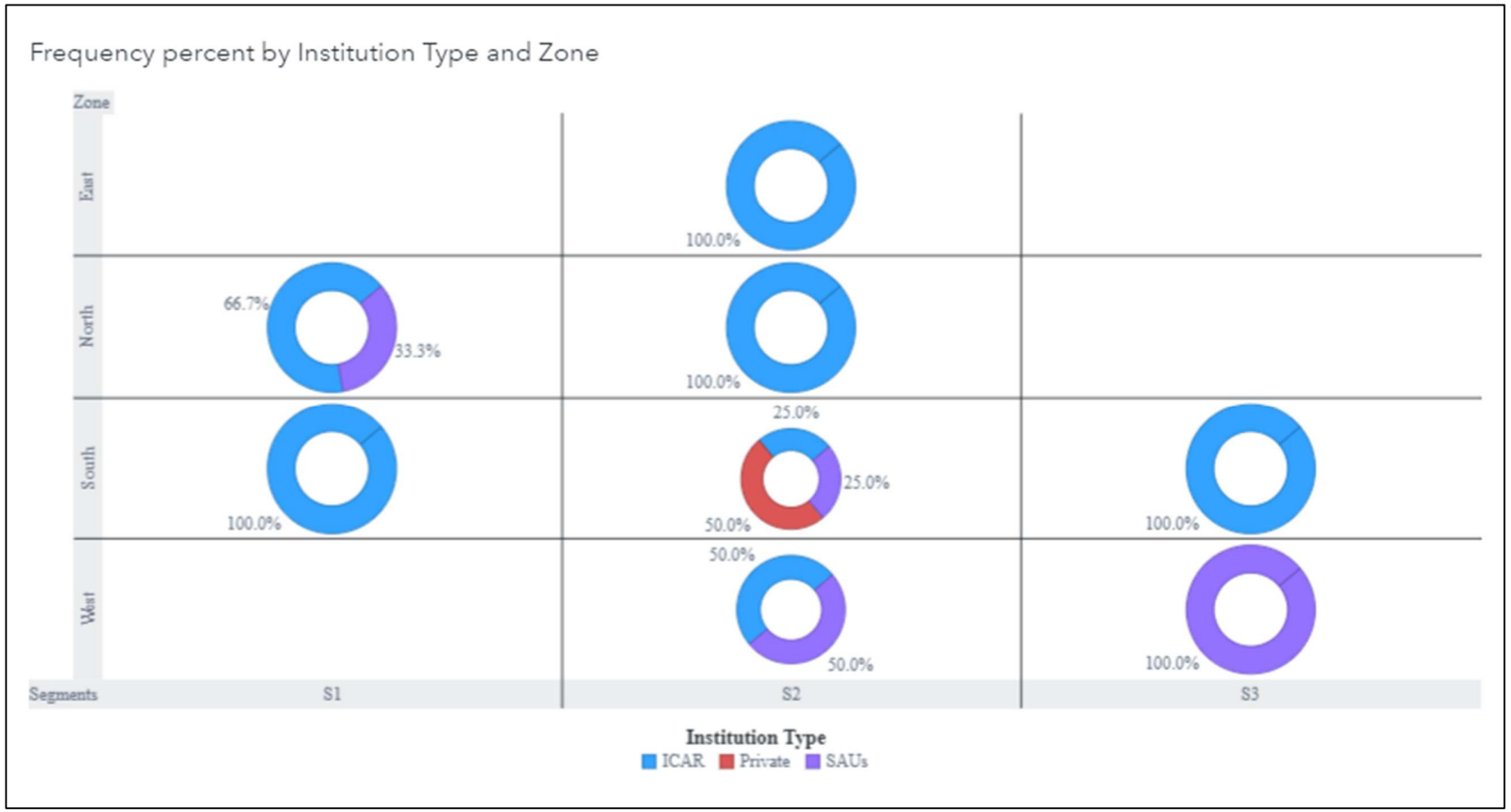


Figure 40: Segment-wise respondents across Institution type and Zone

The results of frequency percentage distribution of northern zone stakeholders across segment and institute show that 82.35 per cent belonged to segment 2 northern zone, ICAR institutes; 11.76 per cent belonged to segment 1 northern zone, ICAR institutes; 5.88 per cent were segment 1 northern zone, SAUs; and none were from all segments in other institutes. In southern region, the maximum stakeholder distribution was found in segment 1 ICAR (25 %), segment 3 ICAR (25 %), segment 2 other institutions (25 %), and segment 2 ICAR (12.5 %), respectively. The western zone stakeholder distribution indicates that most of them were affirmative i.e., 33.33 per cent were from segment 2 ICAR and SAUs each and the rest 33.33 per cent stakeholders were affirmative but they were unaware about their roles and responsibilities by engaging with the TAAS. Only segment 2 ICAR institute stakeholders were engaged with TAAS and none from the rest segments in the eastern region. Overall, the results indicate that in all the regions stakeholders of ICAR institutes were mostly affirmative and satisfied by engaging with TAAS followed by SAUs and other institutions, respectively. Along with this the regional imbalances were identified as most of the stakeholder's distribution were in northern India as compared to the other regions.

Distribution of respondents from the three segments across Institute types and zone is shown in Table 11 and Fig 40. We can clearly see that respondents are higher in number from Northern zone and ICAR institutions, which indicates that TAAS presence is more in northern region of the country and minimal presence in eastern and western part of the country.

The Table 12 gives the details about the segment-wise stakeholders opinions across professional groups. The results signify that research and management groups were engaged in TAAS activities, affirmative, satisfied with the TAAS and its operation.

Table 11. Zone and Institution wise segmentation

Zone	S1			S2			S3			Total Frequency
	ICAR	SAUs	Other Institutes	ICAR	SAUs	Other Institutes	ICAR	SAUs	Other Institutes	
North	11.76	5.88	NA	82.35	NA	NA	NA	NA	NA	17
South	25.00	NA		12.50	12.50	25.00	25.00			8
East	NA			NA	100	NA	NA			1
West	NA			33.33	33.33			33.33		3
Total	13.79	3.45		55.17	10.34	6.90	6.90	3.45		29

Note: NA – Not Available

Table 12. Professional group wise segmentation

Department	S1	S2	S3
Extension	NA	3.57	NA
Research and Management	10.71	57.14	7.14
Research Management & Extension	3.57	7.14	3.57
Research Management & Policy Making	3.57	7.14	0.00

Note: NA – Not Available

TAAS being a research oriented and policy advocacy organization, has been associated with different professional groups in various institutes. Table 12 and Fig 41 shows the distribution of respondents from different segments across professional groups. Research Management has got highest number of respondents (21). And, 16 respondents belong to Segment 2, which indicates respondents are affirmative that TAAS is performing well in all activities.

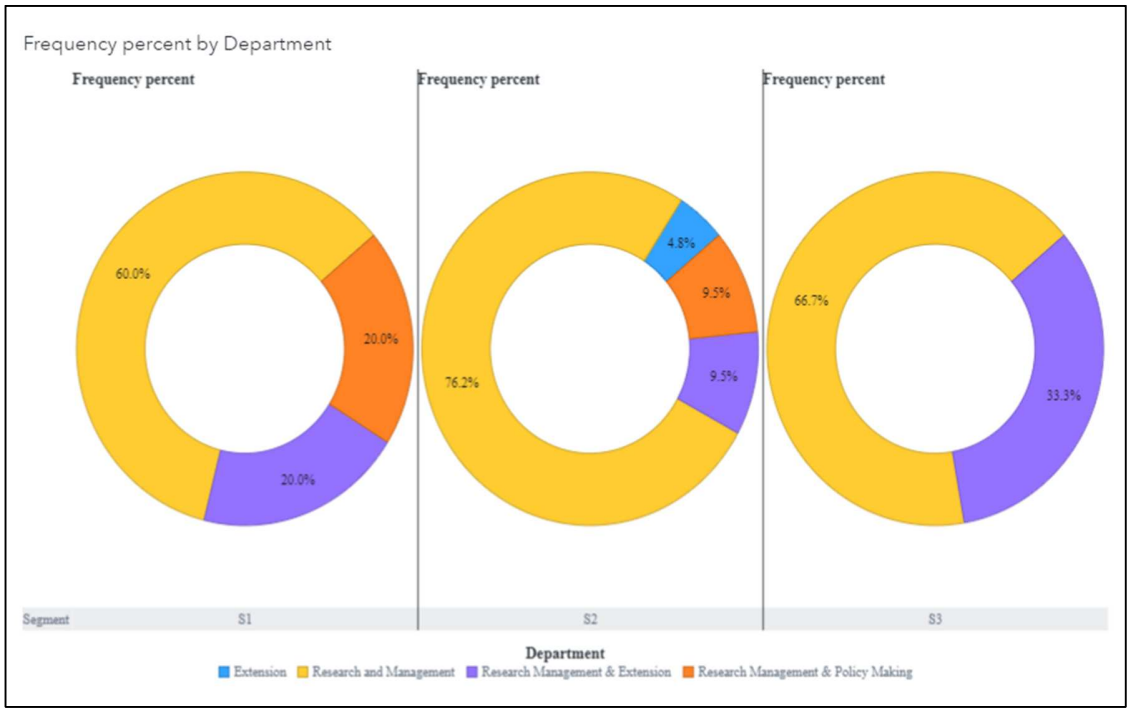


Figure 41: Segment-wise respondents across professional groups

Table 13. Age-wise segmentation

Age Group	S1	S2	S3
36-45	NA	3.70	NA
45-65	NA	3.70	
46-55	3.70	14.81	
46-55	NA	NA	3.70
56-65	14.81	55.56	7.41

Note: NA – Not Available

Table 13 and Fig 42 shows the distribution of stakeholders from different segments across age group. Age group 56-65 got the highest number of stakeholders (21), and 15 respondents belong to segment 2. We can clearly observe in Fig 41, that respondents are more in number which indicates respondents belong to age group 56-65 years are more affirmative and are happy with TAAS activities and its performance. These distribution patterns clearly depict that involvement of young professionals (scientists, students etc.) in TAAS activities were very less. Hence, for still better performance of TAAS and

agriculture sector, it may be important to incorporate younger generations including women.

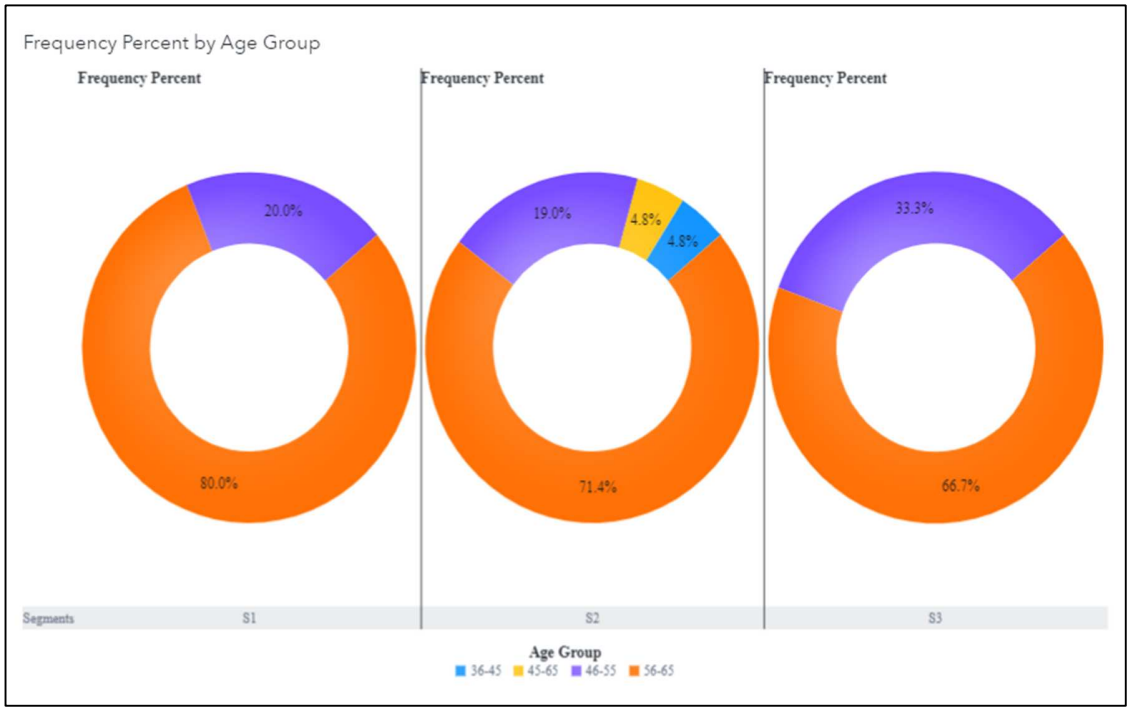


Figure 42: Segment-wise respondents across Age Group

Thus, the segmentation analysis of responses of stakeholders further reinforces the results of earlier analyses that TAAS may have to help its staff to perform well, decentralize to/work with more stakeholders to sensitize about their role and the benefits they get by working with TAAS and show them with evidence of clear impact of TAAS activities including policy advocacy for science and society.

Text Mining: The senior experts and thought leaders were approached to give their opinion about the TAAS mandate, activities, operations and performance, weaknesses, continuation/reorientation of activities, suggestions, comments and feedback for better performance, and TAAS as a brand. The responses were much diverse and different from each respondent from different review categories. To know the most repeated or similar responses/topic groups from the responses obtained so that their importance is recognized and due attention to them may be given by TAAS in future, text mining, an NLP technique was employed.

Table 14: Topic groups and Sentiment identified by SAS Studio on TAAS mandate/programs/activities based on senior experts/leaders' responses

Key words	Topic groups	Frequency
Publication, brief, agriculture, maximum, maximum impact	Impact of TAAS publication, Policy briefs and conferences	23.52
Issue, emerge, Indian, agriculture	Information /Theme/Topic quality, diversity in topics, timely generation, capacity building	11.76
International, workshop, symposia, seminar, dialogue	TAAS an efficient organization in shaping Agriculture in India	23.52
Agriculture, development, research, science, conference	Dissemination of information and organizing problem/need oriented sessions	23.52
TAAS, activity, role	Inclusion of field expertise and young consultants and globalization of TAAS activities	17.65

Table 15: Topic groups and Frequency (%) identified by SAS Studio on TAAS mandate/programs/activities across Zone

Key Words	Topic groups	Zone (%)				
		East	North	Overseas	South	West
Publication, brief, agriculture, maximum, maximum impact	Impact of TAAS publication, Policy briefs and conferences	NA	57.14	28.57	14.29	NA
Issue, emerge, Indian, agriculture	Information /Theme/Topic quality, diversity in topics, timely generation, capacity building		62.50	12.50	25.00	
International, workshop, symposia, seminar, dialogue	TAAS an efficient organization in shaping Agriculture in India		22.22	33.33	44.44	
Agriculture, development, research, science, conference	Dissemination of information and organizing problem/need oriented sessions		87.50	12.50	NA	
TAAS, activity, role	Inclusion of field expertise and young consultants and globalization of TAAS activities		33.33	44.44	11.11	11.11

Note: NA – Not Available

Table 16: Topic groups and Frequency (%) identified by SAS Studio on TAAS mandate/programs/activities across institutes

Key Words	Topic groups	Institution Type (%)				
		ICAR	International Research/ Education Agency	Private Agency	Other Institutions	SAUs
Publication, brief, agriculture, maximum, maximum impact	Impact of TAAS publication, Policy briefs and conferences	57.14	28.57	NA	14.29	NA
Issue, emerge, Indian, agriculture	Information /Theme/Topic quality, diversity in topics, timely generation, capacity building	25.00	12.50	12.50	25.00	25.00
International, workshop, symposia, seminar, dialogue	TAAS an efficient organization in shaping Agriculture in India	44.44	44.44	NA	11.11	NA
Agriculture, development, research, science, conference	Dissemination of information and organizing problem/need oriented sessions	50.00	37.50	NA	NA	12.50
TAAS, activity, role	Inclusion of field expertise and young consultants and globalization of TAAS activities	33.33	33.33	11.11	11.11	11.11

Note: NA – Not Available

Tables 14 to 30 deal with the text mining results for both senior experts/leaders (Tables 14 to 22 and Figs 43 to 45) and stakeholders (Tables 25 to 30 and Figs 46 to 49). The topic groups based on the key responses given were obtained using NLP (Natural Language Programming) along with the frequency percentage. With respect to TAAS mandate/programs/activities five topic groups were categorized and provided in the Table 14. The results depict that 23.52 per cent of the senior experts/leaders stressed and spoke about the topic 1, topic 3 and topic 4 each, 17.65 per cent on topic 5 and 11.76 per cent on topic 2. The importance of northern zone and ICAR institution in stressing topics 1,2&4 and 1,3&4 respectively, may also be seen.

Fig. 43 Pie chart showing topic distribution across institution type and zone on TAAS mandate/programs/activities

The topic groups of the senior experts/leaders with respect to continuation/reorientation of TAAS activities and TAAS as a brand were analysed in the same manner. The results are presented in the Tables from 17 to 22 and Figures 44 and 45, respectively.

Table 17 shows that 33.33 per cent of the stake holders suggested topic 2 (TAAS to be a leading agency in agri-education, cover multiple topics, and creation of rural employment), 30.76% topic 1&5 and 35.9% topic 3&4. Thus, nearly one-third responses suggest continuation with additional staff, strengthening and focus on SAUs, KVKs and farmer welfare activities along with ICAR; nearly one third suggest focus on agri-education, diversification of topics, creation of rural employment; and one-third suggest becoming think tank of emerging/contemporary topics like climate change, women empowerment, engaging youth, etc., and policy advocacy.

Table 17: Topic groups and Frequency (%) identified by SAS Studio on Continuation / Re-orientation of TAAS activities for its further development

Key words	Topic groups	Frequency (%)
Technology, emerge, ICAR, new, provide	Continuation TAAS with involvement of additional manpower, special focus on SAUs, KVKs etc., along with ICAR	15.38
Research, identify, rural development, agriculture, need	Leading agency in Agri-education, coverage of multiple topics and creation of rural employment opportunities	33.33
Climate change, topic, scientist	Think tank of emerging topic viz., climate change, women empowerment, youth in agriculture and science etc.,	17.95
Implementation, recommendation, policy, make, help	TAAS - A leader in dealing with contemporary and emerging issues and policy recommendation	17.95
Existing activity, strategy, continue	Strategies to strengthen of NARS and focus on farmer welfare activities	15.38

Table 18 and 19 give the frequency percentage of suggestions w.r.t the same topic groups across institution type and zone, respectively. We may again see the importance of northern zone and ICAR institutes in suggesting almost same topics in the same pattern as in earlier tables.

Table 18: Topic groups and Frequency (%) per cent identified by SAS Studio on TAAS activities Continuation / Re-orientation for its further development across institution type

Key Words	Topic groups	Institution Type (%)				
		ICAR	International Research/ Education Agency	Private Agency	Other Institutions	SAUs
Technology, emerge, ICAR, new, provide	Continuation TAAS with involvement of additional manpower special focus on SAUs, KVKs etc., along with ICAR	50.00	16.67	NA	16.67	16.67
Research, identify, rural development, agriculture, need	Leading agency in Agri-education, coverage of multiple topics and creation of rural employment opportunities	61.54	15.38	NA	7.69	15.38
Climate change, topic, scientist	Think tank of emerging topic viz., climate change, women empowerment, youth in agriculture and science etc.,	14.29	42.86	14.29	14.29	14.29
Implementation, recommendation, policy, make, help	TAAS - A leader in dealing with contemporary and emerging issues and policy recommendation	28.57	28.57	14.29	28.57	NA
Existing activity, strategy, continue	Strategies to strengthen of NARS and focus on farmer welfare activities	16.67	16.67	NA	50.00	16.67

Note: NA – Not Available

Table 19: Topic groups and Frequency percent identified by SAS Studio on TAAS activities Continuation / Re-orientation for its further development across zone

Key Words	Topic groups	Zone (%)				
		East	North	Overseas	South	West
Technology, emerge, ICAR, new, provide	Continuation TAAS with involvement of additional manpower, special focus on SAUs, KVKs etc., along with ICAR	16.67	33.33	33.33	NA	16.67
Research, identify, rural development, agriculture, need	Leading agency in Agri-education, coverage of multiple topics and creation of rural employment opportunities	NA	69.23	7.69	15.38	7.69
Climate change, topic, scientist	Think tank of emerging topic viz., climate change, women empowerment, youth in agriculture and science etc.,		42.86	42.86	14.29	NA
Implementation, recommendation, policy, make, help	TAAS - A leader in dealing with contemporary and emerging issues and policy recommendation		14.29	28.57	57.14	
Existing activity, strategy, continue	Strategies to strengthen of NARS and focus on farmer welfare activities		83.33	NA	16.67	

Note: NA – Not Available

Fig. 44 Pie chart showing topic distribution across institution type and zone on TAAS activities Continuation / Re-orientation for its further development

Table 20: Topic groups and Frequency (%) identified by SAS Studio on TAAS utilizing its established name as a brand for future endeavours

Key Words	Topic groups	Frequency
Brand name, science, society	Utilization of the TAAS brand name	23.08
Research, technology, change, agricultural, continue	TAAS should explore new areas of research and take part in technology transfer to farmers	20.51
Solution, problem, platform, merge, agriculture	TAAS - A platform for finding solutions to emerging agricultural issues	15.39
Woman, youth, involve, sustainable, science	TAAS take up activities related to sustainable agriculture and involvement of youth and woman	20.51
Consider, university, regional, level, wide	Maintain Regional balance and inclusion of state universities in TAAS activities	20.51

Note: N = Not Available

The results of TAAS recognition and its performance as a brand are provided in Table 20. The results indicate that 23.08 per cent of the stake holders feel that TAAS utilized its brand name to the full extent. Nearly 60 per cent respondents suggested that TAAS should explore new areas, activities in sustainable agriculture, take up technology transfer areas, involve women and youth, maintain regional balances by inclusion of all regions, and SAUs. 15.39 per cent responses suggest TAAS should act as a platform for finding solutions to the critical agricultural issues.

Since the responses highlighted regional imbalances and exclusion of SAUs etc., institution wise and zone wise frequency percentages were calculated and highlighted in the Tables 21 and 22, respectively.

Table 21: Topic groups and Frequency (%) identified by SAS Studio on TAAS utilizing its established name as a brand for future endeavours across institution type

Key Words	Topic groups	Institution Type (%)				
		ICAR	International Research/ Education Agency	Private Agency	Other Institutions	SAUs
Technology, emerge, ICAR, new, provide	Continuation of TAAS with involvement of additional manpower special focus on SAUs, KVKs etc., along with ICAR	66.67	11.11	22.22	NA	NA
Research, identify, rural development, agriculture, need	Leading agency in Agri-education, coverage of multiple topics and creation of rural employment opportunities	12.50	62.50	12.50	NA	12.50
Change climate, climate change, topic, scientist	Think tank of emerging topic viz., climate change, women empowerment, youth in agriculture and science etc.,	33.33	16.67	16.67	16.67	16.67
Implementation, recommendation, policy, make, help	TAAS - A leader in dealing with contemporary and emerging issues and policy recommendation	37.50	37.50	12.50	NA	12.50
Existing activity, strategy, continue	Strategies to strengthen of NARS and focus on farmer welfare activities	62.50	25.00	0.00	NA	12.50

Note: NA – Not Available

Table 22: Topic groups and Frequency (%) identified by SAS Studio on TAAS utilizing its established name as a brand for future endeavours across institution type

Key Words	Topic groups	Zone (%)				
		East	North	Overseas	South	West
Technology, emerge, ICAR, new, provide	Continuation of TAAS with involvement of additional manpower special focus on SAUs, KVKs etc., along with ICAR	NA	44.44	22.22	33.33	NA
Research, identify, rural development, agriculture, need	Leading agency in Agri-education, coverage of multiple topics and creation of rural employment opportunities		75.00	12.50	12.50	
Climate change, topic, scientist	Think tank of emerging topic viz., climate change, women empowerment, youth in agriculture and science etc.,		66.67	33.33	NA	
Implementation, recommendation, policy, make, help	TAAS - A leader in dealing with contemporary and emerging issues and policy recommendation		25.00	25.00	37.50	12.50
Existing activity, strategy, continue	Strategies to strengthening NARS and focus on farmer welfare activities		62.50	25.00	12.50	NA

Note: NA – Not Available

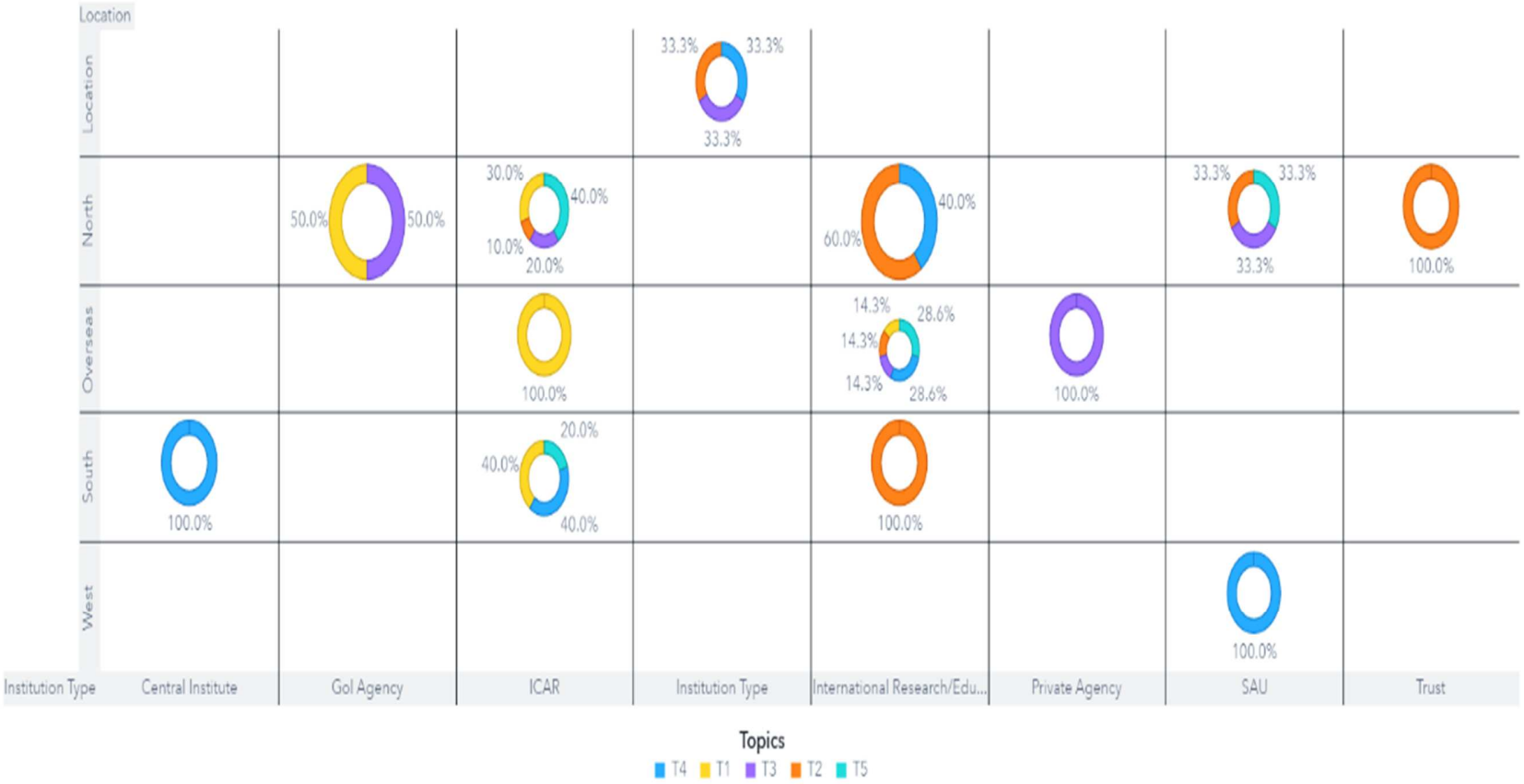


Fig. 45 Pie chart showing topic distribution across institution type and zone on TAAS utilizing its established name as a brand for future endeavours

Table 23: Topic groups and Frequency (Number/%) identified by SAS Studio on TAAS operations and performance across Age groups and Institution Type

Topic groups	Frequency (Nos.)	Age groups (%)			Institution Type (%)		
		36-45	46-55	56-65	ICAR	SAUs	Private Agency
TAAS role in global and national agricultural issue, policy recommendation and promoting agricultural technologies (T1)	8	12.50	50.00	37.50	75.00	25.00	NA
TAAS - A strong base for knowledge enhancement, planned activities and efficiency in scientific developments and technologies (T2)	5	NA	50.00	50.00	75.00	25.00	
TAAS as a think tank in achieving the set mission, vision and goals and a farmer centric approach (T3)	6		20.00	80.00	80.00	20.00	
TAAS a leading organization in growth and development of Indian agriculture through scientific advancements, sessions, workshops, and partnerships (T4)	7		42.86	57.14	100.00	NA	
TAAS communication and interaction with its stakeholders and related organizations in sustainable development of Agriculture (T5)	6		16.67	83.33	83.33	16.67	

Note: NA – Not Available

Table 24: Topic groups and Frequency identified by SAS Studio on TAAS operations and performance across professional groups

Topic groups	Profession (%)				
	Extension	Research and Management	Research Management & Policy Making	Research Management & Extension	Research Management & HRM
TAAS role in global and national agricultural issue, policy recommendation and promoting agricultural technologies (T1)	NA	62.50	37.50	NA	NA
TAAS - A strong base for knowledge enhancement, planned activities and efficiency in scientific developments and technologies (T2)		75.00	25.00		
TAAS as a think tank in achieving the set mission, vision and goals and a farmer centric approach (T3)		100.00	NA		
TAAS a leading organization in growth and development of Indian agriculture through scientific advancements, sessions, workshops, and partnerships (T4)		71.43	14.29	14.29	
TAAS communication and interaction with its stakeholders and related organizations in sustainable development of Agriculture (T5)		83.33	0.00	16.67	

Note: NA – Not Available

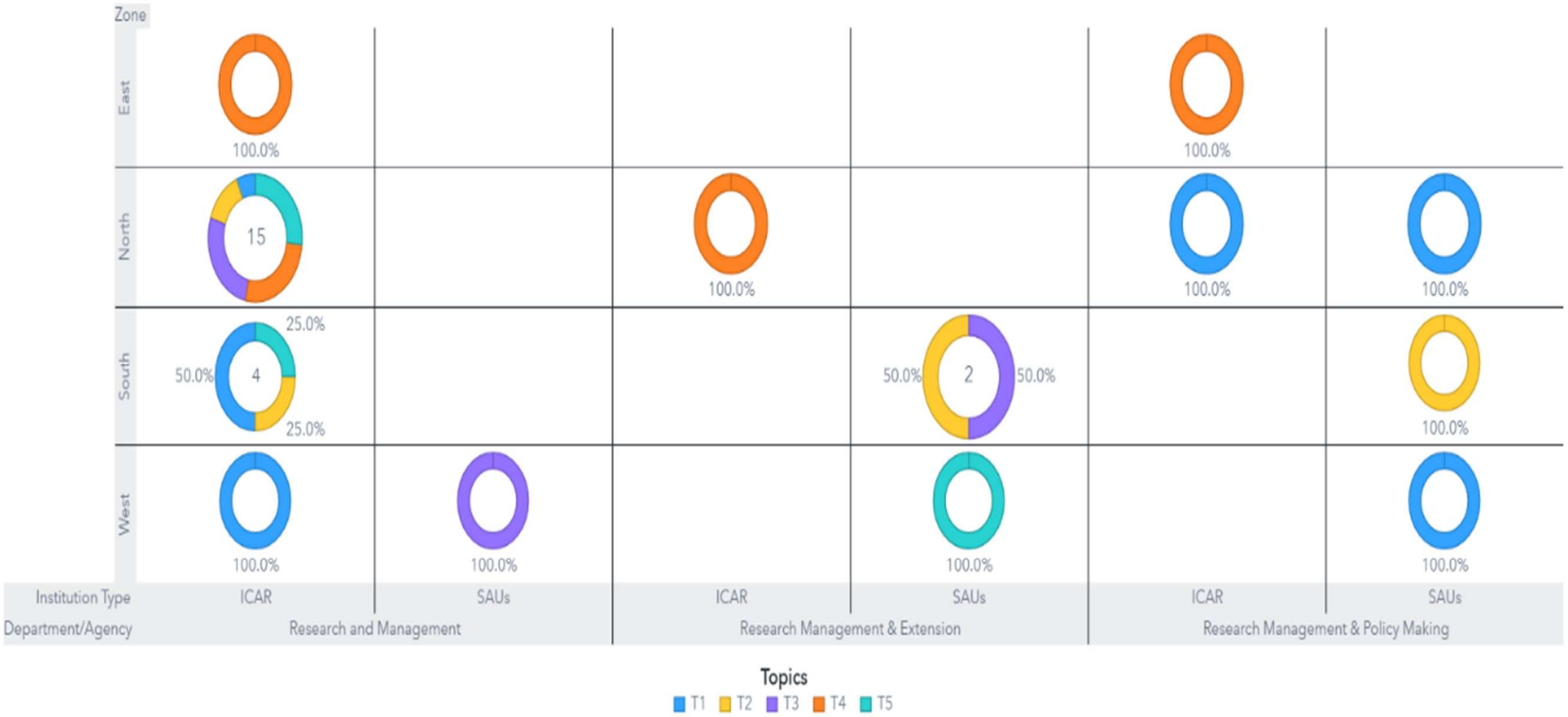


Fig. 46: Pie chart showing topic distribution across profession, institution type and zone on TAAS operations and performance

T1 is the most common value representing 25 per cent (8 of 32 stakeholders) of topics. Other common values are T4 (21.88 %) and T4 and T5 (18.75 %). T2 is the least common value representing 15.63 per cent (5 of 32 stakeholders) of topics (Table 23, Table 24, and Fig 46). In all the cases, most common zone value is North, followed by South, West and East.

Table 25: Topic groups and Frequency (Number/%) identified by SAS Studio on TAAS's weakness across Age groups and Profession

Topic groups	Frequency (Number)	Age groups (%)			Profession (%)				
		36-45	46-55	56-65	Extension	Research and Management	Research Management & HRM	Research Management & Extension	Research Management & Policy Making
Respondents were not sure with the TAAS performance (T1)	11	12.50	50.00	37.50	NA	62.50	37.50	NA	NA
TAAS objectives, scope, and visibility (T2)	7	NA	50.00	50.00		75.00	25.00		
Involvement of youth in agriculture and young scientists in TAAS operations (T3)	4		20.00	80.00		100.00	NA		
Awareness and outreach of TAAS activities (T4)	4		42.86	57.14		71.43	14.29	14.29	
Efficiency of TAAS activities (T5)	3		16.67	83.33		83.33	0.00	16.67	

Note: NA – Not Available

Of the topics identified from the stakeholder's responses, T1 is the most repeated response representing 37.93 per cent (11 of 29 stakeholders) of topics followed by T2 representing 24.14 per cent (7 of 29 stakeholders), T3 and T4 with 13.79 per cent (4 of 29 stakeholders) each and T5 least common value representing 10.34 per cent (3 of 29 stakeholders). T1 and T2 are much more common than all other topics, together representing 62.07 per cent (Table 25, Table 26, and Fig 47).

Table 26: Topic groups and Frequency (%) identified by SAS Studio on TAAS's weakness across Institution Type and Zone

Topic groups	Institution (%)			Zone (%)			
	ICAR	Private	SAUs	East	North	South	West
Respondents were not sure with the TAAS performance (T1)	75.00	25.00	NA	NA	90.91	NA	9.09
TAAS objectives, scope, and visibility (T2)	75.00	25.00			42.86	28.57	28.57
Involvement of youth in agriculture and young scientists in TAAS operations(T3)	80.00	20.00			75.00	25.00	NA
Awareness and outreach of TAAS activities (T4)	100.00	NA			NA	75.00	25.00
Efficiency of TAAS activities (T5)	83.33	16.67			33.33	66.67	NA

Note: NA – Not Available

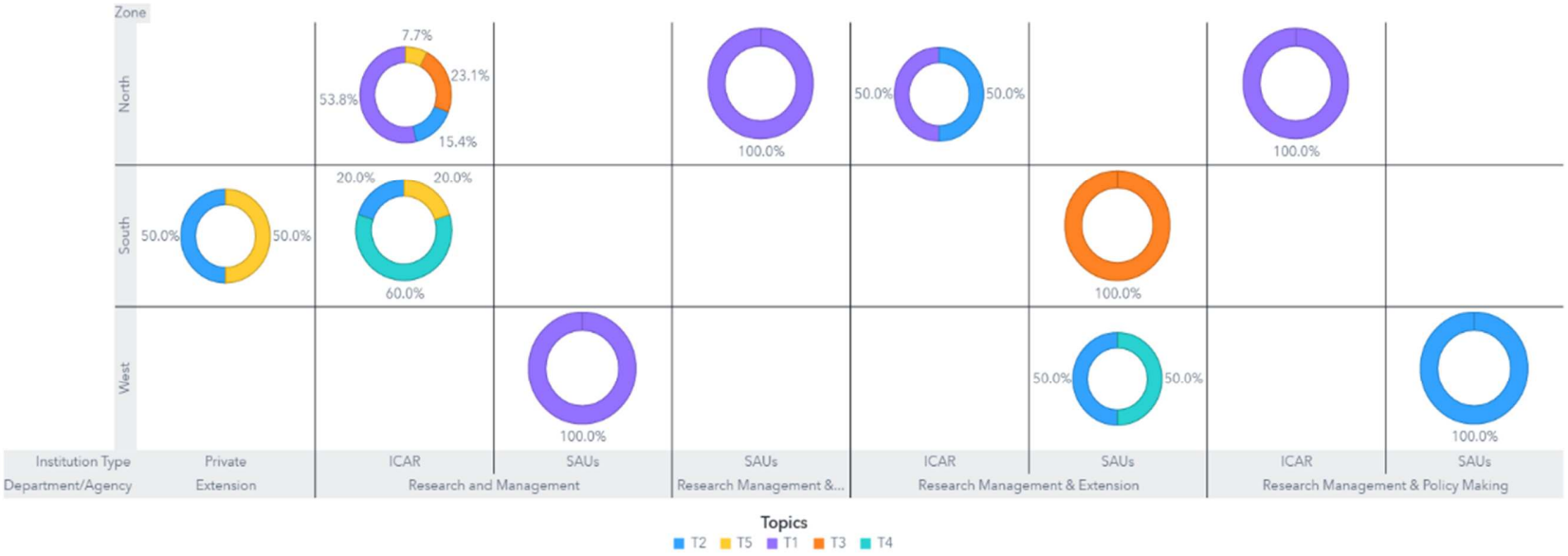


Fig. 47 Pie chart showing topic distribution across profession, institution type and zone on TAAS's weakness

Table 27: Topic groups and Frequency (Number) identified by SAS Studio on suggestions to TAAS across Age groups and Profession

Topic groups	Frequency	Age groups (%)			Profession (%)				
		36-45	46-55	56-65	Extension	Research Management	Research Management & HRM	Research Management & Extension	Research Management & Policy Making
Widening predominant activities of TAAS to core subject lines (T1)	4	NA	25.00	75.00	NA	25	NA	50	NA
Involvement of scientists and stakeholders (T2)	5	20.00	20.00	60.00		80		20	
Policy advocacy by TAAS (T3)	4	NA	50.00	50.00		100		NA	
Enhance institutional and corporate members (T4)	5		20.00	80.00		60			
Conducting research by TAAS on agriculture development in India and taking up consultancy activities (T5)	5		40.00	60.00		100			

Note: NA – Not Available

Five topics were strongly suggested by most of the stakeholder, among them T2, T4 and T5 were the most repeated responses across various categories with the value 21.74 per cent (5 of 23 stakeholders) each suggesting more attention towards these activities or operations to be given. T1 and T3 are much less common than all other topics, together representing 34.78 per cent (Table 27, Table 28, and Fig 48). The most repeated responses were from ICAR institutions, northern zone and Research Management professionals.

Table 28: Topic groups and Frequency (%) identified by SAS Studio on suggestions to TAAS across Institution Type and Zone

Topic groups	Institution (%)			Zone (%)			
	ICAR	Private	SAUs	East	North	South	West
Widening predominant activities of TAAS to core subject lines (T1)	50.00	NA	50.00	NA	50.00	NA	50.00
Involvement of scientists and stakeholders (T2)	80.00		20.00		40.00	20.00	40.00
Policy advocacy by TAAS (T3)	100.00		NA		100.00	NA	NA
Enhance institutional and corporate members (T4)	60.00		40.00		20.00	40.00	40.00
Conducting research by TAAS on agriculture development in India and taking up consultancy activities (T5)	100.00		NA	20.00	80.00	NA	NA

Note: NA – Not Available

Fig. 48 Pie chart showing topic distribution across profession / agency/institution type and zone on suggestions to TAAS

Table 29: Topic groups and Frequency (Number) identified by SAS Studio on comments and feedback to TAAS across Age groups and profession

Topic groups	Frequency	Age groups (%)			Profession (%)				
		36-45	46-55	56-65	Extension	Research Management	Research Management & HRM	Research Management & Extension	Research Management & Policy Making
Increase the frequency of 3rd party evaluation, state level policy advocacy and decentralization of activities.	8	NA	50.00	50.00	NA	25.00	NA	25.00	50.00
Motivation of rural youth, role expansion and linking PPP for accelerating commercialization of demand driven farm technologies	4	NA	50.00	50.00	NA	75.00	NA	12.50	12.50
Involvement of students and corporate sector for broadening the TAAS activities and spread of Organization	4	NA	25.00	75.00	NA	75.00	NA	25.00	0.00
Invest in R&D for commercial, sustainable agriculture and impact the agriculture growth	4	NA	75.00	25.00	NA	50.00	NA	0.00	50.00

Note: NA – Not Available

Topic 1 is the most repeated response representing 40 per cent (8 of 20 stakeholders) of topics. Other three topics have equal distribution of 20 per cent (4 of 20 stakeholders) each (Table 29, Table 30, and Fig 49). The responses are mostly from northern zone, 46-75 age groups, ICAR institutions and research management professionals.

Table 30: Topic groups and Frequency (%) identified by SAS Studio on comments and feedback to TAAS across Institution Type and Zone

Topic groups	Institution (%)			Zone (%)			
	ICAR	Private	SAUs	East	North	South	West
Increase the frequency of 3rd party evaluation, state level policy advocacy and decentralization of activities.	25.00	NA	75.00	NA	50.00	25.00	25.00
Motivation of rural youth, role expansion and linking PPP for accelerating commercialization of demand driven farm technologies	87.50	NA	12.50	12.50	50.00	25.00	12.50
Involvement of students and corporate sector for broadening the TAAS activities and spread of Organization	50.00	NA	50.00	NA	NA	50.00	50.00
Invest in R&D for commercial, sustainable agriculture and impact the agriculture growth	75.00	NA	25.00	25.00	50.00	25.00	NA

Note: NA – Not Available

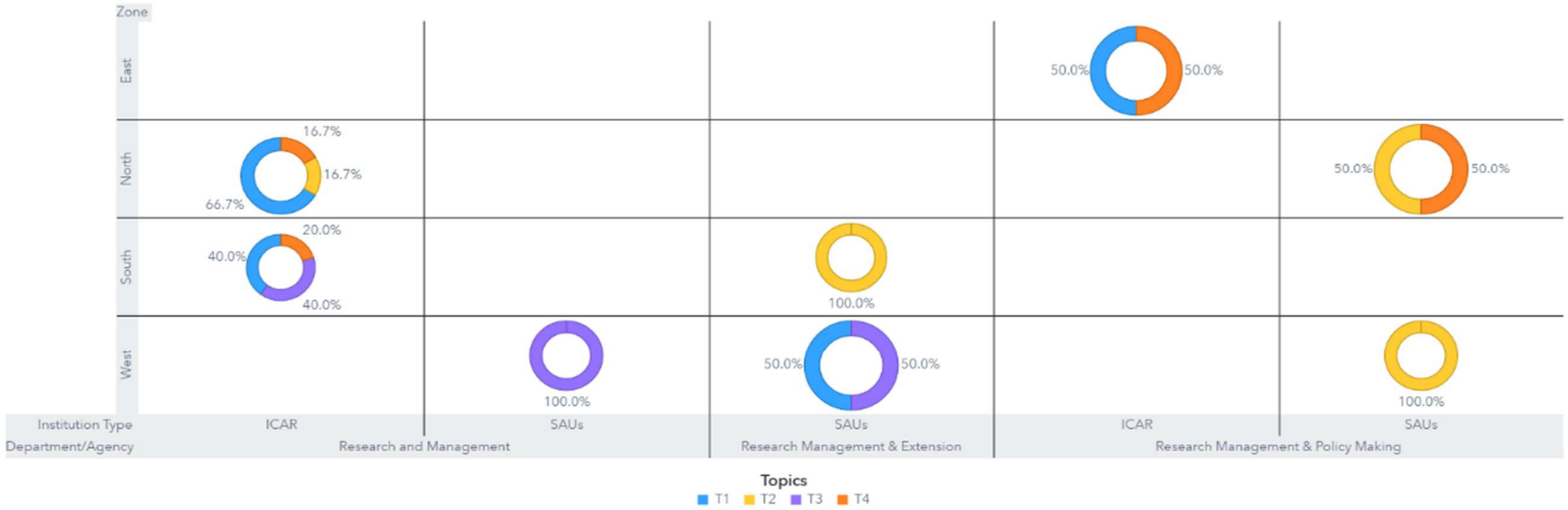


Fig. 49 Pie chart showing topic distribution across institution type and zone on comments and feedback to TAAS

Overall, text mining results broadly suggest that the main strengths of TAAS are: fully utilizing its brand name, bringing out impact making publications, policy briefs, organizing need/problem-based conferences/seminars, and information dissemination/knowledge sharing. Its operation and performance are marked by its national and global role in dealing with contemporary issues facing AFNS and SAD, policy advocacy, technology promotion and scientific advancement through its activities. The weaknesses pointed out in some responses include not sure of impact of TAAS actions, and not much clarity on objectives, scope, and visibility. The responses in general suggest continuation/reorientation of TAAS with focus on agricultural education, cover multiple topics/diversification of activities, promote rural employment, organizing sessions on new/emerging topics such as climate change, SAD, women involvement/empowerment, youth engagement, technology transfer to farmers, policy advocacy, more institutional and corporate membership, periodic 3rd party evaluation of TAAS activities, state level policy advocacy, decentralization of activities, and additional manpower engagement. Thus, the results of text mining also reiterate earlier conclusions of the review.

Word Cloud Analysis

A word cloud is a collection or cluster of words depicted in different sizes. The bigger and bolder the word appears, the more often it is mentioned within a given text and the more important it is.

When senior experts/leaders were asked questions about TAAS, whether they are aware of and were associated with TAAS, its mission, mandate, objectives, and programs/ activities, most of the senior experts/leaders' response was **yes,** they were **aware** of **mission, mandate**, objectives, and programs/ **activities** and **associated** with TAAS. Only few of respondents said that they were aware but not associated with TAAS which can be visualised though the word cloud depicted in Fig 50.

Fig 50 Word Cloud depicting senior members response about awareness towards TAAS

4.3.6 TAAS Outcome Assessment

Key Outcome Areas/Activities of TAAS are:

- Policy advise/advocacy
- Public awareness

Table 31: Summary of Output/Outcome Performance (%) in key actions of TAAS

Sl No.	Key actions	Level 1	Level 2	Level 3	Level 4	Level 5		Level 6	
						Full	Partial	Full	Partial
1.	Policy Advocacy	100	100	100	100	80	20	36	64
2.	Public Awareness	100	100	100	100	59	41	45	55

Note: Level 1 = Opportunity created (Conference, publication, networking, capacity building)
Level 2 = Was active engagement during the event present? Did all participants give feedback?
Level 3 = Did something happen? Any takeaways? Any feedback on takeaways from participants?
Level 4 = Was joint action enabled? Communicated? Any actionable proposal developed?
Level 5 = So, what? Was institutional, policy reform happened? Was the plan implemented?
Level 6 = Inference on change/impact/influence owing to the action initiated?

The summary outcome analysis (adapted from: https//en.wikipedia.org>wiki>Donald_ Kirkpatrick) of 2 key activities and their 36 sub-activities (See Annexure IV for details) of TAAS (Table 1 in Executive Summary and Table 31 above) based on informed responses from selected key stakeholders intimately connected/involved with TAAS for long (Annexure IV) indicate brilliant performance (cent percent) of TAAS up to level 4 of the impact pathway in creating opportunity for debate and change, facilitating active engagement of diverse stakeholders for free and frank policy inputs, planning joint action, communicating it to the concerned leading to development of action plan/proposal at the decision- making level. These results are also matching/corroborating with the results from analysis of responses of stakeholders (Annexure V) discussed earlier in the study. But the low/moderate outcome results at levels 5&6 (reform happening and intended effect becoming visible/realized) suggest scope for still better performance. Though it may not be right to compare the results of TAAS with other related/alternate organizations in view of differences in mission, objectives, etc., but such low to moderate results at higher levels of impact pathway are generally common with results of review studies of other institutions as well (Engel, et.al. 2018). As stated earlier in the report (elaborated in Section 3), better results at higher levels of impact pathway are difficult because generally action/policy continuity is more likely than change in action/policy resulting in intended benefit because institutions are sticky, and actors protect the existing dispensation even if it is sub-optimal. Accordingly, the clear message from low/moderate results at higher levels is that the TAAS should engage soon with needed reforms indicated in the suggested strategy to overcome most of the identified deficits using learnings from the past and waiting/watching for a window of exceptional opportunity for full implementation of the preferred strategies as suggested in the review (Table 32).

5 Conclusions and Moving Forward

5.1 Conclusions

The Review considers that TAAS as an independent neutral think tank is promoting growth and advancement of agriculture through scientific interactions and partnerships in the thrust areas of science based on unbiased policy advocacy, technology and knowledge sharing on key issues of national and global importance in AFNS and SAD. Over the last 20 years TAAS has done this job admirably well. This analytical review conclusively shows that these activities created much needed public awareness in advances in science and science-

based policy advocacy to contribute to AFNS and SAD. These contributions as widely reflected by responses of stakeholders, national and global thought leaders amply reflect unique Indian and international vision/foresight and involvement/experience of Dr.Paroda, Chairman, TAAS in science/technology, institutional innovations and policy reforms areas. Dr.Paroda's stature is a special/invaluable asset to TAAS.

The Review finds that TAAS is strong/high in leadership, clarity of vision, mission, objectives, credibility and accountability, subject matter knowledge, partnership, consultations with stakeholders, a neutral platform; moderate in effectiveness, resources; and low in soft skills including PME, publicity and communication, reach& diversification, and technology.

In conclusion this review states that TAAS's contributions are visionary, dynamic leadership, selection of contemporary issues, selection of competent experts for presentation and discussion, quality debate and discussion, timely well drafted action/policy oriented diverse publications/recommendations and follow up for action/outcome/impact. These features are very important for building on and enhancing Paroda legacy for its sustained relevance for further consolidation of gains, extending the gains and making new gains.

Notwithstanding its enviable stature and reputation with many contributions stated above, time has come in its journey for transition to take some bold decisions in its future directions to build on and enhance Paroda legacy to remain continuously relevant, effective as a high-level think tank in India, region, and globe. The bold decisions on future directions need debate and strong consensus by management of TAAS. As seen earlier, the opinion for transition /bold decisions is already widely held by all the stakeholders. Moreover, to meet the raising expectations and complex challenges of AFSN, it needs to address some inadequacies/deficiencies in its structure, processes, functioning, capacity as stated above for which TAAS may have to consider doing business differently in the short and medium run up to 2030 and undertake disruptive reforms in its business in the long run beyond 2030. This Review do not consider continuing the business as usual as an option considering the past and present performance, enormous good will among key players/stakeholders, growing issues and pressing need for a credible, professional, independent think tank. Consequently, the review suggests three strategies (with reforms under broad categories of Mission/Mandate, Scope /Coverage, Governance, Institutional Structure /Capacity, Partnership /collaboration, and Funding) to move forward. The strategies include: 1) Doing Business as Usual; 2) Doing Business Differently (up to 2030) and 3) Doing Radical/Disruptive Business beyond 2030**.** The strategies are planned to empower TAAS to reach its final goal of becoming World Class Think Tank by transitioning through Strategy 2 integrating seamlessly into Strategy 3 beyond 2030 bringing into sharp focus the choices that need to be made and how they are critical to excel in performance in the short/medium term and the longer term (Table 32).

5.2 Moving Forward

The Review has shown that TAAS as an independent neutral think tank is doing well as was planned: promoting growth and advancement of agriculture through scientific

interactions and partnerships in the thrust areas of science based on unbiased policy advocacy, technology and knowledge sharing on key issues of national and global importance in agriculture and rural development.

A review of its activities in the last 2 decades of its establishment in 2002 and their regular follow up, uptake, and perceived influence on advances in science and science based, informed decision/policy making clearly suggests a great success. The review consisted of study of its documents, profile of participants in debates and discussions, socio-metric analysis of survey responses of key national, regional, and international stakeholders/thought leaders, stakeholders reflections on TAAS publications and views in media, outcome analysis of 36 sub activities under 2 key activities of policy advocacy and creating public awareness, a sample of 6 policy impact success stories, some on voicing the science governance concerns beyond the border. From the combined review of all these sources, TAAS has clearly emerged as a credible/effective think tank not only in India but region and globe. It has raised the stature of agriculture and its importance in economic growth, provided pride to agricultural science and agricultural scientists, farmers, industries, filled the gaps between farmers and research outfits, and academic research and policy making, helped to get respect from farmers and the general-public. Careful selection of critical topics of national and transboundary importance, well prepared concept notes, effective presentations by eminent senior experts and high quality discussion/debate by equally competent senor diverse participants, professionally drafted, vetted recommendations/publications, timely communicating them to the concerned research/policy/decision makers, regular follow up on their uptake and above all the whole process meticulously planned, executed and monitored under the overall charismatic leadership of its Chairman, Dr. R. S. Paroda, TAAS has brought positive change in the science based agricultural production system and policy making in India and demonstrated the importance/influence of quality alternative think tank in the field of agriculture and rural development. Perhaps from the outcomes of TAAS, we could get an answer to our searching question raised earlier in the review that if TAAS did not exist missing its' contributions, science and society would have greatly missed a genuine and effective crusader for advances in science and policy reforms for SAD.

However, some O&M concerns still remain to be addressed by TAAS, like lack of regular follow up in all cases and clear impact/change made which can be exclusively attributed to TAAS, not being much proactive, scope to professionalize, streamline activities and work streams, inadequate inhouse capability to take up multiple tasks, lack of critical mass of core staff in key areas of work and support system, more fund mobilization, lack of visibility owing to limited/restricted diversification of activities, skewed geographic presence and coverage, low/less involvement/engagement of youth, women, farmers and grassroot level organizations/workers in the activities of TAAS. Yet another issue to be given attention is to begin thinking about succession planning beyond the dynamic and charismatic leadership of Dr. R. S. Paroda.

Significant past and present performance, strong positive emotional connect and goodwill among key players/stakeholders within the country, the region and NRIs living abroad (Indian diaspora), growing issues in agri-food systems and the pressing need for a strong professional, independent, credible, effective, alternative think tank relevant to address present and emerging complex problems and frightening anticipated challenges of AFNS in the coming years, and some O&M concerns still to be addressed offer TAAS great opportunities with some challenges. Having demonstrated its worth as a neutral, credible, and most sought- after alternate think tank in India during the last 2 decades, it is important for TAAS to fully harness opportunities and address the challenges to emerge as even better performer and get rated as a world class think tank through well thought out strategies. In this context, it is pertinent to note here that Dr. Paroda as Secretary DARE and DG, ICAR after seeing the greatness of ICAR's structure, service and functioning not only in India but its replication as a successful institutional model in many countries, used to tell "**If ICAR was not there, today we would be required to create it. Since it already exists, it is our duty to nurture it to the best of our ability."** From the results of this review, perhaps we may have to make the same statement with respect to TAAS, **"If TAAS was not there, today we would have created it. Since it already exists making great contributions as an effective alternate/complementary think tank, it is our duty to nurture it to the best our ability for even better performance in future".** But the review results clearly indicate that still better performance in future may not possible if TAAS continues its business as usual. The time for transition to take bold decisions for continuing and enhancing Dr.Paroda legacy has come. Consequently, the review suggests three strategies (with bold reforms under broad categories of Mission/Mandate, Scope/Coverage, Governance, Institutional Structure/Capacity, Partnership/collaboration, and Funding) to move forward. The strategies include: 1) Doing Business as Usual (not preferred); 2) Doing Business Differently (up to 2030) and 3) Doing Radical/Disruptive Business beyond 2030**.** The strategies are planned to empower TAAS to reach its final goal of becoming World Class Think Tank by transitioning through Strategy 2 integrating seamlessly into Strategy 3 beyond 2030 bringing into sharp focus the choices that need to be made in the short/medium term followed by the longer term (Table 32). Needless to mention that after the debate on the suggested strategy and consensus by management for change, a detailed implementation plan to put the strategy to action has to be prepared, approved by management for faithful implementation.

Strategy 1. Doing Business as Usual

Business as usual case is TAAS may continue with the present activities as a neutral policy advocacy convening forum/platform. There will be no change in the mission/mandate, scope/coverage, governance, institutional structure/capacity, partnership/collaboration, and funding (Table 32).

Strategy 2. Doing Business Differently (up to 2030)

The review finds brilliant performance of TAAS with respect to all the objectives, particularly under policy advocacy and creating public awareness on critical issues facing

Agri Food System and the role of science and policy to address them under the dynamic and charismatic leadership of Dr. R. S. Paroda. So much so that all most all the stakeholders are suggesting not only continuation of the present activities but also change (Continuity with Change). In other words, they suggest do business differently. Two important concerns along with others relating to performance of TAAS in the findings of the review requiring immediate attention relate to limited visibility and capability/competence. Obviously, they demand priority attention immediately.

Promoting enhanced visibility is suggested through diversifying activities beyond crops to include livestock, fishery, insects and microorganisms, climate change, one health issue, etc. and decentralization by establishing regional/State chapters with structured/robust partnership with NARS institutions/private sector/NGOs/CSOs/State Farmer Commissions/Professional Societies to pursue activities at the state level, expanding reach/involve/engage young scientists/women scientists/professionals/officials/grassroot level organizations/workers in TAAS activities, involving/work with farmers to connect them with policy makers (for policy support) as well as scientists/high end research institutions (for new technology/innovation/knowledge support), may become the voice/champion of farmers to articulate and express their concerns, and appraise/sensitize farmers on the implications of reforms by Govt to help farmers, expanding membership to include more corporate members, institutional members, institutions beyond NARS, etc. to enhance visibility and mobilize funding, besides Dr. MSS award, conferring awards /recognitions /fellowships (national/international) in diverse fields to meritorious students/young scientists/women scientists /progressive farmers /agripreneurs /Agri-startups.

To enhance capability/competence to play a bigger role and do business differently, O&M changes/reforms to further professionalize/streamline activities/work streams to promote learning culture with a dedicated team (strengthening TAAS Secretariat with critical mass of core staff in key areas of work), develop institutional structure ensuring always continued Dr. Paroda legacy centric services with visionary, dynamic and effective driving leadership and improved governance systems with a very high profile, diverse Board of Management including bringing more transparency (interactive website, improved relationship with media and more media interactions, online presence, annual report publication, professional auditing) and good management processes/practices in place to support expanding, challenging work (dedicated desk with full time professionals with experience and expertise for policy advocacy, editing/reviewing of publications, effective and speedy communication/media management and integration of brand ”TAAS” everywhere, and institutionalizing systematic, timely documentation of actions and their impacts, program planning/execution/monitoring/ evaluation/learning/follow up of activities/recommendations) with emphasis on periodic special on the job skill development of staff, particularly soft skills. The other O&M changes suggested include creating/institutionalizing robust mechanism for regular monitoring and impact assessment/learnings of TAAS activities, contributing further to strengthen scientific rigor in publications/communications, quality improvement of

agricultural education, research, extension in NARS, O&M including leadership development activities in NARS institutions, promoting more structured partnership building with regional and global ARI4D institutions for discussing/dialog on SDGs, their targets, indicators as umbrella link issue for all policy deliberations, transboundary challenges, and strategies for addressing them and actively working with private sector/NGOs/CSOs projects as knowledge partner with clear rules of the game for mutual gains. Thus, the Strategy in general enables TAAS to enhance focus, relevance, effectivity, accountability, reach, depth, width, visibility, capability, stature, viability, and independence (refer Table 32 for details)

Strategy 3. Doing Radical/Disruptive Business (Beyond 2030)

Stakeholders particularly senior leaders and thought leaders strongly suggest that time has come for TAAS to play a bigger role. The suggested reforms under Strategy 3 after successfully implementing suggested reforms under strategy 2 will support playing a still bigger role to position TAAS as a top rated global think tank envisaging playing multiple roles depending on the need (iph.cam.ac.uk/wp-content/uploads/2017/07/Policy-Impact-booklet-print-April-2017-1.pdf) as being engaged (being a partner in the policy impact process including being an advocate for a particular policy or approach)), neutral (concerned mostly with improving efficiency and effectiveness of policy) and critical (maintaining distance from the policy process in order to reflect on developing agendas and champion the voice of those who are outside the policy making process). The strategy include expanding/extending regional/global/cross country collaboration/partnership, involvement for learning, exchange of experiences/progress under global commitments, climate change, SADs, one health, establishing TAAS outreach centers in neighboring countries/outside India, work on pilot projects with private sector in frontier technologies, undertaking selective consultancy service, joint work with other think tanks, work on forecasting future trends in challenges and opportunities in agri-food system, etc., expanding objectives and strengthening capacity in doing policy and Agri-Food System research at national/Regional and Global level besides policy advocacy convening platform like NCAER, TERI, etc. TAAS will be playing a bigger/leader role as a research institution besides a national and regional Agri Food System Research think tank. Thus, the Strategy 3 enables TAAS to remain futuristic and continuously robust, relevant, efficient, viable, independent, and top-level global think tank.

The overwhelming conclusion from the review is the preferred strategies for TAAS to consider/adopt seamlessly are 2 followed by 3 as they lead to continuation and enhancement of Dr. Paroda legacy by consolidation of gains, extension of gains and making new gains particularly remaining futuristic and a leading global player. Strategy 1 do not make any sense neither to TAAS nor to science and society and hence is not an option.

Table 32: TAAS: Strategies for Moving Forward

Sl. No.	Strategy/Scenarios/Broad Categories	Mission/Mandate	Scope/Coverage	Governance	Institutional Structure/Capacity	Partnership/Collaboration	Funding	Remarks
1	Doing Business as usual	Promoting growth and advancement of agriculture through scientific interactions and partnership	Expert consultations/BSSs/ Symposia/Conferences/ Workshops/ Dialogues/ Seminars on important themes Publishing Strategy papers/Policy Briefs/Success Stories. Organizing Foundation Day Lectures/Special Lectures. Conferring Dr. MSS Award for Leadership	Board of Trustees: Chair, Vice Chair, Secretary, Treasurer, 7 Trustees.	Board of Trustees, Chair, Vice Chair, Secretary, Treasurer. 2 Consultants. Secretariat: Office- Secretary (1) and Multitask- fellow (1) Annual Audit (Authorized by Board)	National, regional, international organizations, networks/collaboration across ARD sector, stakeholders	Corpus Fund, Institutional, corporate and life membership, Sponsorship of activities	Not preferred
2	Doing Business differently (Up-to 2030) (Short and Medium term)	Promoting/pursuing SAD/SDGs thru enhanced visibility, capacity, competence, and planning thru multidisciplinary, multi-institutional, multilocational scientific, policy and governance interactions and partnerships	All existing/diversified activities/programs targeting AFNS for SAD/SDGs. Number and frequency of activities to be enhanced. Establish Regional Centres/events in India. Talent search and more involvement/grooming of young scientists and women scientists Focus on reform and restructuring agri sector and strengthening NARS to improve their research (quality& standard) Awards/Fellowships to young scientists/women scientists, Awards for innovations by farmers/agri-prenneurs, Agri- startups. Connect farmers to researchers/policy makers/sensitize farmers/NARS on right policy reforms.	Broad -based, high profile Board of Trustees including regional members. Advisory Board of high profile, powerful, highly respected experts/science, policy leaders from India and the Region, Initiate Succession Planning	Broad based Board of Trustees, Chair, Vice Chair, Secretary, Treasurer. Professionalize/streamline activities: 2-3 consultants/science or policy Fellows, 3 regular/core senior scientists in key skills (one each in biological science, IT and Communication/Professional Editing/media and Social-science/Policy). Support System (Secretariat): Office Secretaries-2, Admin- 1, Multitask-3. Institutionalize Annual program planning, PMEL, regular training of staff in key/critical skills including media management. Up-to-date interactive/informative website. Annual Report. Annual Audit (Board Authorized)	As in 1, private sector, NGOs, CSOs, farmers/FOs/SFCs, collaboration/networking/joint working with other Think Tanks of the region	As in 1, life membership outside NARS, more funding from Govt, Donations, Institutional, corporate membership, CSR provisions of corporate sector, competitive grants	Preferred
3	Doing Radical/Disruptive Business (Beyond 2030)	Promoting/pursuing SAD/beyond SDGs by the top rated, state of the art Think Tank through multi-institutional, multidisciplinary, multilocational research for action with interactions through national, regional, and global partnerships	All activities/programs as under 2 with needed change. Number and frequency of activities to be further increased as needed. Expanded regional/global reach for cross learning on transboundary issues/sharing Indian ARI4D lessons of experiences outside India. Work on pilot projects with private sector/NGOs/CSOs. Undertake policy research/consultancy to emerge as top-rated global Think Tank. Foresight work on anticipated challenges and opportunities of AFNS for SAD beyond SDGs.	Broad based, high- profile Board of Trustees with regional and global members. Advisory Board of high-profile, powerful, highly respected, experts/science, policy leaders from India and even other countries. Implement Succession Planning if needed	Activities as under 2. increase staff (core and hired including support staff) as per need. State of the Art interactive Website Institutionalize APP and PMEL, Quinquennial Review of Prog. and Management. Annual Report. Annual Audit (Board Authorized)	As under 2, private sector, NGOs, CSOs, farmers/FOs/SFCs, collaboration/networking/joint working with other Think Tanks in the region and globe	As in 2, more funding from Govt., Donations. Funds from Global Foundations, Corporate, institutional membership. Consultancy. International institutions membership. Availing CSR provisions of corporate sector	Preferred

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ANNEXURES

ANNEXURE I

List of Acronyms

%	: Percentage
AFNS	: Agricultural Food Nutrition Security
APAARI	: Asia Pacific Association of Agriculture Research Institutions
APP	: Annual Program Plan
ARI4D	: Agricultural Research and Innovation for Development
ARYA	: Attraction Rural Youth in Agriculture
ASCI	: Administrative Staff College of India
ATARI	: Agriculture Technology Application Research Institute
BSSs	: Brain- Storming Sessions
CG	: Consultative Group
CGIAR	: Consortium of International Agricultural Research Centers
CIB&RC	: Central Insecticides Board and Registration Committee
CIFOR	: Center for International Forestry Research
CRISPR	: Clustered Regulatory Interspaced Short Palindrome Repeats
CSR	: Corporate Social Responsibility
DAH	: Department of Animal Husbandry
DARE	: Department of Agricultural Research and Education
DEI	: Diversity, Equity and Inclusion
DG	: Director General
EPA	: Environmental Protection Agency
etc.	: Et cetera
FAO	: Food and Agricultural Organization
FPO	: Farmer Producer Organization/Company
FSII	: Federation of Seeds Industry of India
GAP4GAP	: Gender in Agriculture Platform for Gender in Agriculture Partnership
GEAC	: Genetic Engineering Appraisal Committee
GEB	: Global Environmental Benefits
GFAR	: Global Forum for Agricultural Research
GLP	: Good Laboratory Practice
GM	: Genetically Modified
GoI	: Government of India
GoI	: Government Order
GST	: Goods and Services Tax
IARI	: Indian Agricultural Research Institute
ICAR	: Indian Council of Agriculture and Research
ICRAF	: International Centre for Research on Agro Forestry
ICRISAT	: International Crops Research Institute for Semi-Arid Topics
ICT	: Information Communication Technology
IFAD	: International Fund for Agricultural Development
IPM	: Integrated Pest Management
IPS	: Indian Phyto pathological Society

ITPGRA	: International Treaty on Plant Genetic Resources for Agriculture
KVK	: Krishi Vigyan Kendra
MoA & FW	: Ministry of Agriculture and Farmer's Welfare
MoEFCC	: Ministry of Environment, Forests and Climate Change
MoRD	: Ministry of Rural Development
MRL	: Maximum Residue Limit
MSSRF	: M S Swaminathan Research Foundation
NA	: Not Applicable
NAARM	: National Academy of Agricultural Research Management
NABARD	: National Bank for Agriculture and Rural Development
NARS	: National Agricultural Research System
NBPGR	: National Bureau of Plant Genetic Resources
NCAER	: National Council for Applied Economic Research
NEP	: National Education Policy
NGOs	: Non-Governmental Organizations
NHEC	: National Higher Education Commission
NITI	: National Institution for Transforming India
NLP	: Natural Language Processing
NMYA	: National Mission on Youth in Agriculture
NRC	: National Research Centre
NRM	: Natural Resource Management
PAU	: Punjab Agricultural University
PCO	: Pesticide Control Order
PGRFA	: Plant Genetic Resources for Food and Agriculture
PJTSAU	: Professor Jayashankar Telangana State Agricultural University
PMB	: Pesticide Management Board
PMEL	: Prioritization, Monitoring, Evaluation and Learning
PPP	: Public Private Partnership
PRD	: Protection of Regulatory Data
SAD	: Sustainable Agricultural Development
SAS	: Statistical Analysis System
SAUs	: State Agricultural Universities
SDGs	: Sustainable Development Goals
SDN1, SDN2, SDN3	: Sie-Directed-Nucleases, 1,2 and 3
SPS	: Society for Pesticide Science
TAAS	: The Trust for Advancement of Agricultural Sciences
TERI	: The Energy and Research Institute
Tn	: Topic Groups (n = 1,2,3,4 and 5)
Viz.,	: Videlicet, namely
WFP	: World Food Prize
WUE	: Water Use Efficiency
YPARD	: Young Professionals for Agricultural Development

ANNEXURE II

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ANNEXURE IV

Policy Advocacy by TAAS – Final outcome Items (Evaluation Proforma)

Sl No.	Policy Advocated	Level 1	Level 2	Level 3	Level 4	Level 5		Level 6	
						Full	Partial	Full	Partial
1	Effective coordination and convergence of all agro-biodiversity matters								
2	Raising the concern for establishment of PPV and FRA authority, creation of Gene Fund								
3	Emphasized creation of seed mission to promote hybrids/HYV crop seed, increase productivity and quality								
4	Suggestion to make Seed Bill 2020 further useful and farmers friendly and approve in Parliament								
5	Suggestions to provide incentives to private seed sector on par with public sector especially for hybrid seed production								
6	Suggestions to pass Pesticides Management Bill 2020								
7	Inclusion of Soya milk and other products in the midday meal scheme								
8	Single window clearance of regulatory process relating to testing and release of GM crops								
9	Suggestions to promote farm development activities like bunding, field levelling etc.								
10	TAAS "Ranchi Declaration for preparation and implementation of a national plan of action on management and conservation of Farm Animal Genetic Resources								
11	Suggestions to modify APMC Act to reform markets and link farmers with markets, delink F&Vs, flowers from APMC purview								
12	Invest at level 1 % of Ag GDP for/on ARI4D as against the present 0.4 %								
13	Strengthen research management cadre, scientists have both EDP & MDP at NAARM, Hyderabad								
14	Motivate, attract, and retain youth in agriculture, emphasize capacity development, vocational training, funding, market reforms etc.								
15	Integrate and empower women for inclusive growth and development through global partnership on gender in agriculture								
16	Harness potential of biotechnology through appropriate policy support, clear road map for prioritizing								

	biotechnology for F&V security, biosafety regulatory & IP management, public awareness								
17	Strengthen livestock sector to transform from subsistence level to commercial level								
18	Dedicated TV Channel on Agriculture to help farmers								
19	Inclusion of Maize in Food Security Mission								

Note: Level 1 = Opportunity created (Conference, publication, networking, capacity building)
Level 2 = Was active engagement during the event present? Did all participants give feedback?
Level 3 = Did something happen? Any takeaways? Any feedback on takeaways from participants?
Level 4 = Was joint action enabled? Communicated? Any actionable proposal developed?
Level 5 = So, what? Was institutional, policy reform happened? Was the plan implemented?
Level 6 = Inference on change/impact/influence owing to the action initiated?

Public Awareness activities by TAAS-Final Outcome Items (Evaluation Proforma)

Sl No.	Areas/Items	Level 1	Level 2	Level 3	Level 4	Level 5		Level 6	
						Full	Partial	Full	Partial
1	Conservation and sustainable use of natural resources of land water and agrobiodiversity								
2	Sustainable diversification of agriculture through reorientation towards “Farming Systems” mode integrating crops, animals, and fisheries								
3	Soil Test based use of fertilizers								
4	Out scaling of proven innovations which solve inputs enhance income like CA, plastic mulching, DSR, micro irrigation etc.								
5	Judicious use of water through required pricing of water, promotion of micro irrigation to enhance WUE								
6	Women empowerment through technology, capacity building, legal rights, supportive policies, and incentives								
7	Motivate and retain youth in agriculture through NMYA via., training, skilling, engage them as technology agents, incentives, funding support								
8	Sensitization of researchers, policy makers and development officials to upscale and out scale farmer led innovations, impressed ICAR to create National Innovation Fund								

9	Catalysed states to form State Farmer Commission and take aggressive steps to address farmer problems and come out with farmer centric agricultural policies								
10	Effectively address climate change issues, promote climate smart agriculture, crop and livestock insurance, seed banks, credit at low interest								
11	Impress ICAR to create National Agri information System to help farmers with dedicated TV channel								
12	Awareness about importance and relevance of GM crops for India								
13	Catalyse PPP model to ensure quick delivery of results to end users, establish Technology Parks for scaling out innovations								
14	Awareness to use Soyabean as food crop to overcome protein malnutrition								
15	Revive Oilseeds Mission to reduce heavy import of oilseeds								
16	Supply of planting materials in horticulture, urban, peri-urban horticulture								
17	Emphasize value addition, emphasize on FPOs, skill development in horticulture								

Note: Level 1 = Opportunity created (Conference, publication, networking, capacity building)
Level 2 = Was active engagement during the event present? Did all participants give feedback?
Level 3 = Did something happen? Any takeaways? Any feedback on takeaways from participants?
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Level 6 = Inference on change/impact/influence owing to the action initiated?

ANNEXURE V

Annexure 1 (Schedule)

Opinion survey of Thought Leaders (very Senior NARS/Global Leaders/Experts)

a) Are you aware of/ were associated with TAAS, its objectives, activities?

b) Which of its activities in your opinion have made the maximum expected impact?

c) Do you suggest that TAAS should continue, focus on existing activities, or make any change in its activities and implementation process/procedures/mechanisms in future?

d) What are your suggestions to make TAAS a brand name in its mandate/programs/activities and become more beneficial to science and society?

Annexure 2 (Schedule)

Stakeholder Survey

1. Name:
2. Date:
3. Organization/Affiliation:
4. Survey Questions:

A. Questions with choice feedback about TAAS

Questions	Strongly agree	Agree	Neither	Disagree	Strongly disagree
TAAS has a clear vision, mission, goals					
Like to explore more about TAAS?					
Do you understand your role in TAAS?					
Do you feel the work of TAAS is related to your work?					
Do you think that TAAS helps its staff to perform well?					
Do you know TAAS is independently working?					
Do you think TAAS is a credible and accountable organization?					
Does TAAS consult/communicate enough with stakeholders					
Do you get any benefit/s from working with TAAS					
Do you rate the accountability and transparency of TAAS high					
Do you think the Members/Staff of TAAS are knowledgeable about the problems and prospects of Indian Agriculture					
Do the TAAS Members/staff plan and perform actions to solve problems and enhance prospects of Indian Agriculture					
Does TAAS assess effectiveness and results of its activities					
Is TAAS technology driven?					

B. Open ended questions

i. What do you think is working well in TAAS?

ii. What do you think is not working well in TAAS?

iii. What are your suggestions to improve, enhance and promote TAAS?

iv. What Department/agency you belong to? (I think the categories should have clear distinction to avoid confusion e. g. Persons under Executive Category may also fit to some extent under Management, Leadership or Administration. In view of this, you may consider regrouping of below mentioned categories):

a) Executive
b) Management

c) Leadership
d) Human Resource
e) Accounting
f) Administration
g) Operations
h) Others

v. What is your age group (years)

a) 18-25
b) 26-35
c) 36-45
d) 46-55
e) 56-65
f) 66-75
g) 76 and above

vi. Do you have any suggestions/s comments and feedback?