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Racy Nature-A Sun Technology towards Quantum Agriculture

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Abstract An alive, smart and enthusiastic (racy) agriculture technology developed based on innovative application of scientific facts and assembled convergence package capsule of best practices derived from the past researches is named as racy nature agriculture. It uses concept of quantum mechanics and produces technologies of generation I (1G), even without conducting experiment and completes research needs by optimisation for bringing world agriculture to generation II (2G). This unique green Sun technology is universally applicable to enlighten all ecosystems, soils, crops, both rainfed and irrigated agriculture, together with eliminate the global worries of sustainable food production and protection of environment.

Keywords: *racy nature, sun technology, quantum agriculture, sustainable, technologies*

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1. Introduction

All agricultural practices and technologies, leaving aside the plant genetic improvement and varieties, have largely come from experience gained by doing and confirming results based on field experiments. These practices constitute the generation I (1G) practices. In this endeavour the success stories are highlighted as bright spots1 Therefore, it is well established fact that researches have been going on endlessly involving repetitions. The situation of resources constrains, degradation, scarcity and pollution [2,3] cause global worries on food and environment are given the stake of blame on increase of population. But, the food production domain requires one technology having calibre of the Sun to brighten the global agriculture everywhere and forever. However, such universally applicable technologies do not exist and the scenario of world agriculture follows slow pace with chance dependent technologies, producing effects similar to the glittering of fireflies. We devised a path of certain successes.

In the soil habitat and the atmosphere, the activity of physical and chemical transformations many toxic gases and salts develop in the soil. The release of green house gases [2,3] viz carbon dioxide, methane, nitrous oxide, CFC, HFC and SF6 to the atmosphere has been causing global warming and climate change. The global warming has been causing world over worry for future food sufficiency and protection of environment.

For plant production the soil habitats have to be provided with adequate quantity of water, oxygen, nutrients and living organism that conduct respiratory process and bring several useful chemical reactions4. These reactions convert the substances present in the form in the habitats so that plants are able to absorb and perform all essential function of photosynthesis and production of carbohydrates, necessary for food production. This function is unique and same under all conditions and everywhere in use by all plant species that constitute the global sustainable food. The Sun and the Moon being only one enlighten entire globe. The universal fact of plant nutrient extraction also implies that there could be a particular one technology to fulfil all needed functions for all crops and ecosystems, for both irrigated and rainfed agriculture. The present study carried out with the objective of developing universally applicable technology has accomplished fulfilment of the dream by innovative applications of scientific facts. The scientific and technological advancements (Table 1) have brought miracle changes in the daily life. The examples of continuity of technological developments are everywhere. Breeding of desired traits in plant and animals, the original biotechnology is as old as farming itself. The part of component of technology for improvement of crop and variety developed but when it comes to cultivation condition its success get varied so it remains as advancement of local technology. There has been lack of any universally applicable Sun technology to enlighten the global agriculture and protect environment.

The scientific facts of Carbon, Nitrogen, Phosphorus, Potash, Oxygen, Hydrologic cycle, and sulphur cycle indicate that cycle of the decomposition and composition follows universal cycle of change which may follow useful or harmful products producing paths [4,5]. In the absence of the knowledge of detailed scientific facts [5] no careful wisdom emerged in devising the right path and

it led to the processes to follow the harmful paths that produced toxic compounds and gases which brought bad effect on the productivity of land, water, nutrients and caused land and water degradation and environmental pollution.

Table 1.Technological changes that have affected daily life through rapid pace vis a vis un developed one

S,N.	Area of advancement	Specific area	Visible effects
1	Micro-electronics for information processing	Computer	Computer graphics stopped T.V. goers accept as realistic
		Electronic mail	Displaced postal services
		World Wide Web	Displaced postal serevices
		Cable T.V.	Displaced T.V. antenna
2	Medical and Biotechnology	Biotechnology research	Development of antibiotics etc
3	Magnetic resonance imaging and fibre optics Technique	To image human anatomy	To make surgical repairs with only minimum amount of cutting of healthy tissues.
4	Cloning of large animals and genetic modification of plants, microbes	Improvement in strains	Offer possibility of enhanced health and well being in future
5	Ancient Babylonia evolved in Scriptoria of medieval monasteries	Passed through the invention of printing movable type	Photography, lithography and computer desk top publishing.
6	The basic need fulfilling sustainable global food production by Land and Water Management	Advancement of inconsistent, isolated, scanty and short lived bright spots of	Universally applicable Sun technology has not been visualised and produced.

Plants and animals depend on continuous supply of sulphur for synthesis of some amino acids and proteins. Aerobic decomposition of cellulose by sulphur bacteria produces sulphate.

Anaerobic decomposition under polluted condition produces hydrogen sulphide, which bring deleterious and inimical effect to damages plants and animal cells. In unpolluted water under aerobic condition the sulphur bacteria convert the hydrogen sulphide into sulphate for further production of proteins.

Use of air and solar radiation are made by plants in their own way but as such there has been, in general, lack of innovative engineering method to foster the activities to promote productivity. The nitrogen has received maximum research attention, because it produces quick visible effect on improvements in crop growth and production of final yield. Similar has been situation of research base with some other macro nutrient viz Phosphorus and Potash. Some micro nutrients have also been researched upon, but some nutrients have not been adequately realised for their importance, in most of cases, and there has been situation of process based knowledge gap [5,6,7]. Interactions of water, sulphur and environment were not adequately explored scientifically. The knowledge gap was substantiated based on the review study of 35 experimental studies found to be conducted in different part of the world since 1971 till date. There was lack of knowledge and capitalisation of interaction effects for bringing the innovation in agriculture world over. This fact established setback in the world food production scenario, and environment [5]. The exhaustive review covering different domain of world agriculture also substantiated and established that lack of knowledge of sulphur cycle in agriculture world over kept world agriculture mere in the generation I (1G), i.e. agriculture by doing and gaining experience and applying results endlessly.

2. The Technology

A knowledge intensive green technology for the time sequence and convergence based new alive, smart and enthusiastic (racy) named as, Racy Nature Agriculture was innovated [7] to alleviate the drudgery of the adverse factors in present day agriculture and convene sustainable global food security and protect environment.

The racy nature agriculture [7] comprises best results creating soil habitat, nutrient supplementation and conductance of oxygen, moisture, protection from water logging and keeping condition for aerobic decompositions. All these supplementary conditions are necessary for functioning of nitrogen, phosphorus, potash and sulphur cycles to follow beneficial paths to produce nitrate, phosphate, potash and sulphate under all changing hydrologic conditions. In the development of racy nature agriculture band of best practices supported by the scientific facts were synthesied to form the panacea green technology capsule prescriptive for ameliorating agriculture and environment. The technology comprises raised bed and furrow [8,9], nutrient supplementation of 25% of N requirement of crop by organic N sources [3,5,10,11,12] such aerobically decomposed compost or aerobically decomposed green manure or liquid green manure new formations[5], precision planting, sprinkler irrigation creating condition of green water as rain [13], supplemented with furrow irrigation of high water demand at jointing, heading and flowering stages of crops, good drainage during flood and long duration rainfalls [14],weeding, interculture, harvesting and post harvest practices to reduce the emission of green house gases [14,15], when land is free of crops. It adopts crops selection that builds nutrient reserve which can be synergically utilised in relay race like situation5. It promotes productivity with existing situation and conserves resources for posterity. It is a panacea technology suitable for all agro-eco regions, climates, soils, crops and water shortage and poor quality conditions. For example, the racy nature agriculture is applicable even for cactus, a desert nonconventional fruit cultivated in Yemen in Gulf to the other extreme of wettest environment experiencing highest rainfall for paddy crop at Cherrapunji, India. It is also equally applicable for controlled environment agriculture such as green house and poly house. The technology has capacity to endure adverse impacts of droughts and floods that are likely to become severe due to global warming and climate change in future. The racy nature agriculture focuses and meets world over challenge in the use of natural and fixed resources for agriculture and environment conservation, which have not been found in the existing scientific ventures, except situations of bright spots [1]. The technology surpasses by bringing improvement for

covering all agriculture domains, instead of that get produced in isolated and short lived bright spots [1].

The technology capsule components have been validated [7] for their efficient working. The scientific publications and presentations on the related science and engineering of racy nature agriculture technology capsule have been documented [3,5,6,7,12,13,14]. Validations of component practices and the composite technology fulfil the validation need of composite technology capsule of nature agriculture. Thus, the technology surpasses and overtakes all known and existing researches and developments in agriculture, food production and environment protection. The racy nature agriculture fulfils and accomplishes challenges related to global agriculture, food, environment and people. It has accomplished more than one and half dozen challenges of natural resources management (NRM). The technology produces ecological benefits of improvement in soil quality (SQ), water productivity (WP), low external input (LEI), integrated pest management (IPM), water cycling (WC), biodiversity (BD), carbon sequestration (CS) and social capital (SC), more than those known for the bright spots [1]. It is technology of field level application in entire arable area of any watershed to cover any ecosystem accompanying agriculture component in it. The technology will usher global revolution in land and water resources use for bringing food security. Local optimisations of the technology will take care of customization accuracy to account for existing roles of agro- eco-regions, man-machine and socio-economic status. The alteration of decomposition process, arrest of GHGs and heavy metals will reduce GHGs load in atmosphere, reduce load of heavy metals that will reduce global warming and avert climate change [3,5,7,14,15,17]. This aspect, totally new application in agriculture will produce food better than so called organic food. Thus, in lieu of some high profile having access to limited organic food, a better quality and accessible to all surpassed solution is developed. Further, scope for refinements for the third generation research is opened so as to bring technology refinement, in future as well. The lag in the situation and makeup in the shortfall in present day agriculture can be made by recognition of motivational oriental saying i.e. late is better than never. Therefore, it requires to makeup mind, without further delay and come in action for implementation of the racy nature agriculture. The implementation will revamp all to join in mission to create mansion of global sustainable food sufficiency for present and posterity.

3. Yearly Cropping Sequence Yield Based REY

The uniqueness of the technology is further exemplified by presenting the data on yield increase of annual crops cultivated in different situations and put in different cropping sequences. The composite rice equivalent yield (REY) in different cropping sequences were accounted (Table 2) for assessing the potential production of foods [7]. In the table addition of third crop, quite prevalent under intensive agriculture to increase nitrogen fixation will further enhance the REY. Nevertheless, this component is not included in the data of REY for the sake of keeping the margins of variations at different locations as compensating component for the racy nature agriculture to surpass production everywhere. These values guide one as to which cropping sequence should be followed in a given situation. This will help decide customized management of nature agriculture. The outcome will be better efficient use of resources in agriculture viz increase in food production, conservation of water and reduction of land degradation on various accounts, viz water, wind, chemical, nutrients etc. The REYs will create new niche in food production. The application of technology makes it possible to use any successful cropping sequence under the limited water supply situation. The limitation of water availability will increase in the years to come because of global warming and climate change and increase in water demand for diverse uses. Thus, racy nature agriculture will be the only stake for future sustainable food security. The customized data will guide governance to be promoted in different agro-eco regions. Likewise, the quality of the food produced in racy nature agriculture will get identified for geographical indication registry (GIr) and Quality patenting. This will help consumers select most genuine and desirable food for purchase and the produces get remunerative price. This situation will enhance the GDP in agriculture and make agriculture more alive, smart and enthusiastic. The primary productivity will give base for industrialization in agriculture and increase in employment opportunities.

Table 2. Yearly cropping sequences and rice equivalent yields (REYs) [7]

Items	Crops		Total q/ha
Crops	Rainy season	Winter season	
Cropping sequence Ricewheat			
Crops	Rice	Wheat	
Yields Q/ha	114	76	
REY	114	57	171
Cropping sequence Maize wheat			
Crops	Maize	Wheat	
Yields, q/ha	91	76	
REY	57	57	114
Cropping sequence Maize Mustard			
Crops	Maize	Mustard	
Yields, q/ha	91	36	
REY	57	74	131
Cropping sequence Soybean wheat			
Crops	Soybean	Wheat	
Yield, q/ha	50	76	
REY	63	57	120
Cropping sequence Maize gram			
Crops	Maize	Gram	
Yields, q/ha	91	46	
REY	57	115	172

Price of commodity, Rs/q: Wheat 1200; Rice 1600; Maize 1000; Mustard 3300; Soybean 2000; Gram 4000

In addition to the increase in yield, the green house gas emission [3,5,7,13,14] of carbon dioxide and methane will be minimum that will protect environment. It supplements the statements that think global and act local. It is evident that theory should be used to make the global policy tool. Their modifications should be made as per impact of driving factor and adjustment of global policy tool in to local policy tool. The policy should be declared and made fully aware to the stake holders for their enhanced participation in any mission with their clear mind. This strategy will enable efficient and conservative use of resources. Their local customization will indicate the factor that would need revamping and management for enhancement of yield, thus it will involve strategic

management of scientific agriculture. These facts add enormous strength to this innovative technology of natural resources management. It will help launch generation II (2G) agriculture in the global scenario.

The agricultural technologies can be broadly classified to have two arms; as a. crop variety improvement and b. cultural improvisation including irrigation and nutrient management and auxiliary agronomic practices. The variety improvements can be imported and transferred from one country to the other. There has been good advancement in development of dwarf varieties of wheat and rice that brought green revolution worldwide. Dr Norman Borlaug was awarded noble peace prize (1970) for bringing this breakthrough.

The second arm viz improvisation comprising of cultural practices have been going on as per justification of the effect of local variations. Nothing emerged as universal culture as a cultural practice to make it of universal application. This situation leads to worsening of land, water, environment and lack of resources for the posterity. This situation bogged down all concerned with food, environment and resources globally. The racy nature agriculture has carved many challenges and devised solution to the problems [1,7]. It would be appropriate to say that a universal innovative practice devised in this present development fulfils all challenges in culture i.e. heavy weight arm to strengthen global agriculture. There has been continuing global concern, but with situation of helplessness due to implication of various factors beyond known controls.

The varietal improvement had reached to a level of occurrence and existence of risk in the world agriculture on one hand and the unscientific cultures that lead to the situation of degradation of land, water and environment, both leading to the great worry on the global food supply and its sustainability [1,5,7]. The racy nature agriculture will go long way to alleviate the global food situation by enhancing food quantity, quality by way of enhancement in productivity of existing crops and enabling crop diversifications. Many countries which had not been able to produce wheat will be able to produce it in their own country as per enabling situation of racy nature agriculture and get rid of imports. This will be greatest achievement in world food situation. The World Food Prize is meant to encourage efforts to enhance productivity of small farmers with the overall growth of achieving a better global food security. This technology of at site resources conservation enables all categories of farmers with poor knowledge and financial resources to join the mission of producing enough and good quality food for the globe as an alternative and supplementing technology to any other technology that would emerge in time to come. This will alleviate the danger and the global worry of food demand projected to rise by the year 2050. This fact is revealed by the technology development process. The technology is free from any reservation from the users and the consumers' preference. It's at site application enables generation of employment and eliminates foreign reserves need for importing food. Thus, it is a technology that enables create real global food security by feasible and plausible means. Infrastructures are to be developed locally that will usher industrialisation in countries so agriculture and industries will go, may be in the form of corporations as well, and flourish together in the synergic way.

4. Enforcement of Quantum Mechanics in Agriculture

In the development of innovative technology of racy nature agriculture, chemical reactions on nitrogen cycle, sulphur cycle, biological nitrogen fixations [3,5,11,12,13,14] and solubilisation of phosphate by bacteria are conducted by creating aerobic decomposition process brought by the raised bed and furrows [8,9,14]. The decomposition of organics and cellulose are conveyed by chemical reactions that involve proton, electron and neutron to describe the chemical behaviour and some physical properties of element [4,16]. The mechanism is created by selective components in the technology. Earlier studies on raised bed and furrow were conducted by several researchers [8,9], but it were not able to enforce quantum mechanics [16]. Therefore, advantages that are produced in racy nature agriculture were not possible in the earlier studies. The involvement of quantum mechanics approach in the innovative technology make it a specific fixed package of practice of universal application to be working well under all conditions, crops, ecosystems, irrigated and rainfed. Theoretical physicist used these components to build atomic models based on wave like motion of electron around a nucleus [16]. In the model electron in atom can exist only in a state called the wave function, which is defined by those quantum numbers [16]. In the racy nature agriculture the chemical reaction of fixed nature are enforced and wave action of electron is incorporated to bring desirable good effect [5,7,16]. This effect will occur under all the conditions. The incorporation of biochar [17] for adsorption of toxic salts and absorption of toxic gases, a component in creating quality of water and air in the soil habitat will facilitate the things to happen in the fixed mode of reactions. Thus, although it is not strictly cent percent true as a result of less refined conditions in agriculture than that of the nuclear model; the concept has been enforced in devising innovation of the similar nature. Thus, racy nature has moved to enforce function of quantum agriculture [16] transforming present day agriculture in vague to a fixed and crystallised science. The science is going to be true for all time and everywhere.

The racy nature agriculture will produce results with certainty and it eliminates chance factor of generation I (1G) in agriculture. The misdeeds of faulty practices will get eradicated and agriculture will get transformed from vague science to the crystal clear science and fixed frame work. The application of the fixed knowledge will produce results of the generation I (1G), which otherwise involve expensive researches, large scientific times and resources. The instantly generated result will enable optimisation that will save the time loss in technology identification; the optimisation can be brought in reasonably limited time within cropping seasons etc., enabling large scale adoption of the practices. Unified technology and practice will generate special characteristics of produce which will be subject for the GIr and Quality patenting.

The claim that racy nature agriculture will quickly identify the antidotes, its dose determination will get decided by optimisation, is exemplified by citing case studies on the working of food produced in some locations. In the Yaqui valley of Mexico with low land farmers adopted irrigated agriculture with intensive use of chemical fertiliser and pesticides. After 50 years high level of pesticides were found in bloods of naval chord and breast milk of mothers, that caused children of low intelligence quotients (I.Q.). High arsenic level is problem in Bangladesh and surrounding areas. High fluoride content appeared in Southern India after 15 years in two irrigation projects as a result of mobilisation of sodicity. Likewise, problem of excess selenium in the alkali soil of Punjab, India was noticed [18]. In all the situations the severe health hazards appeared, but no solution existed even today to reduce the problems. All researches are being conducted that report gravity of the problems and severity of human sufferings. The racy nature agriculture having provision of adsorption, absorption, fixing the toxic solids, and suppressing up takes of toxic salts, will be able to reduce the uptake of excessive chemicals, pesticides, arsenic (As), fluoride (F), and selenium (Se) by creation of sulphate, phosphate and nitrate inhibit uptake of the As, F and Se. These anions are convened in the technology by biological nitrogen fixation brought by the nitrogen cycle, sulphate by the sulphur cycle and phosphorus by solubilising bacteria. These practices involve residue incorporation and aerobic decomposition [5,6], aerobically decomposed green manuring, liquid green manuring and aerobic compost [5] and will go long way in alleviating the problems. These practices reduce GHG emission and fix or immobilise the toxic salts.

These practices are to be optimised for deciding the control measures in agriculture and bringing a normal practice in agriculture to lessen the insurmountable problems [1,18]. The researchers [18] conducted lab study and reported utility of anions in reducing adsorption of selenium in alkali soil that also supports the involvement of quantum mechanics in racy nature agriculture.

Therefore, we conclude that racy nature agriculture involving quantum mechanics will bring sustainable food production and protection of environment in the whole world as a Sun technology.

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