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# Resource Management for Sustainable Agriculture: A review

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**ABSTRACT**
*Soil and water are two naturally available resources need to be managed efficiently in dry land agriculture. Under given ecological limitation, it is the rainfall variation that causes fluctuation in productivity from year to year. The technologies which may be followed for resource management are viz. Effective utilization of stored soil moisture is important and hence crops and varieties having high moisture use efficiency (MUE) need to be used and crop planning as per length of cropping season: Select the crop of proper duration to match the length of growing season for stabilizing in crop production.*
***Key words*** *– Resource Management, Sustainable Agriculture, Dry Land Horticulture, Integrated Farming Systems (Ifs), Integrated Dry Land Technology*

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## INTRODUCTION

Significance and Contribution to the Economy: The agriculture sector in India has always played a crucial role in driving the wheels of socio-economic development of the country. India was primarily an agrarian economy with almost 60% of the country's population depending on agriculture for their livelihood. This dependence on agriculture in terms of employment has not undergone much of a change, since majority of the population are still engaged in agricultural and allied industries. In most of the countries of the world, agriculture still remains the biggest division responsible for the employing and feeding a large percentage of the population. Since there is no strict concentration on the requirement of superior skills for labour employed in this sector, the absorption ratio of this sector is very high. Also, around 43% of India's territory remains employed in agricultural activities.

Agriculture is also important from the viewpoint of assessing the standard of development in a country, based on the capability of its farmers and the scale of productivity. In this context, the role of education, health & nutrition and awareness programmes for imparting the necessary knowledge to the labour force is of vital importance. As we know, that poorly trained farmers are not well-equipped in applying higher methods and new technologies required to achieve better productivity.

We must also bear in mind, that majority of the Indian population live in villages and hence, the contribution of agriculture to the Indian economy becomes an indicative measure for determining the performance of the country.

Soil and water are two naturally available resources need to be managed efficiently in dry land agriculture. Under given ecological limitation, it is the rainfall variation that causes fluctuation in productivity from year to year. The technologies which may be followed for resource management are viz. Effective utilization of stored soil moisture is important and hence crops and varieties having high

moisture use efficiency (MUE) need to be used and crop planning as per length of cropping season: Select the crop of proper duration to match the length of growing season for stabilizing in crop production.

**Objectives – following are the objectives of this study**

1. To discuss the technologies to be followed for resource management for sustainable agriculture.
2. To discuss about concepts of resource management for sustainable agriculture,
3. To discuss about concepts of dry land horticulture, integrated farming systems (ifs), integrated dry land technology and its components.

## RESEARCH METHODOLOGY

This is descriptive study based on secondary data. Various Research Journals, Books, Websites & various reports which is related to technologies to be followed for resource management for sustainable agriculture, concepts of dry land horticulture, integrated farming systems (ifs), integrated dry land technology and its components were studied to draw the conclusions.

## RESULTS AND DISCUSSIONS

In this paper different concepts of resource management for sustainable agriculture, dry land horticulture, integrated farming systems (IFS), integrated dry land technology and its components are discussed as follows.

### Resource Management for Sustainable Agriculture

Soil and water are two naturally available resources need to be managed efficiently in dry land agriculture. Under given ecological limitation; it is the rainfall variation that causes fluctuation in productivity from year to year. The following technologies may be followed for resource management.

• Effective utilization of stored soil moisture is important and hence crops and varieties having high moisture use efficiency (MUE) need to be used.

• Crop planning as per length of cropping season: Select the crop of proper duration to match the length of growing season for stabilizing in crop production.

### A. Dry Land Horticulture

Fruit trees with drought tolerance potential can substitute annual crops in many dry land tracts. The criteria for selection of fruit trees for dry lands are drought tolerance, adaptability to varying soil conditions, flowering and fruiting during period of adequate moisture availability, quick regeneration after pruning and rapid recovery after stress is removed. The Table 13.17 gives an idea to go for fruit trees under different rainfall and soil type conditions. Successful dry land horticulture depends on many cultural requirements *viz.*, selection of trees suitable for rainfall and soil, planting during monsoon season in one m3 pits, pot watering during hot months in the early establishment period of 2–3 years, pruning to reduce canopy during dry season and moisture conservation through vegetative barriers, large basins sloping towards tree trunk, crescent or saucer shape basins, mulching with dry leaves, straw or crop waste.

**Table 01. Fruit Trees under different Rainfall and Soil Type Conditions**

| ***Rainfall* (*mm*)** | ***Fruit trees suitable*** |
|---|---|
| 560–700 | Ber, pomegranate, cashew sapota, pomegranate, jamun, amla |
| 700–900 | Mango, cashew, custard apple, guava, fig. |
| *Soil type* | |
| Black soils | Ber, sapota, pomegranate, jamun, amla, wood apple |
| Red soils | Mango, cashew, custard apple (Annona), pomegranate, sapota, amla. |

Inclusion of fruit trees in dry land farming systems can be done through:

(*a*) ***Pure horticulture***: Plantations of mango, cashew, guava etc.

(*b*) ***Agri horticulture:*** Annual crops intercropped in between fruit trees. *E.g.*: Mango + Groundnut/samai/horse gram, ber + cowpea/green gram.

(*c*) ***Hortipasture:*** Growing pasture grasses and legumes between fruit trees. *E.g.*: Ber/guava *+Cenchrus cilliaris + Stylosanthes.*

### B. Integrated Farming Systems (IFS)

Integrated farming system (IFS) refers to the adoption of allied agricultural enterprises along with crop production in a mutually beneficial manner in the same farm holding. *E.g.,* Crop + sheep/goat, crop/sericulture, Crop + poultry, crop/tree + forage + livestock. IFS offers many advantages compared with annual cropping alone by increased farm income, stability in farm income, increased employment opportunities, balanced food to farm family, efficient use of resources and recycling of farm wastes.

### C. Integrated Dry Land Technology and its Components

A single technology in isolation will not give desired results. Adoption of all related technologies as an integrated dry land technology package alone will provide a synergistic effect and improve the crop productivity in dry regions. The various components of such an integrated dry land technology (IDLT) are the following:

- *In situ* soil moisture conservation
- Choice of suitable crops and crop substitution
- Selection of high yielding drought tolerant varieties
- Cropping system to suit rainfall quantity, duration of rainy season and soil moisture storage
- Tillage to conserve moisture
- Establishment of optimum population
- Soil fertility management
- Crop protection against weeds, pests and diseases.

## CONCLUSION

Soil and water are two naturally available resources need to be managed efficiently in dry land agriculture. Under given ecological limitation, it is the rainfall variation that causes fluctuation in productivity from year to year. The technologies which may be followed for resource management are viz. Effective utilization of stored soil moisture is important and hence crops and varieties having high moisture use efficiency (MUE) need to be used and crop planning as per length of cropping season: Select the crop of proper duration to match the length of growing season for stabilizing in crop production.

## REFERENCES

1. Ahluwalia, Montek S. (2011): "Prospects and Policy Challenges for the Twelfth Plan", Economic & Political Weekly, Vol 46, No. 21, May 21.
2. Baby, K. (2012): "Food security and public distribution system- issues and concerns" Kurukshetra, A Journal of Rural Development, Publication Division, Ministry of I&B, Government of India, New Delhi, Vol. 58, No. 6, April, p.20.
3. Barnett,V., Payner,R., and Steiner,R. (1995) Agricultural Sustainability: Economic, Environmental and Statistical Considerations, John Wiley and Sons, UK, 266 pp
4. Brown,L.R (2001) , Eco-Economy: Building an Economy for the Earth, WW Norton &Co., New York, ICAR(1999). ICAR – Vision 2020, Indian Council of Agricultural Research, New Delhi, India,
5. Chand, Ramesh, S. S. Raju, S. Garg, L. M. Pandey (2011): "Instability and Regional Variation in Indian Agriculture", Policy Paper 26, National Centre for Agricultural Economics and Policy Research (NCAP), New Delhi, June.
6. Gautam, H. R. and Bhardwaj M. L. (2011): "Better practices for Sustainable agricultural production and better Environment", Kurukshetra, A Journal of Rural Development, Publication Division, Ministry of I&B, Government of India, New Delhi, Vol. 59, No. 9, July, p.26.
7. Jeyakumar, S. (2011): "Sustainable agriculture in India-An overview", Kurukshetra, A Journal of Rural Development, Publication Division, Ministry of I&B, Government of India, New Delhi, Vol.59, No.9, July, p.27.
8. Khandelwal, S. K. and Rajamani G. (2011): "BgM: A boon to sustainable agricultural production", Kurukshetra, A Journal of Rural Development, Publication Division, Ministry of I&B, Government of India, New Delhi, Vol.59, No.9, July, p.41.
9. Kumar, Praveen (2010): "Food Security: The Challenge Ahead", Yojana, A Development Monthly, Ministry of Information and Broadcasting, New Delhi, p. 28.
10. Lynam,J.K (1994). in Opportunities, Use, and Transfer of Systems Research Methods in Agriculture in Developing Countries, (eds: Goldsworthy, P. and Penning de Vries,F.W.T) Kluwer Academic Publishers, Dordrecht, Netherlands, pp 3-28.
11. Lynam,J.K. and Herdt,R.W., Agricultural Economics, 1989, 3, 381-98
12. Paull,J.(2014) Lord Northbourne, the man who invented organic farming, a biography. Journal of Organic Systems, 9(1), 31–53.
13. Ministry of Agriculture (2000). National Agricultural Policy .
14. National Research Council (1999) Our Common Journey: a transition toward Sustainability, National Academy of Sciences, USA, 1999, 363 pp
15. RIRDC (1997). Sustainability indicators for agriculture, Rural Industries Research and Deve;lopment Corporation, Australia, 1997, 54pp
16. Seregeldin, I (1999). Current Science, 76, .4, 501-506
17. Stewart, B.A. and Robinson,C.A (1997)., Advances in Agronomy, , Vol 60, 191-228.
18. Barnett,V., Payner,R., and Steiner,R. (1995) Agricultural Sustainability: Economic, Environmental and Statistical Considerations, John Wiley and Sons, UK, 19
19. Wals,E.J (2000). Integrating sustainability in higher agricultural education: dealing with complexity, uncertainty and diverging world views, Interuniversity Conference for Agricultural and Related Sciences in Europe,0, Ghent, Belgium.