

Conservation Agriculture in India

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INTRODUCTION

Achieving food security for a developing populace and mollifying monetary condition while continuing rural frameworks underneath the current situation of exhausting characteristic assets, negative effects of climatical inconstancy, turbinate estimation of information sources and unpredictable food costs are the key difficulties before the majority of the Asian nations. Also to those difficulties, the key markers of non-manageability of farming frameworks incorporates: dissolving, soil natural issue decay, salinization. These are caused primarily by: intensive tillage elicited soil organic matter decline, soil structural degradation, water and wind erosion, reduced water infiltration rates, surface protection and crusting, soil compaction, skimpy come of organic material, and monocropping. Therefore, a paradigm shift in farming practices through eliminating unsustainable elements of standard agriculture (ploughing/tilling the soil, removing all organic material, monoculture) is crucial for future productivity gains whereas sustaining the natural resources. Conservation agriculture (CA), a plan evolved as a response to issues of property of agriculture globally, has steady exaggerated worldwide to hide concerning V-E Day of the globe tillable land 124.8 M hour angle (FAO,2012) . CA may be a resource-saving agricultural production system that aims to attain production intensification and high yields whereas enhancing the resource base through compliance with 3 reticulated principles, along side alternative sensible production practices of plant nutrition and pesterer management.

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Traditional agriculture, supported tillage and being extremely mechanized, has been suspect of being accountable for eroding issues, surface and underground pollution, and a lot of water consumption. Moreover, it's involved in land resource degradation, life and diversity reduction, low energy potency and contribution to heating issues. Hence, conservation agriculture (CA) may be a thanks to cultivate annual and perennial crops, supported no vertical perturbation of soil (zero and conservation tillage), with crop residue management and canopy crops, so as to supply a permanent soil cowl and a natural increase of organic matter content in surface horizons. The most environmental consequences of this methodology are investigated worldwide with the target of presenting a synthesis of the obtainable studies and documents to the farmers and scientific communities. It stresses the terribly useful impacts of a conservative manner of cultivation on the worldwide surroundings (soil, air, water and biodiversity), compared to ancient agriculture. Further, it conjointly presents the particular gaps or uncertainties regarding the scientists' positions on these environmental aspects. CA promotes most soils to own a richer bioactivity and diversity, an improved structure and cohesion, and a really high natural physical protection against weather (raindrops, wind, dry or wet periods). Eroding is so extremely reduced, soil science inputs transport slightly reduced, whereas chemical bio-degradation is increased. It protects surface and well water resources from pollution and conjointly mitigates negative climate effects. Hence, CA provides glorious soil fertility and conjointly saves cash, time and fossil-fuel. It's Associate

in Nursing economical various to ancient agriculture, attenuating its drawbacks.

1. Conservation agriculture definition and goals:

Preservation farming might be an administration framework that keeps up a dirt cowl through surface maintenance of harvest deposits with no till/zero and diminished culturing. CA is represented by as an idea for resource saving agricultural crop production that is predicated on enhancing the natural and biological processes higher than and below the bottom. Conservation agriculture (CA) isn't "business as usual", supported maximising yields whereas exploiting the soil and agro-ecosystem resources. Rather, CA is predicated on optimizing yields and profits, to attain a balance of agricultural, economic and environmental advantages. It advocates that the combined social and economic advantages gained from combining production and protective the atmosphere, as well as reduced input and labor prices, square measure bigger than those from production alone. With CA, farming communities become suppliers of additional healthy living environments for the broader community through reduced use of fossil fuels, pesticides, and different pollutants, and thru conservation of environmental integrity and services. It targets turning around the strategy of debasement intrinsic to the quality rural practices like concentrated agribusiness, consuming/evacuation of yield buildups. Henceforth, it means to moderate, improve and utilize common assets through coordinated administration of available soil, water and natural assets joined with outer sources of info. It may be named as resource economical or resource effective agriculture.



1. Principles of conservation agriculture:

Conservation agriculture practices perused in several elements of the planet area unit designed on ecological principles creating land use a lot of property. Adoption of CA for enhancing Resource use potency (RUE) and

crop productivity is that the want of the hour as a robust tool for management of natural resources and to attain property in agriculture. Conservation agriculture primarily depends on three principles, that area unit coupled and

should be thought of along for acceptable style, designing and implementation processes.

(A). Minimal mechanical soil disturbances:

The soil biological activity produces terribly stable soil aggregates similarly as numerous sizes of pores, permitting air and water infiltration. This method will be known as “biological tillage” and it's not compatible with mechanical tillage. With mechanical soil disturbance, the biological soil structuring processes can disappear. Minimum soil disturbance provides/maintains optimum proportions of respiration gases within the rooting-zone, moderate organic matter oxidation, porousness for water movement, retention and unleash and limits the re-exposure of weed seeds and their germination (Kassam & Friedrich, 2009).

(B). Permanent organic soil cover:

A permanent soil cover is vital to shield the soil against the harmful effects of exposure to rain and sun to produce the small and macro organisms within the soil with a continuing supply of “food”; and alter the microclimate within the soil for best growth and development of soil organisms, as well as plant roots. Successively it improves soil aggregation, soil biological activity and soil multifariousness and carbon sequestration (Ghosh et al., 2010).

3. Status of conservation agriculture in India and abroad globally:

CA is being practiced on regarding a hundred twenty five M angular distance. The foremost CA active countries are USA (26.5 M ha), Brazil (25.5 M ha), Argentina (25.5 M ha), Canada (13.5 M ha) and Australia (17.0 M ha). In India, CA adoption continues to be within the initial phases. Over the past few years, adoption of zero tillage and CA has distended to hide regarding one.5 million hectares. The foremost CA based mostly technologies being adopted is zero-till (ZT) wheat within the rice-wheat (RW) system of the Indo-Gangetic plains (IGP). In alternative crops and cropping systems, the standard agriculture based mostly crop management systems are step by step undergoing a paradigm shift from intensive tillage to reduced/zero-tillage operations. Additionally to ZT, alternative idea of CA got to be infused within the system to more enhance and sustain the productivity still on faucet new sources of growth in agricultural productivity. The CA adoption conjointly offers avenues for abundant required

diversification through crop intensification, relay cropping of sugarcane, pulses, vegetables etc. as intercrop with wheat and maize and to accentuate and diversify the RW system. The CA based mostly resource conservation technologies (RCTs) conjointly facilitate in desegregation crop, livestock, land and water management analysis in each low- In Republic of India, efforts to adopt and promote conservation agriculture technologies are afoot for nearly a decade however it's solely within the last eight – ten years that the technologies are finding fast acceptance by farmers. Efforts to develop and unfold conservation agriculture are created through the combined efforts of many State Agricultural Universities, ICAR institutes and therefore the Rice-Wheat syndicate for the Indo-Gangetic Plains. The unfold of technologies is happening in Republic of India within the irrigated regions within the Indo-Gangetic plains wherever rice-wheat cropping systems dominate. Preservation farming frameworks haven't been attempted or advanced in elective major agro-ecoregions like rainfed semi-bone-dry tropics and consequently the dry locales of the mountain agro-biological systems. Unfurl of those advances is going on inside the inundated areas of the Indo-Gangetic fields any place the rice-wheat trimming framework rules. The principle focus of creating and advancing preservation advancements has been on zero-till seed-cum manure drill for planting of wheat in rice-wheat framework. Alternative interventions embody raised-bed planting systems, optical maser instrumentality power-assisted land leveling, residue management practices, alternatives to the rice-wheat system etc. it's been reportable that the world planted with wheat adopting the zero-till drill has been increasing speedily, and presently twenty fifth – half-hour of wheat is zero-tilled in rice-wheat growing areas of the Indo-Gangetic plains of Republic of India. Experiences from many locations within the Indo-Gangetic plains showed that with zero tillage technology farmers were ready to save toward land preparation prices by regarding Rs. 2,500 (\$41.7) per angular distance and cut back diesel consumption by fifty – sixty litres per angular distance. Zero tillage permits timely sowing of wheat, allows uniform drilling of seed, improves fertiliser use-efficiency, saves water and will increase deliver to twenty. Success has conjointly been

achieved in bed planting of wheat, cotton and rice. This has resulted in savings in irrigation water, improved fertiliser use and reduced soil crusting.

4. Constraints for adoption of conservation agriculture:

A mental modification of farmers, technicians, extension and researchers faraway from soil degrading tillage operations towards property production systems like no tillage is important to get changes in attitudes of farmers. However, noted that in all probability the foremost necessary consider the adoption of CA is overcoming the bias or outlook about tillage. It's argued that convincing the farmers that booming cultivation is feasible even with reduced tillage or while not tillage could be a major hurdle in promoting CA on an oversized scale. In several cases, it should be tough to convert the farmers of potential edges of CA on the far side its potential to cut back production prices, chiefly by tillage reductions. CA is now, thought of a route to property agriculture. Unfold of conservation agriculture, therefore, can require research connected with development efforts. The subsequent area unit many necessary constraints that impede broad scale adoption of CA. Lack of acceptable seeders particularly for little and medium scale farmers: though important efforts are created in developing and promoting machinery for seeding wheat in no until systems, booming adoption can require accelerated effort in developing, standardizing and promoting quality machinery aimed toward a variety of crop and cropping sequences. These would come with the event of permanent bed and furrow planting systems and harvest operations to manage crop residues. The wide unfold use of crop residues for eutherian feed and fuel, Specially beneath rainfed things, farmers face a inadequacy of crop residues because of less biomass production of various crops. there's competition between CA observe and eutherian feeding for crop residue. This can be a significant constraint for promotion of CA beneath rainfed things this has become a typical feature within the rice-wheat system in north Asian nation. This creates environmental issues for the region. Lack of information concerning the potential of CA to agriculture leaders, extension agents and farmers: this means that the total vary of practices in

conservation agriculture, together with planting and harvest home, water and nutrient management, diseases and persecutor management etc. got to be evolved, evaluated and matched within the context of latest systems.

CONCLUSION

Conservation agriculture offers a replacement paradigm for agricultural analysis and development totally different from the standard one, that primarily geared toward achieving specific food grains production targets in Asian country. A shift in paradigm has become a necessity in sight of widespread issues of resource degradation, that attended the past ways to boost production with very little concern for resource integrity. Integration considerations of productivity, resource conservation and soil quality and therefore the setting are currently elementary to sustained productivity growth. Developing and promoting CA systems are going to be extremely rigorous in terms of the mental object. This may necessitate greatly increased capability of scientists to deal with issues from a systems perspective; be ready to add shut partnerships with farmers and different stakeholders and strong information and information-sharing mechanisms. Conservation agriculture offers a chance for stunning and reversing the downward spiral of resource degradation, decreasing cultivation prices and creating agriculture additional resource – use-efficient, competitive and property. “Conserving resources – enhancing productivity” has got to be the new mission.

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