

Problems faced by agricultural engineers in India

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Agricultural engineering has traditionally been defined as the application of engineering knowledge to solve agricultural problems. Agricultural engineers thus use engineering tools and practices to solve production, handling and processing problems for food and fibre along the production to consumption chain. The origins of agricultural engineering as a discipline can be traced to societal needs in general and farmers' requirements in particular. The forces and factors that come into play in the development of agricultural engineering included the need for increased agricultural production to feed growing populations, labor shortages and production costs leading to mechanization, climatic vagaries leading to irrigation, and environmental factors leading to farm structures for animal housing, just to mention a few.

The traditional core pillars of agricultural engineering were agricultural machinery and farm power, soil and water engineering, post harvest technologies, agricultural structures and the environment.

The overview will enumerate the problems with respect to the agricultural engineering profession, agricultural engineer, and agricultural engineering degree programmes at universities and colleges in India

Problems faced by agricultural engineering :

Agricultural engineering has faced and continues to face several problems, directly and indirectly, as well as those of its own making and others beyond its control.

Problems faced by agricultural engineering profession : The agricultural engineering discipline has faced several problems to do with definition, identity, recognition and support.

Problem of definition and identity: As alluded to in the introduction, the origins of agricultural engineering are based in agricultural mechanization and thus for a long time in India, the discipline was taken to be synonymous with mechanization and farm power. Thus the moment one talked about agricultural engineering, it was automatically perceived to be something to do with tractors and ploughs. At best, over and above mechanization, agricultural engineering also included soil and water conservation, which was synonymous with contour pegging and construction of storm drains. The situation was not

helped at all by the fact that in most government ministries and departments, research centers or institutions charged with agricultural engineering research and extension, tended to have the two units of tractors (implement development, tractor testing, etc.) and soil and water conservation and very little of the other agricultural engineering aspects, further cementing the wrong definition and identity of agricultural engineering.

Lack of professional recognition: Agricultural engineering was for a long time not recognized as an engineering profession in India and in some cases this is true up to date. In olden days, the agricultural engineering profession was manned by civil and mechanical engineers plying their trade in agriculture. As a result, their allegiance was to their primary qualification rather than agricultural engineering. Thus no one slaved to put agricultural engineering on the professional map until quite recently. Society and industry did not recognize agricultural engineering and so the profession suffered from lack of good will investment into it. It is not surprising to find agricultural engineering excluded from competitions undertaken or awards given (e.g., civil or mechanical engineer of the year award) by industry in many countries in the region today.

Low ranking of agricultural engineering: Generally, agricultural engineering was always ranked lower than the other traditional engineering disciplines. This meant that conditions of service were always not so good implying that the profession could not employ the best. By extension, it meant the profession did not get the best of representatives to argue for it in general.

Limited opportunity to practice the trade: In most of the India, agricultural engineering was rarely practiced as a profession in its' totality. Industries in the region generally did not have research and development (R & D) department, thus limiting the practice of agricultural engineering.

Low value of agriculture: In the production to consumption continuum, agriculture occupies the base of the value pyramid. This means there is very little value addition (beneficiation) at this level thus limiting investment in support disciplines like agricultural engineering involved

at these lower levels of production. The situation has only started to turn around as agricultural process engineering has come to be more prominent in the final stages of the production to consumption chain.

Problems faced by agricultural engineer : Like the profession, the agricultural engineers in India also faced a plethora of problems. Some of these were aligned to the ‘hazards’ of the profession whilst others were more to do with societal perceptions.

Lack of recognition: Agricultural engineers were not recognized as engineers, unless if they were from the traditional disciplines of engineering. The problem was even more acute in later years when agricultural engineers were perceived to be agriculturalists with a little engineering. This is reflected in the often quoted definition of an agricultural engineer as “*a person who prefers to talk about engineering in the presence of farmers and about agriculture in the presence of engineers*”.

Poor professional development prospects: Coupled with the lack of recognition by the society and industry, agricultural engineers suffered from poor professional development prospects. If agricultural engineering was seen as mechanization, there was very little scope for professional growth except to become head or chief workshop mechanic, so to speak. Industry was more interested in sales and marketing thus putting to waste all the engineering knowledge that the agricultural engineer had acquired. In government research setups, the structure was generally flat, mainly research officer to senior officer and the usual chief or head of the unit. Exposure to all fields of agricultural engineering was very limited. Thus the agricultural engineer had a very narrow career development path. On the academic development front, academic growth has been frustrated by the lack of support and funds for research. In India, when the first batch of agricultural engineering professors left the academic system, it was quite a while before the next generation of professors came through.

Lack of access to information: Developing countries are notorious for not having access to information. Likewise, agricultural engineers suffered from lack of access to recent and relevant information. Their libraries were always poorly resourced. The effect of this was that the agricultural engineer in India was somewhat always behind in information and hence technology development and the research tended not to be ‘cutting edge’. Although the problem has improved slightly with the advent of internet and online information, still most agricultural engineers in the region do not have access,

mainly because of poor connectivity.

Poor conditions of service: In most of India, traditional engineers (civil, mechanical, and the like) tended to get relatively good conditions of service compared to agricultural engineers. Whilst traditional engineers were given professional and retention allowances, agricultural engineers rarely got these. This problem was found both in universities, government and industry. A negative consequence of these poor conditions of service was that agricultural engineers, invariably, had to engage in side activities or private businesses such as consultancies, farming, transport services and the like. These side activities are necessary but do not add to the professional growth of the agricultural engineers. The agricultural engineer would thus lag behind in terms of research publications, engineering inventions, and so on. The poor conditions of service would also mean that academic and research institutions would have problems in recruiting experienced professors and personnel leading to the employment of young inexperienced agricultural engineers who cannot offer any mentorship to others, thus leading to further lack of professional development.

Poor employment prospects: As economies in India have moved from central command to market driven economies, employment prospects for agricultural engineers have diminished drastically. Instead of expecting to be employed upon completion of their studies, more and more graduate agricultural engineers have to ‘walk the streets’, or be engaged in entrepreneurial activities that may have absolutely nothing to do with agricultural engineering. It is not unheard of in parts of the region to find an agricultural engineer teaching geography or bible studies at a secondary school. This points to poor employment chances for agricultural engineers. Some of the ramifications of poor employment prospects are interesting, but somewhat saddening. In academic institutions, professors would often engage brilliant recently completed under graduates students for postgraduate research and studies leading to master’s and doctorate qualifications in a short space of time. Whilst this is good, what you have at the end is a highly qualified but highly inexperienced individual in agricultural engineering – never spent a single day of their lives working in really agricultural engineering. This leads to lack of confidence and also an undesirable incestuous knowledge base between the professor, the former student and the research project they worked on.

Problems faced by agricultural engineering degree programmes : Agricultural engineering degree programmes in most of the India faced and have continued

to face problems to do with support, access to resources and competition with other more visible programmes. This translates into the quality of the teaching and the product of that programme.

Lack of popularity of agricultural engineering degree: Agricultural engineering degree programmes were really never popular in this Indian region. The cynical argument was always, if you can get into the engineering college why not do real engineering. Thus the agricultural engineering degree programmes were dogged by low student numbers, which probably translated to less resource allocation to the programme with the consequent problems associated with poorly resourced programmes. This is indeed a sad day for agricultural engineering – probably quietly sinking into oblivion?

Lack of support from central authorities: Low student numbers as well as lack of popularity of the agricultural engineering degree programme manifest themselves through less resource allocation from central administration of agricultural colleges and universities towards agricultural engineering. This is much more true in India where universities are already under funded to a large extent. As a result, agricultural engineering laboratories are rarely adequately equipped or staffed. The industrial base in India is also very small leading to further resource constraints in terms of donations or funded programmes from industry to agricultural engineering. The lack of support, including for research funds, is reflected in the type of research that is carried out in the region, it's mainly of an applied nature and that is good, but it is rarely breakthrough type of research. An interesting phenomenon of lack of local research funding is that most of the agricultural engineering research is funded from overseas sources that have their own research agenda, some of which might really not be critical to the problems faced by countries, further making agricultural engineering work irrelevant and not adopted or taken up by many.

Competition from more visible degree programmes: In the past, agricultural engineering suffered from competition from much more visible programmes such as civil or mechanical engineering and in the not so recent past, environmental and chemical engineering. Engineering ranked and still ranks fairly low amongst the more traditional engineering disciplines. In some institutions agricultural engineering was like a specialization in the main traditional engineering degree programmes, further clouding the identity and competitiveness of agricultural engineering.

Lack of accreditation by engineering councils and boards: It is sad to note that some engineering programmes have not been formally accredited by the appropriate engineering boards or councils in their countries. Lack of accreditation weakens the programme and limits the employment prospects of students coming out of that programme as well as their ability to be registered as engineers after serving the required professional housemanship.

Slow responsiveness to change: Agricultural engineering degree programmes in India are very slow in changing and adapting to changing times. Whilst most agricultural engineering degree programmes in India have since evolved and changed their names to modern and more encompassing ones, in this region the old name is still being used and still persists. This slowness is a problem for agricultural engineering in the region. By the time change is brought about, the names will be dated and working against properly profiling agricultural engineering. Constrained and crowded curricula in agricultural engineering: Agricultural engineering students are expected to do a certain number of courses from departments of civil, mechanical and electrical engineering and then those from agriculture and agricultural engineering.

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