Eco. Env. & Cons. 28 (January Suppl. Issue) : 2022; pp. (S194-S199)
Copyright@ EM International
ISSN 0971–765X

http://doi.org/10.53550/EEC.2022.v28i01s.028

Rebooting the Value of Traditional Knowledge in Scientific Fruit Farming

Jinto James, J., S. Senthilkumar* and S. Manivannan

Department of Horticulture, Central University of Tamil Nadu, Tiruvarur 610 005, India

(Received 31 August, 2021; Accepted 1 September, 2021)

ABSTRACT

India is a hub of traditional knowledge that existed through experiences and shifting practices over generations. Over the past few decades, it has been advanced in fruit farming with its productivity and marketing aspects, but in present scenario, it has been facing several hurdles with the progress. It raises several queries in mind over the reliability of concepts with modern fruit farming over long-term sustainability, strategy as a solution for numerous problems in cropping programme etc. Additionally, it was observed that even modern fruit farming methods render solutions to overcome the demand fluctuations with growing populations, the stability remains to be doubtful and lacks ensured values. Hence, in this content, it enforces horticulturalists to seek on the past traditional value from the roots of the farming histories to realize the importance of traditional farming systems with the approach of integrating latest technological advancements into the system. Current situations in present horticulture world enact the farmers to adopt a hand-in-hand approaches so that the traditional systems may promote hand-in-hand with modern technology and we can come to a better solution for the long-term sustainable fruit farming model. In the current review, the essentiality of traditional farming practices and their importance of bringing back traditional knowledge into the modern system of fruit farming are discussed.

Key words : *Traditional values, Fruit farming, Genetic diversity, Cultural crisis, Climate change.*

Introduction

Agriculture and farming were the basis of every human life and is being progressed since the start of humankind. Fruit farming in the modern era has seen many scientific advancements and optimizations that the knowledge gained and passed down by our ancestors is quickly fading away because of the higher priority to scientific knowledge due with the evolution of present day science and technological advancements.

The heritage of Indian Agriculture system dates back to many centuries. The roots of subsistence based tribal groups are the source for traditional Agriculture (Gowtham Shankar, 2006). It is built upon multiple generations of experiences and knowledge, it was refined further over generations. It was a proven system, as we evolved further the market goals and needy changes. Moreover, in due with the explosion of population, those traditional values and knowledge were under-utilized and atmost forgotten now. Presently, they were retained very rare with some old people or in some archives. These have been replaced when the Green Revolution came about and more priority has been given to long term sustainability and productivity now. This caused the sidelining of the traditional values and practices. But the traditional values have their own benefits and advantages that went unnoticed. The traditional systems focused on human as well as nature's health and quality rather than productivity or profit.

In recent times, the efforts of fruit farming focus on long term sustainability and profit thus the tradition has been more or less forgotten except for some rare places and few communities. This strategy can be changed to a mode where the tradition goes hand in hand with modern technologies. This can be advantageous in protecting the useful traditional knowledge while concentrating on long time sustainability and profit in the market. Traditional values used to get passed down from generation to generation, but now it is not given much importance and is getting overshadowed by more scientific approaches and techniques. This was absolutely essential for modernisation but it sure has its negative side. Now we are trying to combat it by bringing a change to this strategy.

This change in strategy is especially relevant in the modern times where we are starting to understand the cons of modern revolution and starting to realize more scientifically the effect it has had on human health and life expectancy in general. The modern era is trying to revert back the negative impact and is starting to seek new ways to bring us closer to nature. This is the perfect opportunity to look back at our traditional knowledge and practices, to revive them and integrate the same with the modern technological advances. The goal should not be to exploit nature but to work with it.

Problems faced with traditional knowledges in present scientific era

The changing times and evolving societies have posed some serious threats and challenges to our traditional knowledge. When the technological evolution was on full swing, we quickly started to find the limits of the traditional fruit farming knowledge. At this point we started to think that with traditional knowledge alone we will not be able to meet the future requirements and demands of the market.

Thus, the fruit farming sector started to venture into more scientific and modern approaches to solve the problems. In the beginning of this transition great achievements were made and things were looking bright. At this point the general thought that scientific fruit farming approaches are better than the traditional one started to take hold. In this context there were several limitations and problems the traditional system had to face. Some of them are mentioned below.

Meeting the needs

In the wake of globalisation and urbanisation, the food requirements of Indian people have greatly diversified. In a recent research it was found that only with traditional practices alone, the requirements could not be met, which can only be solved with modernisation in the production and retail sector (Gandhi and Zhou, 2014). As globalisation takes places, out food requirements and desires also change, today in the fruits sector, the change is very visible as there is high demand for valuable fruits but not all people buying them are economically equal. Thus, modern and scientific approaches came about to increase the production while still keeping the costs in check so that the product is accessible to more people. Privatization of many new fruit varieties also leads to the lack of accessibility to common people (Sievers-Glotzbach and Wolter, 2018).

Even with modern scientific methods, the fruits sector is not fully stable. The increase in productivity has resulted in compromise in other areas such as quality and purity as the use of artificial chemicals in the farming sector resulted in them being transferred throughout the food chain.

Thus, it is very essential to integrate our traditional knowledge with the existing technologies. This will allow us to focus on health while also meeting the demands of the Nation.

Supply Chain

Our traditional fruits and vegetable produce supply chain was simple and efficient. This meant the farmers can end up with more profit. It was more streamlined and had lesser blocks in between. It was a more direct connection from the farmer to the consumer.

The modern fruits and vegetables supply chain in India is a rather long and confusing one. It is not very efficient. Most of the fruit varieties are becoming less accessible and more exclusive (Hendrik Wolter and Stefanie Sievers-Glotzbach,2019). Due to the complicated structure, most of the profits of farmers are eaten up by the supply chain itself (Saurav Negi and Neeraj Anand, 2015). This has driven the farmers to move out of the traditional systems into more profitable modern agricultural systems.

We have to decrease the losses in the supply chain and make it more efficient so that we can encourage the use of more traditional knowledge and

so that it gets protected. The traditional knowledge of farmers has to be put to use in the modern system so that we can benefit both the parties in terms of profitability as well as marketing.

Cultural Crisis

This is one of the most talked about topic in the modern era. The whole of fruits farming sector was affected by this. Asian countries were very attracted and are borrowing several cultural practices from the Western Countries This creates variability and fluctuation in the market suddenly and thus to adapt to such change, modern techniques were developed. This causes demands of different fruit products to fluctuate at different periods of the year. Thus because of the modernisation that had to be introduced into this sector, health and safety concerns began to arise. The sudden change in food habits also lead to nutritional imbalance and caused problems.

This is still an ongoing crisis. This major effect this has had on our own system is that because of this foreign obsession, our own cultural and traditional knowledge is getting side-lined as time passes. When we stop caring for our traditions it is also giving more freedom for bio-piracy to happen.

Land Availability

In the past, most of our land was dedicated to agriculture, now due to Urbanization; the land availability has reduced drastically. In recent research it was found that the area of arable land has seen a drastic decline in the past three decades Traditional fruit farming relied on the vast availability of arable land that was available to them. This allowed them to do many cultural practices seamlessly. Now this is becoming less of a possibility due to the less availability of cultivable land. In a recent study it was found that the change in landscapes also had an impact on the varieties of trees grown, it also shows the need to link landscape values with food marketing (Larcher *et al.,* 2016; Takeshi *et al.,* 2016).

This is one of the reasons modern techniques replaced the traditional ones, to achieve maximum production with less given area. This problem is very hard to negate as population explosion happened and now more area have to be allocated to buildings and architecture rather than agricultural purpose.

Genetic Diversity

Due to urbanisation, we saw a drastic overall decrease of arable land; this also took a hit on the genetic diversity. Traditional farmers used to rely heavily on wild relatives of the cultivated crops. These wild species were often relied upon for crop improvement Due to these species declining as well as new and improved scientific crop improvement methods, these traditions are mostly side-lined now. Many studies show that the use of agrochemicals and pesticides has reduced the biodiversity in many fields (Richards, 2001). Genetic diversity is a very essential resource for the breeding efforts of fruit crops in the past, present as well as in future

The heavy scientific methods used for breeding now is much more consumer centric. This is not beneficial to nature as nature has its own way of natural selection. Although the market gets benefited from this, it does not account for natures benefit. The traditional system of fruit farming varied in a way that the importance of nature and health came first.

Climate Change

Climate change is one of the most talked about global phenomenon. It started since the modern Industrial Revolution. This climate change has also had an effect on plant biodiversity In the future, many production systems and plant growth patterns will get influenced by the changing climatic patterns, increasing atmospheric temperatures as well as CO2 gasses (Bange *et al.,* 2016)

In some areas of the world, fruit production heavily relies on rainfall The wild plant species that the traditional farmers rely on are getting threatened of extinction. This heavy reliance on wild species and their threatening should be taken seriously and actions have to be taken to ensure their protection so that not only the species is protected but also the traditional knowledge associated with them.

Misconception

When people hear the words traditional and scientific next to each other, they perceive them as two separate contrasting entities. It feels as though tradition is perceived as old and backward whereas scientific is perceived as more accurate and forward thinking It is this diversification that confuses people. The common reaction will be why go towards old and potentially unproven path rather

than the scientifically proven and modern path.

The modern agricultural trends are more profit biased than consumer centric; it is built to account for financial changes and not just consumer demands. The misconception that 'only high-tech can save us now' is not exactly true. It is not only meet consumer demands but also to bring more profit to the table (Tudge and Colin, 2018)

Traditional knowledge is built on many generations based upon what 'works', it is formed on the basis of many experiments and trials, where the successful trials were passed down the next generations and was improved or optimized upon each generation

Influence of media

Globally, we are now undergoing high resource intensive development; this caused the re-allocation of many available resources.This forced us to uptake more efficient scientific farming methods. When the modern system of agriculture started to bloom, it grabbed all the headlines and media attention. This caused confusion and a sense of false hope among the people. So much was promised but what got delivered did not stand up to the promises

This shift in people's minds gradually caused the depreciation of the value in traditional systems of fruit farming. This was replaced with the promise of high productivity, higher profit and better sustainability of the modern farming system. This influence of media caused the further side-lining of traditional systems of fruit farming.

Realisation

We moved away from traditional fruit farming system for a reason, because it doesn't meet the long-term sustainability requirement, we were right but the modern system was also found only to be a temporary solution to the problem. We should hybridise this knowledge and merge the two systems so that goal of long-term sustainability while also keeping nature healthy can be reached. This realisation has revoked the interest in traditional farming system and has shown a new way to relearn the past, it is proven that traditional system focuses on a different type of sustainability, the sustainability of the natural resource base as they rely more on its particular environment and local resources available within (Altieri and Miguel, 1990). It is also a fact that the traditional system is a tried and tested one and is a working recipe.

Problems of modern fruit farming system

With the misconception that traditional means old and obsolete, everyone is looking big time on the modern 'Western systems' of farming. This gives priority to scientific approaches; it puts production efficiency and consumer benefit first. This is a good system for sustainable production, but if it overloads nature and causes negative effects in the long term then the question arises, how sustainable is it really.

The answer to that question is that it is not as sustainable and future-proof as people think. Not every farmer has adopted modern fruit farming willingly. People are starting to see the implication of modern farming in the long term. The use of agro-chemicals in the long term has shown serious degenerative effects and had forced us to think of alternative systems of farming (Ram and Kumar, 2019). Now we are looking for new ways that are more in tune with nature and one that won't work against it in the long term.

Advantage of traditional fruit farming system

Our ancestors had to deal with a lot of problems back in the days of traditional fruit farming. Nature was a tough force to deal with overcoming climate change was one of the major strides they had to face in those days and remain successful by tackling the issues with their traditional practices.

- Traditional crops were cheap, easily accessible as well as more tolerant to climatic changes
- Wild varieties of crops can be relied on for breeding
- Traditional knowledge is adapted to local situations and circumstances
- It is resource conserving
- It cares for nature's health

Traditional knowledge is free knowledge, it does not need any research and development, traditional knowledge is gained from centuries of experience. It is distributed among the people; we just have to find it. Scientific knowledge on the other hand needs high sums of financial investment for research and development and takes time to test and refine the knowledge. In recent research it was found that some communities focus mainly on the judiciary use of natural plant resources and preventing over exploitation

Hand in hand approach

While it is evident that we cannot rely solely on modern fruit farming systems alone, it is also not feasible to completely switch back to traditional systems. The most effective way is to combine both modern as well as traditional systems so that we can benefit from the nature prioritising ways of traditional systems while also getting the results of yield and sustainability focused approach of modern fruit farming systems. They both should go hand in hand for the best results. Conducting more in-depth research into traditional knowledge has shed more light onto the various systems at a local scale.
It is essential to reboot the traditional knowledge, practices and reassess it so that we can gain from the years of traditional knowledge and integrating the same with modern technical advances for a long term, health (of nature as well as human beings) and long-term sustainability focused fruit farming system.

Integrating scientific assistance in Traditional Farms

Currently there are many small scale and traditional farms across India. A good way to start rebooting the value of Traditional Knowledge in Scientific farming methods is to integrate some amount of scientific technology into them. Thus, traditional practices can be followed while getting some monitoring and analysis capability of modern scientific technology. A good way to study the traditional methods and its advantages is to link ecologists to traditional farmers so that they can study and get a better understanding on how the traditional farmers were able to build a self-sustainable and nature conserving practices (Altieri and Miguel, 2004).

In the past decade, many research works have been done to bring modern farming methods and smart technologies into the hands of small-scale farmers. Advancement and mass demand of technologies in the likes of smartphones, local networking devices and cheap sensors means that the concept of smart farming integrated into traditional methods is not too far-fetched. A prime example is that a group of researchers at the University of Arizona used a smartphone camera with a cheap light filter to monitor plant water stress (Chung *et al.*, 2018). This can be implemented with traditional farming systems so that if any stress occurs, it can be detected early.

Conclusion

We can all commonly agree that the modern revolution in fruit farming was absolutely essential to fulfil the exceedingly increasing demand from the market. If it had not happened, then only with the traditional knowledge we could not have met the demand of the growing market. Thus, our venture into modern scientific farming was a good decision. The downside is that this new system had promised for long term sustainability and security, this did not turn out to be the case. And from pressures from environmentalists and activists we are now forced to think of new ideas for the betterment of our future. We can conclude that the nature first approach of the traditional fruit farming system can go well with today's productivity and profitability-oriented system. We can integrate both to make a better and future proof method that we can continue developing and refining. In this new system the priority will be nature and health first, with equal importance to productivity, profitability, sustainability and food security.

References

Altieri and A. Miguel, 1990. *Why Study Traditional Agriculture?* McGraw-Hill Inc.

Altieri and Miguel, A. 2004. Linking ecologists and traditional farmers in the search for sustainable agriculture. *Frontiers in Ecology and the Environment.* 2(1): 35-42.

Bange, Michael P., Jeff T. Baker, Philip J. Bauer, Katrina J. Broughton, Greg A. Constable, Q. Luo and Derrick Oosterhuis, M. 2016. *Climate change and cotton production in modern farming systems*. No. 6. CABI.

Barooah, M. and Pathak, A. 2009. Indigenous knowledge and practices of Thengal Kachari women in sustainable management of bari system of farming. 8 (1): 35-40.

Beckford, C. and Barker, D. 2007. The role and value of local knowledge in Jamaican Agriculture: adaptation and change in Small-scale farming. *The Geographical Journal*. 173(2) : 118-128.

Chung, S., Breshears, L.E. and Yoon, J.Y. 2018. Smartphone near infrared monitoring of plant stress. *Computers and Electronics in Agriculture.* 154 : 93-98.

Colby Witherup, M. Iqbal Zuberi, Salma Hossain and Nyree J.C. Zerega. 2019. Genetic Diversity of Bangladeshi Jackfruit (*Artocarpus heterophyllus*) over Time and Across Seedling Sources. *Economic Botany*. 73(2): 233-248.

Croizier, R.C. 1970. Medicine, Modernization, and Cul-

tural Crisis in China and India. *Comparative Studies in Society and History.* 12(3): 275-291.

Eliton Chivandi, Trevor Nyakudya, Nyasha Mukonowenzou and Kennedy Honey Erlwanger. 2015. Potential of indigenous fruit-bearing trees to curb malnutrition, improve Household food security, income and community health in Sub-Saharan Africa: A review. *Food Research International*. 76 : 980-985.

Gandhi, V.P. and Zhou, Z. 2014. Food demand and the food security challenge with rapid economic growth in the emerging Economies of India and China. *Food Research International*. 63 : 108-124.

Gowtham Shankar, K.J.N. 2006. Endogenous Development in Tribal Agriculture. In: *Traditional Knowledge Systems of India and Sri Lanka*, 68.

Granderson, A A. 2017. The Role of Traditional Knowledge in Building Adaptive Capacity for Climate Change: Perspectives from Vanuatu. *Weather, Climate and Society.* 9(3) : 545-561.

Hendrik Wolter and Stefanie Sievers-Glotzbach. 2019. Bridging traditional and new commons: The Case of fruit breeding, *International Journal of the Commons*, 13(1): 54.

Jarvis, A., Annie Lane and Robert J. Hijmans. 2008. The effect of climate change on crop wild relatives, *Agriculture Ecosystems and Environment.* 126(1-2): 13-23.

John Briggs. 2005. The use of indigenous knowledge in Development: problems and challenges. *Progress in Development Studies.* 5(2): 99-114.

Johnson, B. and Villumsen, G. 2018. Environmental aspects of natural resource intensive development: The case of agriculture. *Innovation and Development.* 8(1): 167-188.

Kabila Abass, Selase Kofi Adanu and Seth Agyemang. 2018. Peri-urbanisation and loss of arable land in Kumasi Metropolis in three decades: Evidence from remote sensing image analysis. *Land Use Policy.* 72 : 470-479.

Larcher, F., Gullino, P., Mellano, M.G., Beccaro, G.L. and Devecchi, M. 2016. Integrating historical and social knowledge for restoring and planning traditional fruit landscape in Piedmont (Italy). In: *VI International Conference on Landscape and Urban Horticulture.* 1189 : 339-342.

Ram, R.A. and Kumar, A. 2019. Growing fruit crops organically: challenges and opportunities. *Current Horticulture.* 7(1) : 3-11.

Richards, A.J. 2001. Does low biodiversity resulting from modern agricultural practice affect crop pollination and yield?. *Annals of Botany*. 88(2): 165-172.

Saurav Negi and Neeraj Anand. 2015. Issues and Challenges in The Supply Chain of Fruits & Vegetables Sector in India: A Review. *International J. of. Managing Value and Supply Chain.* 47-62.

Sievers-Glotzbach, S. and Wolter, H. 2018. Bringing Commons elements into fruit breeding. Eco fruit. In: *18th International Conference on Organic Fruit-Growing: Proceedings. 19-28.*

Swiderska, K., Hannah Reid, Yiching Song, Jingsong Li, Doris Mutta, P Ongogu, P Mohamed, Rolando Oros and Sandra Barriga. 2011. The Role of Traditional Knowledge and Crop Varieties in Adaptation to Climate Change and Food Security in SW China, Bolivian Andes and coastal Kenya., IIED, London, July 2011

Takeshi Osawa, Kazunori Kohyama and Hiromune Mitsuhashi. 2016. Trade-off relationship between modern agriculture and biodiversity: Heavy consolidation work has a long-term negative impact on plant species diversity. *Land Use Policy.* 54: 78-84.

Tudge and Colin. 2018. Lies, misconceptions and global agriculture. *The Ecological Citizen.* 2 *:* 77-85.