

A Nexus between Safe Drinking Water, Clean Air and Food for All

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Abstract

The current study's objective was to simulate a number of factors essential for economic development, including clear water, hunger, sustainability, and the environment, all of which are necessary for life to exist on earth. The method which the farmer adopted as the subterranean is nexus between Safe Drinking Water, Clean Air and Food for All [WAFa] has been developed at five-acre model Ayur jackfruit farm in Veloor Panchayat, Thrissur, and Kerala, India. The site is between North latitudes. 10° 37' 34.3" N and longitudes 76° 09' 16.2" E. This helps to improve agricultural output and address the issue of water scarcity, food security and clean air in hilly areas.

Keywords: Drinking Water; Clean Air; Food for All; Thrissur; Ayur jackfruit; WAFa; Hunger Poverty; SDG2; Nutritional Security

Background

In comparison to other areas of the Thrissur District, Veloor, a hamlet and panchayat in Thalapilly Taluk, Kerala State, receives less rainfall. As of 2016, the healthy rubber plantation used to create the hilly jackfruit plantation was still in operation. In 2017, he cleared 5 acres of rubber trees and replaced them with jackfruit plants. Because they utilise a lot of groundwater and rains, he believes that rubber plantations are one of the causes of the water shortage. The farmer's choice to use a rainwater collection method was also influenced by the area's changing climate.

Introduction

All terrestrial life depends on water for existence and survival, which ensures food security. Water is necessary for both plant and animal growth. The amount of high-quality water needed for irrigation, different production processes, and agricultural varies. Pressure on limited water supplies is being put on by population growth, climate change, and rising irrigation water demand. Safe drinking water, sanitation and hygiene at home are essential requirements for human health, and all countries have a responsibility towards this goal (World Health Organisation 2009). In 1995, Kerala Samuhya Jellashama Samithi [KSJS] dug a community bore well for 35 homes 150 metres away from the model "Ayur Jackfruit Farm," but it was unsuccessful. Due to the area's very low rainfall in 2012, the farm's wells and hand pumps become dry.

In recent years, the water table in foothills has also declined dramatically; indicating the necessity for further measures such properly storing rainfall. In 2017, the farmer developed the underground water balancing system (UWBS) in order to extract water scientifically with no water loss. The damage brought on by the flood may have been greatly lessened with a straightforward water collection technique in residential and agricultural plots, and now that all 35 open wells have been replenished, there is no lack of water in the area [1].

Total benefits accrued (Tangible &Intangible)

- It aids in easing the local water shortage.
- Prevents erosion and soil deterioration.
- Improves soil moisture and infiltration of surface water.
- Improved percolation; halt soil erosion.
- Improve the soil's quality and the area's green cover.

- Groundwater levels rose by 500 m or so, and all wells had enough water over the summer.
- Keep the farm's interior at the right temperature, humidity, and moisture levels to help it harvest between 18 and 20 percent more jack fruit each year.
- The method increases resource efficiency, protects water supplies, and lessens water pollution.
- Expand the amount of drinking water available near crops.
- Lower flood risks; applies to all soil and precipitation conditions

Safe Drinking Water

The contour trench, which he called the underground water balancing system (UWBS), is 1.5 metres deep, spaced 4.5 metres apart, and splits the water in two directions from the centre. This recharges the groundwater. It prevents soil erosion, recovers groundwater in arid areas, and maintains the water content or moisture in soil strata. Farmers that use UWBS have the ability to store 6.0728 trillion litres of water yearly on five acres of land. For irrigation reasons, a farmer may retain up to 42% of flooded water, and in 2018 he or she may retain up to 20% of floodwater. In hilly places, UWBS is suggested for managing flooding and water scarcity [2].

Since each square metre of the field receives 0.05 m, or 5 litres, of precipitation that is later stored as groundwater, the suggested design is both economically and voluminously practical with a 5 mm rainfall. The farmer transformed the rubber plantation into the Ayur Jack Farm in 2017 and planted jackfruit trees along the hillside in an effort to conserve water. Once projects utilising a simple water collection technique were implemented in farmlands in 2017, the damage caused by the flood may have been greatly reduced. All of the bore wells inside

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the farm and neighbourhood provide enough water year-round for 35 families as well as the other wells within a 500-meter radius. The groundwater table in the area was refilled as a result of his five-acre rainwater gathering system.

Cost-effectiveness of innovation/ Technology: The Underground Water Balancing System (UWBS) construction process is fairly straightforward. Mark the contour line after laying down the contour line's level. Following that, ridges are built along the contour line, typically spaced 4.5 metres apart and 1.5 metres deep; to intercept running water before it reaches the erosive velocity. The trench section has the ideal following dimension and is parallel in shape.

Work Cost

The cost to conserve water is Rs Two lakh/Acres including fencing, trenching, 2 bore wells, 2 electrical connection, and drip irrigation

Food for All

All of the fertilizer and pesticides are made on the farm, and it is kept up in an organic manner. The several varieties of jack fruit trees he has cultivated grow to an average height of 5 to 6 feet in the farm. Trees typically start producing fruit after two years. He planted 1000 jackfruit trees and one lakh sapling on a five-acre plot of ground. In order to fulfil his goal, he is giving one seedling to each school student who visits his farm at free of cost. He aims to carry out the mission of planting one jackfruit tree for every home through his farm [3].

Objectives

1. To assess Kerala's local food security and food system conditions.
2. To determine the connections between regional dietary practises and food security.
3. To determine the principal difficulties in ensuring food security at the village level.
4. To research and analyse the potential significance of jackfruit in hill locations, particularly tribal hamlets, as a supplement to staple foods in providing food and nutrition security.
5. Making the most of indigenous cuisine improves the indigenous community's hunger and nutrition issues.

Study procedures

You can see jackfruit in its natural state every day at Ayur Jack Farm. He planted 200 or so Jack fruit trees in one acre, spaced about 15 feet apart. He created compost on his farm by digging trenches and filling them with cow and goat manure, neem, and cocopeat. "For every tree, utilises about 3-4 kilos of dry compost as a natural fertiliser," he said. Each tree has one turmeric plant below it, which guards against numerous pests and is utilised as a pest deterrent. The farm's output increases dramatically after switching to organic practises. The fruit-bearing jackfruit trees, which are just seven to eight feet high and are even grown on terraces or on small house plots costing two to three cents.. The jackfruit variety bears fruits in one-and-a-half years of time.

Access to Nutritious

Food Jackfruit is quite versatile and is adaptable in Indian homes. It tastes wonderful in a range of savoury and sweet cuisines and can be eaten raw, cooked, ripe, or unripe. One jackfruit in every house releases adequate oxygen for each family. Peeling and preparing the

jackfruit was an earlier activity that brought the complete family together. Jackfruit provides high levels of vitamins and minerals to fill the nutritional gap in youngsters.

Carbohydrates

According to a study carried out by Chrips et al., the carbohydrate concentration of different varieties of jackfruit seed may vary from 37.4% to 42.5%.

Proteins

Arginine, cystine, histidine, leucine, lysine, methionine, threonine, and tryptophan are among the amino acids found in jackfruit [42]. 100 grammes of ripe jackfruit flesh contain 1.9 g of protein. The jackfruit seeds' protein content can range from 5.3 to 6.8 percent [41]. The protein content of the flesh of various types of ripe jackfruit has been reported to range from 0.57 to 0.97 percent by Goswami et al.

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Jackfruit is rich in vitamin C. Additionally; it is a rare fruit that contains high quantities of the B-complex vitamin family, which also includes niacin, pyridoxine, riboflavin, and folic acid at extremely good levels

Jackfruit is a strong source of vitamin C, which shields the skin from deterioration brought on by the ageing process and prolonged sun exposure. Additionally necessary for the synthesis of collagen, vitamin C also strengthens and firms skin and promotes oral health.

Farm Productivity

Farm production increased to 20 percentages every year. In 2020 the production was 60000kg from 1000 trees and by 2021 it increased to 70000kg from 1000 trees. Every year farm productivity will increase and income also shoots up.

Nutritional Content in Jackfruit seeds

These nutty seeds are rich in proteins and important vitamins like vitamin B complex, iron, calcium, copper, potassium, magnesium, and zinc. They also prevent bacterial infections and aid in digestion. The abundance of antioxidants contributes to the maintenance and improvement of skin and hair.

Adequate health Benefits

The primary causes of cancer were modern foods, particularly their gluten content. However, gluten must be avoided by those who have celiac disease to reduce the danger of other grave health issues such under nutrition, anaemia, osteoporosis, neurological issues, alopecia (hair loss), skin rashes, and thyroid issues. The human body need practically all of the vitamins, proteins, and minerals found in jackfruit, in addition to a respectable quantity of fibre and no gluten. The phyto nutrients included in jackfruit seeds, including lignans, saponins, and isoflavones, are important for maintaining human health [4].

Commercial Benefits

Every year farmers get 100 kilos worth of jackfruit from each tree and able to sells hundred tons of jackfruits annually. Demands for sapling are high and each sapling he is selling for Rs 250 to 1000 Rs. It's going to be a major source of food security.

Clean Air

Trees like jackfruit play a significant part in restoring oxygen when we are dealing with global warming and a decrease in the amount of oxygen in the atmosphere owing to deforestation and trees being felled to create room for factories and commercial buildings. During photosynthesis, all trees absorb carbon dioxide and exhale oxygen as they grow. As they release oxygen into the atmosphere, their glucose molecules also store energy. The sustainability of life on earth is ensured by trees through this lovely process. A single Jack fruit tree produces 13.16 tonnes of oxygen annually, and every component of the jackfruit is important. I.e. 36.05 kg of oxygen per tree each day. An average person needs 550 liters of oxygen every day. One litre of oxygen costs Rs 108.33. A component of the rising popularity of wellness tourism is the search for clean air and tourist invest good amount of money in search of fresh air which is essential for healthy body and mind [5].

Result and Discussion

This study was successful in determining how much water the farmer is saving by using water-conservation techniques. The “Underground Water Balancing System,” an existing rainwater gathering system, is an innovation that might be able to aid with the water shortage problem at the Ayurjack farm and nearby wells in and around five hundred metres. 35 previously dry wells close to the farm now have access to ample water in the summer. He saves enough rainwater each year to irrigate 1,000 or so jackfruit trees and one lack sapling throughout the year on his farm, which amounts to roughly 6.0728 crore litres. He conserved every drop of water by collecting every drop of precipitation into groundwater when Kerala was devastated by a disastrous strong flood in the year 2018. The farmer’s use of the rainwater collection technique encourages large water savings and offers technology solutions to enhance water quantity and quality elements that considerably support long-term water conservation measures.

The Ayur Jack farm’s optimal PH level for the water is 6.5, which is acceptable and steadily rising.

Due to both natural and human-caused processes, small plantations serve as significant carbon sinks that exchange CO₂ with the atmosphere on a constant basis. Long-term pollution and low air quality index are challenges that the plantation attempts to address (AQI). The greenhouse impact is lessened by trees because they act as carbon sinks and annually release 13.16 tonnes of oxygen. This pilot initiative benefits society by increasing awareness of the importance of freshwater as a resource that needs to be conserved [6].

The production of jackfruit needs to be improved because of its “poor people food”. It’s having many nutrition values and significantly contribute to household livelihoods of farmers and as well as contributing towards soil management for sustainable environments. Every year farmers get 100 kilos worth of jackfruit from each tree and able to sells hundred tons of jackfruits annually and earns Rs 10,000 per tree. . Demands for sapling are high and each sapling he is selling for Rs 250 to 1000 Rs. The prospects of the jackfruit industry are huge in India in terms of ensuring food security and a sustainable environment.

This is due to the fact that standardising the trenches would enable maximum rainwater and runoff capture during the rainy season and storage of the water for crop use during the dry season. Around 13 lakh acres are covered in rubber plantations in Kerala, 93% of which are smallholdings, and farmers there are currently dealing with torrential downpour or drought-like conditions. Farmers can adopt the “Underground Water Balancing System” with ease and rationale.

The technology would assist farmers in maintaining the ideal level of water, which would lead to a rise in ground water levels. Additionally, it aids in avoiding climate change-related situations like drought and flooding.

Conclusions

Increasing food production while reducing hunger and poverty; is made possible by supporting rural development and sustainable agriculture. Food and nutrition security are the milestones of a decent existence. Additionally, conserving soil and water boosts net productivity and creates quality jobs in addition to increasing net production. Soil and water conservation should be given top priority by policymakers and development organisations in order to reduce land degradation and improve the livelihoods of rural farming people. Soil erosion is accelerated by intensive farming practises. Due to greater groundwater exploitation, the level of groundwater dropped. In order to maintain agriculture and safeguard the natural ecosystem, soil and water resources must be managed holistically. If agriculture is to be maintained and the natural ecosystem is to be safeguarded, soil and water resources must be managed holistically. Protecting soil and water from deterioration through the development and application of innovative technologies, prudent use of natural resources and effective management techniques is imperative today.

India’s jackfruit sector has a huge potential in terms of achieving food security and a sustainable environment. Therefore, it is important to prioritise research and development (R&D), and using effective postharvest techniques may facilitate exportation by increasing shelf life. The focus of R&D should be on higher value-added products, health benefits, seed production, water conservation, air purification, and a variety of growth methods. Finally, it’s important to pay attention to economics and marketing. Due to its many benefits, including as its food, fodder, fuel wood, and lumber qualities, jackfruit holds a major place in tropical agroforestry as an integrated cropping system.

Jackfruit is essential for human nutrition, food security, and health. The Sustainable Development Goal 2 (SDG2) recognises the links between promoting sustainable agriculture, empowering small farmers, advancing gender equality, eradicating rural poverty, promoting healthy lifestyles, and combating climate change. Its objectives are to “End hunger, achieve food security and improved nutrition, and promote sustainable agriculture.”

Replicability of the Technology the underground water balancing system method of farming by dividing the land into layers by digging trenches can be effectively replicated in the high ranges and other hill areas to prevent landslips. The studies confirm the crucial role of Jack fruit trees in preventing landslides. The deep-rooted trees observe water and help to avoid excessive soil water pressures and also an source of fresh air. The jack fruit is additionally crucial to the culinary and pharmaceutical industries. The added value of jackfruit, which is currently greatly in demand and becoming more well-known, may have a significant economic impact on farmers, particularly in hilly locations. As value-added products, jackfruit is preserved as pickles, chips, papas, pickles, ice cream, jelly, candies, and beverages such wine, nectar, and squash. Traditional medicines also make use of the leaves, bark, inflorescence, seeds, and latex of the jackfruit.

Jackfruit to reduce the risks of hunger, meet the urgent food demands of the vulnerable populations, keep the domestic supply chain moving, and support smallholder farmers’ and having ability to boost food production, helps to increase agricultural productivity.

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