



## Process Evaluation through Satisfaction Indices: Drawing Corollaries from National Agricultural Higher Education Project

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### HIGHLIGHTS

- The study assessed the satisfaction levels of students and faculty across agricultural universities under NAHEP by a thorough process evaluation.
- There was an increase in the satisfaction rate of the students and faculty towards NAHEP initiatives in enhancing the quality and relevance of agricultural higher education.
- Agricultural Universities' under NAHEP demonstrated a proactive approach, enhancing education, and benefiting students, faculty, and university development.

### ARTICLE INFO

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### ABSTRACT

Agriculture education has become an alluring opportunity for students and university faculty, because of NAHEP's comprehensive vision to support SAUs and Deemed universities of the ICAR in providing more relevant and higher-quality education. Students and faculty availed benefits of the project and improved their skill set. Assessing student and faculty satisfaction was necessary to understand their level of contentment with the project's activities and to establish a quantifiable measure of how effectively the project met their needs. Data was collected from 9322 students and 3386 faculty using Google Forms and analyzed by calculating average and weighted satisfaction score. The results depicted that in the case of student satisfaction index ratings, there was an increase of 6.6 per cent with a weighted satisfaction score of 2.42 in 2022-23 in comparison to the year 2020-21 with a weighted satisfaction score of 2.26. Faculty also revealed satisfaction with an increase of 3.8 per cent comprising a weighted satisfaction score of 2.61 in 2022-23 in comparison to the year 2020-21(2.51) highlighting the positive impact of the NAHEP program. Thus, the evaluation framework delved into intricate dynamics of the satisfaction levels of students and faculty and provided valuable insights into the efficacy of the project's processes and outcomes.

### INTRODUCTION

The Indian agriculture sector has achieved notable advancements in both production enhancement and technology adoption, with human resources playing a pivotal role in this evolution. Recognizing the crucial need for skilled professionals in the sector, the ICAR has been committed to providing high-quality

and relevant education to students. In pursuit of this objective, ICAR, in collaboration with the World Bank, initiated the National Agricultural Higher Education Project (NAHEP) in 2017 with its focus on enhancing the quality of agricultural education by supporting Agricultural Universities (AUs) to propose and implement technically sound and verifiable investments. Over the past six years of implementation in India, 62 State Agricultural

Universities including 04 ICAR Deemed Universities actively participated on different themes under three major sub-components of a major component (Support to Agricultural Universities) i.e. Investments towards 21<sup>st</sup> Century Agricultural Universities through Institutional Development Plan (IDP), Investment in Centres for Advanced Agricultural Science and Technology (CAAST) and Innovation Grant (IG) to universities towards the project's intended outcomes. The project stands as a testament to the concerted efforts aimed at fostering excellence in India's agricultural education landscape. These investments boosted faculty performance, attracted students towards agricultural education, improved student learning outcomes, enhanced their prospects for future employability and provided international exposure.

Innovative infrastructures have been developed in the universities under NAHEP to improve the learning outcomes of the students and enhance the experience of teaching-learning through digital initiatives such as innovative smart classrooms, AI labs, robotics and automation labs, language proficiency labs, virtual laboratory, the adoption of augmented/ virtual reality facilities, digitization of libraries, etc. It also facilitated students in moving from teacher-centric to learner-centric education, utilizing ICTs, providing vocational and technical certificate programs (national and international) and improving learning and academic environment that expanded and sharpened their skills which is much needed for fetching good employment. Similarly, the faculty through various national and international training increased collaboration among Indian agricultural universities and among other universities globally to raise research quality and publications and its linkages to educational quality, improving the delivery of education and its learning outcomes (NAHEP Annual Report, 2022-23). Thus, both students and faculty have reaped numerous benefits from the project and enhanced their skill sets. To gauge the satisfaction levels of students and faculty regarding the project's activities and to obtain a quantifiable measure of how effectively the project has addressed their needs, it became imperative to evaluate their satisfaction over a period of time through specifically developed satisfaction indices in order to draw corollaries from NAHEP.

In view of the above, this study endeavours to conduct a thorough process evaluation spanning the last three years, with a specific focus on assessing the satisfaction levels of students and faculty across various parameters within the agricultural universities and ICAR Deemed universities that received project awards. In a quest for a more comprehensive understanding of satisfaction rates, the current investigation delves into distinct sets of questions tailored for students and faculty, thereby offering a nuanced perspective on the project's impact from both stakeholder groups.

## METHODOLOGY

Process evaluation of student and faculty satisfaction was done for three consecutive years starting from 2021 to 2023 by developing satisfaction indices. Online surveys were done using Google forms along with the QR code and shared with 62 NAHEP-awarded agricultural institutes and ICAR Deemed universities with the request to the Principal Investigator of the project to put the QR code in the common areas of the university, hostels, and social media groups to encourage participation and gather diverse

perspectives. Finally, the total responses of 9322 students and 3386 faculty were found complete and considered for the final analysis out of the total responses received from students (12423) and faculty (3672).

The key parameters to assess the students' satisfaction level were divided into three major indicators i.e. industry orientation and professional skill development, training and capacity building initiatives, and facilities and infrastructure with corresponding weightage of 45, 25 and 30 per cent, respectively comprising a total of 19 statements. The faculty satisfaction levels were assessed on training and capacity building, facilities and infrastructure, and collaboration and linkages with corresponding weightage of 40, 30 and 30 per cent, respectively comprising 08 statements. Responses were collected on a continuum for each statement as extremely satisfied (3), moderately satisfied (2), and not at all satisfied (1). The responses from the students and faculty were analysed separately by calculating the average satisfaction score and weighted satisfaction score. The weighted satisfaction score was calculated by multiplying the average satisfaction score under each parameter with the assigned weightage of the particular parameter.

## RESULTS

The faculty and student satisfaction are key indicators of institutional and academic quality (Sweitzer & Volkwein, 2009). The satisfaction data helps colleges and universities make their curriculum more responsive to the needs of a changing market place (Dhaqane & Afrah, 2016). Students' satisfaction with the quality of the education services they receive is a crucial index of the performance of high-education institutions in today's world (Butt & Rehman, 2010; Santini et al., 2017). The faculty satisfaction helps to evolve and develop conditions desirable for the all-round growth and development of the organization (Jayasingh et al., 2022). It is necessary to review the influences, programmes, and different factors affecting students at all stages of their education (Meinan et al., 2023). The increased number of national and international training, hi-tech infrastructure, advanced teaching methods, competencies, research, well-defined course curriculum and high placement rate are valuable means to ensure and demonstrate academic quality which leads to an increase in satisfaction of students and faculty. Student and faculty satisfaction with the quality assurance role of the education division was assessed based on the parameters separately for students and faculty.

### **Student satisfaction towards NAHEP initiatives in enhancing the quality and relevance of Agricultural higher education**

Student satisfaction is a short-term attitude resulting from an evaluation of students' educational experience, services and facilities (Weerasinghe & Fernando, 2017). Students are the most important stakeholders in every educational institution and their satisfaction is determined by their experience, perception and expectations from the higher education institutions (Saika, 2022). The overall utility of experiential learning programme was perceived by students to have been positively influenced by administrative issues and teaching methods, while teachers perceived extra-curricular activities to have influenced it negatively. Student satisfaction is vital both for the success of institutions and for that of individual students,

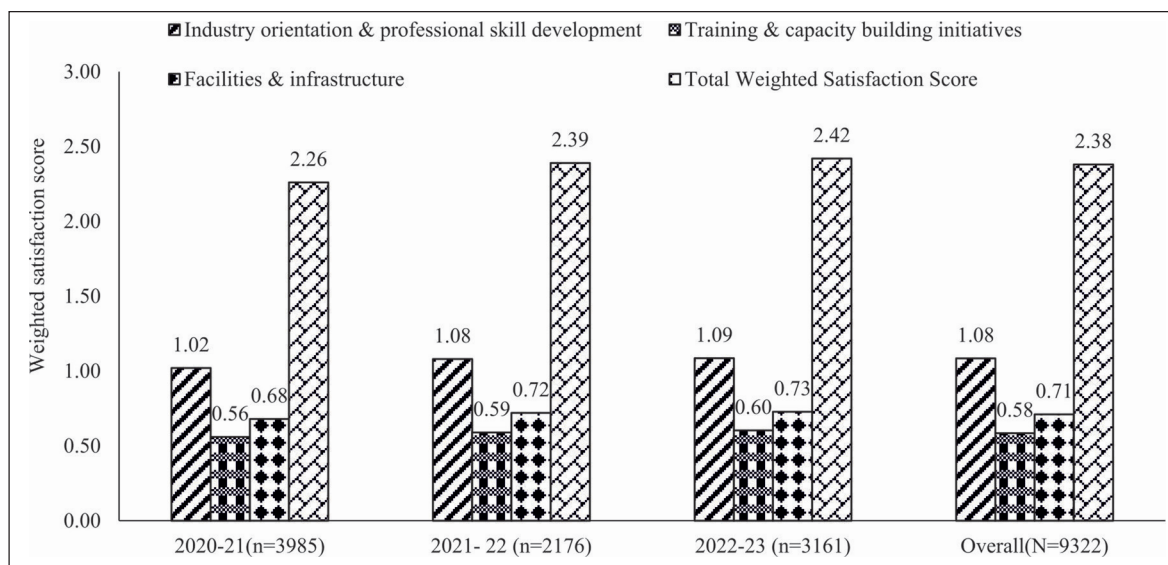


Figure 1. Student satisfaction scores

Table 1. Average satisfaction score and ranking towards NAHEP initiatives revealed by students

Category	Weightage	Max Score	Survey queries	2020-21 N=3985 Average satisfaction score	2021-22 N=2176 Average satisfaction score	2022-23 N=3161 Average satisfaction score	Overall N=9322 Average satisfaction score	Rank
Industry orientation & professional skill development	45%	3.00	i. Entrepreneurship development program	2.32	2.50	2.50	2.44	II
			ii. Leadership development programs	2.30	2.37	2.37	2.35	IV
			iii. Industry-oriented exposure visits	2.17	2.33	2.33	2.28	VI
			iv. Improved awareness of guidance provided on Career Opportunities in agriculture and allied sector by your AU faculties	2.37	2.48	2.48	2.44	II
			v. Industry collaborations made by your AU under NAHEP	2.21	2.37	2.37	2.31	V
			vi. Pilot courses on emerging areas of agriculture and allied course	2.16	2.31	2.31	2.26	VII
			vii. Industry seminars and professional workshops from experts	2.30	2.41	2.41	2.38	III
			viii. Internship and experiential learning programs	2.23	2.35	2.35	2.31	V
			ix. Communication skill development program	2.37	2.51	2.60	2.49	I
			Average	2.27	2.40	2.41	2.36	
Training & capacity building initiatives	25%	3.00	i. Guest lectures by national/international faculties	2.39	2.51	2.51	2.47	I
			ii. Agriculture Education Fair organised by your AU under NAHEP	2.28	2.45	2.45	2.39	II
			iii. International training programs	2.18	2.30	2.40	2.29	III
			iv. Sandwich program with national/international organization	2.10	2.23	2.30	2.21	IV
			Average	2.24	2.37	2.41	2.34	
Facilities & infrastructure	30%	3.00	i. Alumni cell established by your AU	2.22	2.35	2.40	2.32	IV
			ii. Designated placement cell established placement related activities	2.20	2.32	2.32	2.28	V
			iii. Capability for in-house or lateral placements/jobs	2.26	2.34	2.34	2.32	IV
			iv. Benefitted from the establishment of virtual/smart classroom	2.36	2.50	2.50	2.45	II
			v. Facilities to learn through online classes-MOOC	2.28	2.41	2.40	2.36	III
			vi. Benefitted from Next generation infra-structures and equipment	2.36	2.46	2.60	2.48	I
Average	2.28	2.40	2.43	2.37				

particularly in our current global climate (Wong & Elaine, 2023). Therefore, using satisfaction assessment indices developed for the project, it was necessary to ascertain the degree of satisfaction of students at NAHEP-awarded universities.

The study depicted that the student satisfaction index rating increased over the years highlighting the positive impact of the NAHEP activities (Figure 1). There was an increase of 5.4 per cent with a weighted satisfaction score of 2.39 in 2021-22 in comparison to the year 2020-21 (2.26) and 1.2% in the year 2022-23 (2.42) in comparison to the year 2021-22(2.39) The results depicted that there was an increase of 5.8 per cent in industry orientation and professional skill development satisfaction of students in 2022-23 as compared to 2020-21, 7.1 per cent in training and capacity building and 6.2 per cent in facilities and infrastructure indicators.

The average satisfaction score for each of the statements of the three parameters for measuring student satisfaction was calculated and ranked (Table 1). The first parameter i.e. Industrial orientation and professional skill development had nine statements. Among these, the communication skill development program (2.49) got the maximum satisfaction rating and was ranked first. The students were extremely satisfied with the improved awareness of guidance provided on career opportunities in agriculture and allied sector by university faculties (2.44) and the entrepreneurship development program (2.44) which were ranked second. The students also expressed their satisfaction with industry seminars and professional workshops from experts (2.38) followed by leadership development programs (2.35), industry collaborations made by AU under NAHEP (2.31), internship and experiential learning programs (2.31), industry-oriented exposure visits (2.28) and pilot courses on emerging areas of agriculture and allied course (2.26).

In the training and capacity building initiatives, guest lectures by national/ international faculties got the maximum satisfaction rating with an average satisfaction score of 2.47 over the three years followed by the agriculture education fair (2.39), international training programs (2.29) and sandwich program organized by awarded universities under NAHEP with national/ international organization (2.21).

For facilities and infrastructure parameters, the students benefitted from next-generation infrastructures and equipment and the establishment of virtual/ smart classrooms and showed average satisfaction scores of 2.48 and 2.45 respectively. Students in the present study were also satisfied with the facilities to learn through online classes- MOOC (2.36), alumni cell established by AU's (2.32), capability for in-house or lateral placements/ jobs (2.32), and establishment of placement cell and related activities (2.28).

#### Faculty satisfaction towards NAHEP initiatives in enhancing the quality and relevance of Agricultural higher education

Faculty satisfaction is an essential motivation for the advancement of the educational systems of the institution towards achieving efficiency and effectiveness in the processes of learning and education (Marwan & Yahya, 2015). The faculty must have a high level of job satisfaction as they are the significant pillars of educational institutions for providing students with theoretical and practical experience in different relevant fields efficiently. NAHEP initiatives focus on enhancing the overall capacity of agricultural universities, which includes faculty development programs aimed at improving teaching methodologies, curriculum development, and pedagogical techniques. The project provided opportunities for faculty members to enhance their skills and knowledge through workshops, seminars, training programs, and exposure visits both within the country and internationally, encouraged them to engage in innovative research that contributed to the agricultural sector's development, improved infrastructure facilitated supported research and teaching activities, which indirectly benefitted faculty members by creating a conducive academic environment, better administrative support etc. (NAHEP Annual Report, 2022-23). Enhanced participation in conferences, workshops, and other events provided faculty members with networking opportunities with peers, experts, and stakeholders from academia, industry, and government agencies, fostering collaborations and knowledge exchange. Thus, it was imperative to understand the level of satisfaction of faculty of NAHEP awarded universities through process evaluation indices specifically designed under the project.

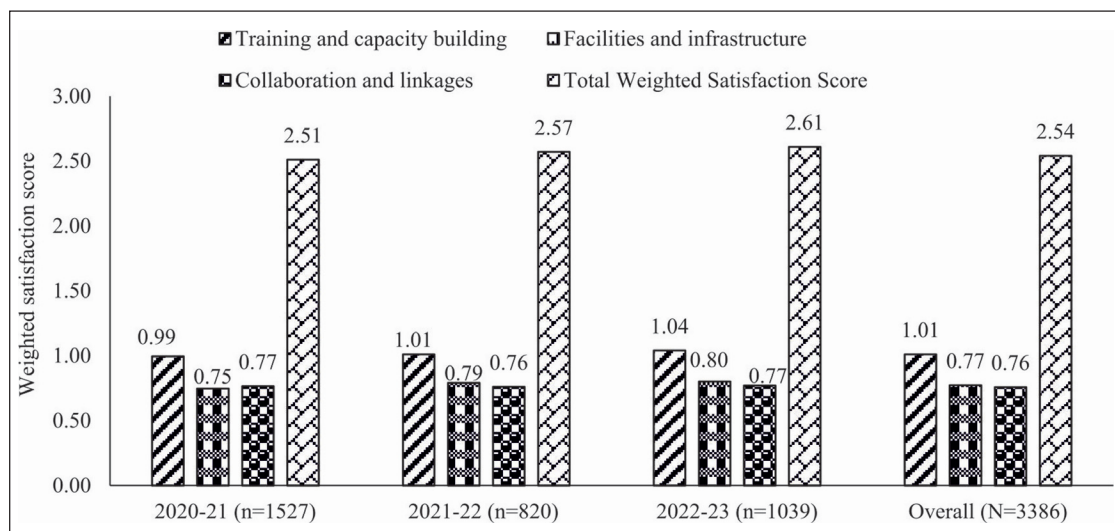


Figure 2. Faculty satisfaction scores

**Table 2.** Average satisfaction score and ranking towards NAHEP initiatives revealed by faculty

Category	Weightage	Max Score	Survey queries	2020-21 N=1527 Average satisfaction score	2021-22 N=820 Average satisfaction score	2022-23 N= 1039 Average satisfaction score	Overall N=3386 Average satisfaction score	Rank
Training and capacity building	40%	3.00	i. Faculty development program at the national level	2.58	2.65	2.68	2.64	I
			ii. Faculty development program at the international level	2.35	2.40	2.5	2.42	III
			iii. Subject-matter specialized CB programs	2.53	2.56	2.6	2.56	II
			Average	2.49	2.50	2.59	2.53	
Facilities and infrastructure	30%	3.00	i. Infrastructure Libraries/laboratories/facilitative units established under NAHEP to improve the research effectiveness	2.57	2.64	2.68	2.63	I
			ii. Establishment of management information system (MIS) under NAHEP	2.41	2.59	2.6	2.53	II
			iii. Availability of advanced teaching aids (virtual/smart classrooms/seminar/conference halls) established under NAHEP	2.48	2.69	2.72	2.63	I
			Average	2.49	2.57	2.67	2.58	
Collaboration and linkages	30%	3.00	i. Improved MoU opportunities with the industry for tech transfer and commercialization	2.59	2.50	2.5	2.53	II
			ii. Improved awareness of global/national research collaboration & competitive grant opportunities	2.51	2.58	2.65	2.58	I
			Average	2.55	2.45	2.58	2.53	

Figure 2 clearly shows that the faculty satisfaction index rating increased over the years depicting the success of the NAHEP program. There was an increase of 2.3 per cent with a weighted satisfaction score of 2.57 in 2021-22 in comparison to the year 2020-21 (2.51) and 1.5 per cent in the year 2022-23 (2.61) in comparison to the 2021-22. The results showed that there was an increase of 4.02 per cent in training and capacity-building indicators of satisfaction of faculty in 2022-23 as compared to 2020-21, 7.2 per cent in facilities and infrastructure and 1.2 per cent in collaboration and linkages indicators.

The faculty satisfaction index developed under three parameters i.e. training and capacity building, facilities and infrastructure and collaboration and linkages. In training and capacity building, the highest average satisfaction score was given to the faculty development program at the national level with a score of 2.64 followed by subject-matter specialized capacity building programs (2.56) and the faculty development program at the international level (2.42).

In our study too, the faculty revealed extreme happiness with the infrastructural development of libraries/ laboratories/ facilitative units with an average score of 2.63. They could improve the research effectiveness and also the availability due to the availability of teaching aids (virtual/smart classrooms/seminar/ conference halls). The faculty gave a score of 2.53 for the establishment of a management information system (MIS) under NAHEP.

Under the collaboration and linkages parameter, improved awareness of global/national research collaboration and competitive grant opportunities was ranked first with the highest average

satisfaction score of 2.58 followed by improved MoU opportunities with the industry for tech transfer and commercialization with a score of 2.53. The average satisfaction score of the faculty on all the parameters from the previous three years (2021-2023) is presented in Table 2.

## DISCUSSION

There was an increase in students' and faculty satisfaction which can be because of the remarkable outcomes achieved under NAHEP. The partner Agricultural Universities under NAHEP have played an instrumental role in developing innovative infrastructures to improve the learning outcomes of the students, to provide the world-class experience of teaching-learnings through digital initiatives such as the adoption of augmented/ virtual reality facilities, digitization of libraries, virtual laboratory, language learning modules with innovative smart classrooms, artificial intelligence labs, robotics and automation labs, language proficiency labs enhancing communication skills, etc. These out-of-box initiatives undertaken by partner AUs have improved the quality of agricultural higher education and also augmented the overall teaching-learning experience. Garcl a-Aracil (2009) in his study on European graduates' level of satisfaction with higher education also found that the advanced teaching/learning materials, course content, learning equipment and stocking of libraries had a significant influence on the students' satisfaction. Lekang et al., (2016) reported that the overall utility of experiential learning programme was perceived by students to have been positively influenced by administrative issues and teaching methods, while teachers perceived extra-curricular

activities to have influenced it negatively. Also students perceived the programme to be useful while teachers were not sure of its usefulness in imparting entrepreneurship skills. In the absence of specialized teachers for entrepreneurship education, accountability and commitment towards the programme are also likely to be compromised (Lekang et al., 2016). The availability of physical facilities of a university worked as a key determinant of students' choice in selecting universities also revealed by Douglas et al., (2006). The students put extra effort into education when the level of satisfaction is high (Khan, 2011). Kanan & Baker (2006) examined the efficacy of academic educational programs based on Palestinian developing universities and also found that academic programs make a significant impact on students' satisfaction.

The increase in student satisfaction rate is further supported by the increase in the percentage of success measuring indicators like on-time graduation rate which increased from 77 per cent (baseline) in 2016-17 to 95.7 per cent in December 2023. Similarly, there was increase in cut-off scores for students in ICAR entrance tests from 26 percentile (baseline) to 37.1 percentile. The increase in student placement rates from 49.1 per cent (baseline) to 61 per cent has been documented. Under the project, the share of female beneficiaries has increased from 37% (baseline) to 43 per cent in the year 2023. (NAHEP Annual Report, 2022-23) This corresponds with the increased enrolment of females in agricultural higher education in the country. There were various national and international training programs organized for the students under NAHEP. Around 2100 students have embraced international training opportunities in more than 500 emerging areas of agri and allied. Due to these programs, there was an increase in student diversity in the universities from 19 per cent (baseline) to 25.3 per cent (2023). Also, 259 pilot courses have been added/upgraded on communication skills, entrepreneurial skills, information processing, creative and innovative thinking, leadership skills, and industry-oriented courses helped the students to acquire desired traits and experience along with requisite skills. Engaging with alumni and developing e-content modules have further supported students' success and growth. The satisfied students are more likely to engage in alumni activities, greater alumni engagement can in turn benefit the institutions through the provision of direct financial support, as well as attractive employment opportunities for current graduates (Paul & Pradhan, 2019; Senior et al., 2017).

The findings also revealed that there was an increase in the satisfaction rate of the faculty over the years which can be attributed to various factors such as the implementation of innovative educational technologies, innovative infrastructures, advanced teaching aids (virtual/smart classrooms/seminar/ conference halls), faculty international training programs wherein > 800 faculty have been trained and could increase in global and national research collaborations, etc. It has been documented that 20 per cent of the faculties got promoted/ secured better positions in the institute beyond post-NAHEP training and also there was a 54.5 per cent increase in faculty diversity in the universities/institutes. Out of the trained faculty, 47 per cent got external projects and there was a 30.6 per cent increase in faculty research effectiveness may be the reason for the higher satisfaction scores of the faculty. (NAHEP Annual Report, 2022-23) The faculty's satisfaction with their job

and efficient work environment motivated them to prove themselves to be a resource to the university. The study by Arun et al., (2022) found centralization of education, educational disparity and financial and coverage gap as challenging factors in NEP2020 as such actions accordingly are warranted. The findings of Karna & Julin (2015); Wilkins & Balakrishnan (2013) also support our findings which revealed that the research, advanced teaching facilities (Karna & Julin, 2015), resources and effective use of technology (Wilkins & Balakrishnan, 2013) had great impacts on faculty satisfaction. According to Papos & Kumar (2019), training and development practices created a learning environment in the organization which eventually contributed towards faculty job satisfaction through appropriate skills development for individual and organizational growth in Maharashtra. Overall, the awarded Agricultural Universities under NAHEP have demonstrated a proactive and progressive approach to education, benefiting students, faculty and the university's overall development and increasing the satisfaction rate of the students.

## CONCLUSION

Process evaluation through satisfaction indices was found effective as it helped in assessing the impact and identifying the successes and challenges of the project. By systematically collecting and analyzing satisfaction data, NAHEP could ensure that its initiatives effectively met the needs of students and faculty members. It also helped in creating a better teaching-learning environment with favorable outcomes, ultimately contributing to the improvement of higher agricultural education in India. The students and faculty satisfied with the organisation's academic services, innovative institutional infrastructure, skill enhancement programs, international exposure, collaboration among universities globally and high prospects for future employability perform efficiently and become a resource to the organisation. Such studies can help universities refine their academic environments, thus enhancing support for both students and faculty by optimising their educational offerings and fostering a more conducive learning atmosphere.

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