

AKKADI SAALU

Biodiversity based ecological farming in Rainfed areas of Karnataka

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AKKADI SAALU (Diversified Farming Systems) is a traditional culture of farming by growing diversified crops in a given plot under rainfed conditions. It is a strategy to allow natural resources like rain – soil – seed to interact themselves to produce multiple crops. It is also connecting monsoon and rabi cropping seasons, where the rainfall is effectively utilized to secure varieties of food – fodder – fiber crops in a given land. Securing nutritional food security for soil microbes – plants – domestic animals and farming communities is the goal of AKKADI SAALU.

AKKADI SAALU METHOD ensures one or the other crops above the soil for more than eight months in a year to conserve the soil moisture, enhance the nutrients status of soil, control the erosion losses, suppress the weeds in crop plants, and remove the residual effects of pesticides, fertilizers, and heavy metals from earlier use. The natural mulch also improves the aesthetic value of landscapes and economic value of crop and provides year-long cattle fodder. This way, Akkadi, in comparison to sole crops provides much better onsite resources required for integrated farming system.

As said, AKKADI SAALU is a system approach. It is not just growing plants / crops in a given land. It is also re-establishing relationship with all living beings existing in that part of the land. Building a farm-ecosystem is the goal of this system. Creating a paradise of biodiversity is the ultimate call in this approach. Adoption of AKKADI SAALU PRACTICE, systematically sustains and strengthens existing natural resources unlike the dominant practice of mono-cropping.

The diverse crops and the complete absence of chemical fertilisers and pesticides mean an amazing array of life that converge on an Akkadi farm. You observe the emergence of multiple life forms, like soil microbes – native seeds – domestic animals, that functions in that ecosystem and collectively contributes to the production of multiple crops. The roles and services of each of these life forms have been researched to be unique.

The creation of farm ecosystem begins with the onset of monsoon rains. A seed, which is the source of life or energy is put/sown in the soil. Akkadi farms depend on up to 20 different varieties of diversified seeds in single farm. The complementarity nature of the roots help better quality of germination of the diversified seeds. The various microbes and fungi in the soil, which would have otherwise been reduced in a chemical intensive farm, support the growth of the plants by supplying the required nutrients. The key to increasing productivity in mixed cropping is understanding the nature of interaction between crops in the mixture. While it is generally understood that plants compete for growth factors such as light, water, nutrients, oxygen and carbon dioxide and the outcome of this competition is, in general, a reduction in plant

growth and performance of the species in mixture, Akkadi is based on science of farm managements including soil preparation, organic and timely application of liquid and solid manure, cropping system that there is greater production from intercropping than when either crop is grown alone.

Diversified plants bear diversified flowers with diversified colours. The structure of the leaf of each plant is different. The life span of each plant is different. The produced grains – pulses – oilseeds etc are also different in nature.

The multiple plants, growing in AKKADI SAALU SYSTEM, provides shelter to many insects. Different colours of the plants attracts specific insect. Some of these insects damage the crops and are generally called pests. The natural balance between beneficial insects drawn into the diversity based farms, along with trap crops that line the farms in strategic locations, effectively manage the pests with no need for chemical pesticides that are destructive for all life forms in an agricultural field.

Observing the developments happening within the soil during the cropping season is also scientifically fascinating. As the plants are growing densely, the soil is completely covered from direct sun. The roots of these crops are diverse in shape, size and potency. Some of the roots are shallow, which spreads at the surface level of the soil. Some develop and remain in shallow depths while roots of other plants can break the hardpans in the soil to go further deeper. There is evidence that longer roots that go deeper tap the nutrients available in the soil and pumps them to the surface level, which are used by shallow rooted plants.

Many of the Akkadi plants grow roots beyond the soil layers, sometimes deep into weathered and/or fractured hard rock and bedrock thus accessing water and nutrient supplies unavailable to surface roots. Recent research suggests that deep roots could be of pivotal importance to alleviate water stress in many crops. In addition, carbon deposition from deep root growth could be much more substantial than commonly accepted.

While independent estimates of soil organic carbon (SOC) are almost exclusively based on the standard IPCC (Intergovernmental Panel on Climate Change) sampling depth of 0-3 many of the world's soils are much deeper than 1 m and there is clear evidence that biological activity extends several metres into the soil and bedrock. Akkadi with a mixed range of root systems contribute to this scientific betterment of soil, crops, water management and climate change mitigation. The movement of life forms in the soil keep soil alive and active. The combination of mixed roots system in the Akkadi system will improve the geochemical flow in agro-ecosystems and also improves the physical structure of the soil. This enhances soil quality, which supports soil productivity.

Akkadi farms provide natural habitats for diverse life forms both above and below the soil and transform bare land into living soils.

AKKADI SAALU goes beyond just plant diversity. The farms adopting Akkadi impact diversity and difference at various levels, including:

- Plant / Crop Diversity (Native Seed Diversity)
- Wild plants diversity (Weeds – Bushes – Grass)
- Farm animal Diversity
- Birds Diversity
- Insects Diversity
- Reptiles Diversity
- Ants – Bees – Spiders – Flies – White Ants – Centipede – Millipede etc
- Below soil diversity
- Microbial Diversity
- Soil Diversity (Colour – structure – texture – with and without life)

The multiple benefits of AKKADI SAALU PRACTICE

- Insures against crop loss
- Improves farm level income
- Creates opportunities for value addition
- Reclaims degraded soils & lands
- Nutritional and Multiple Food Security
- Nutritional Fodder Security
- Crop residues as organic material / matter to the soil microbes
- Relatively more climate resilient
- Protects and promotes soil life
- Moisture is retained in the soil for a longer period
- Conservation of Natural Resources
- Increases biomass
- Conservation of biodiversity
- Connecting Monsoon and Rabi cropping season to ensure one or the other crop will be above the soil for more than 8 months
- Efficient use of water
- Recharges ground water
- Employment generation
- Gender equity as women are also primary right-holders in the farm activity
- Improves individual skills and impacts knowledge systems of growing multiple crops in a single plot
- Conserving – producing – protecting – promoting of Native Seeds
- Development of Native breed of livestock
- It rejuvenates a progressive farming culture that the country was known for
- It has the potential to build sustainable rural communities

- It facilitates a more qualitative peer to peer knowledge transfer for better adoption. RRAN in Karnataka facilitates such an equalizing exchange of experiences and knowledge through 'Anubhava Mantapas'

AKKADI SAALU

Annual activity calendar

South interior Karnataka



Month	Rain type	Activities
April	Ashwini and Bharani	<ul style="list-style-type: none"> - Lake silt application - Building contour bunds - Allowing livestock for grazing - Sowing seeds for green manure and ploughing
May	Kruthika and Rohini	<ul style="list-style-type: none"> - Mixing green manure to land - Management of weeds - Application of compost and surface ploughing
June	Mrugashira and Ardha	<ul style="list-style-type: none"> - Seed Germination test - Seed treatment (Organic and homemade) - Sowing of native seeds (Up to 20 varieties)
July	Punarvasu and Pushya	<ul style="list-style-type: none"> - Management of weeds using traditional agricultural implements - Application of liquid Manures (Trimurthy Tonic)
August	Ashlesha, Makha and Hubha	<ul style="list-style-type: none"> - Pest management (Organic and homemade) - Application of liquid Manure (Panchagavya)
September	Uttara and Hasta	<ul style="list-style-type: none"> - Identification of seeds for next season - Application of Liquid Manure (Jaggary, Cow Urine and Turmeric) - Application of Fish concoction
October	Chita and Swati	<ul style="list-style-type: none"> - Harvest of Kharif crops (Many crops will remain into Rabi season) - Seed Conservation - Sowing of Rabi Crops (without ploughing)
November	Vishaka and Anuradha	<ul style="list-style-type: none"> - Crop Management (Pulses) - Pest Management
December	Jesta, Mula and Pusya	<ul style="list-style-type: none"> - Harvest of Millets - Identification of seeds for next season - Seed Conservation - Fodder Collection - Application of Egg concoction
January	Uttarashada and Shravana	<ul style="list-style-type: none"> - Value addition and Marketing - Application of Egg concoction
February	Danista and Shatabista	<ul style="list-style-type: none"> - Harvest of Pulses and Rabi crops - Identification of seeds for next season - Seed Conservation - Fodder Collection

Policies to be introduced to support AKKADI SAALU PRACTICE

- Discouraging Monocropping practice
- Incentivising the cultivation of multiple crops (millets – pulses – oilseeds etc) especially in rainfed farmlands
- Encourage community seed banks
- Incentivising Akkadi farming in fallow lands
- Incentivising the use of crop residues and animal waste to address organic soil inputs
- Focussed knowledge development around the 4 Ms in Rainfed Farms: MATTER(Soil organic matter) – MOISTURE – MICROBES – MULCHING
- Discouraging Burning of stubbles / crop residues
- Focussed knowledge development on minimum tillage to keep the carbon in the soil
- Take up ecology based agro-landscape development at the Taluk level
- Educating farmers to improve soil physical components and increase the population of soil life
- Discouraging the usage of heavy machinery in the farmlands
- Incentivising zero inorganic chemical farms in the state

While above-ground biodiversity is familiar to most people, and its protection is managed under regulations, there are few comparable activities that focus on the protection of soil biodiversity.

Protecting above-ground biodiversity is not always sufficient to protect soil biodiversity. Above-ground and below-ground biodiversity are shaped by different environmental drivers, and are not necessarily linked to one another.

Above and below-ground biodiversity requires tailored protection, conservation and restoration considerations because they are connected but at the same time very distinct.

- Soil biodiversity needs to be reflected in National Reports and National Biodiversity Strategies and Action Plans (NBSAPs)
- Strengthen education and capacity building on the interdependence of soil – plant – farm animal – human health
- Sustainable soil management practices should be adopted by farmers and land users to prevent and minimize soil biodiversity loss
- Soil remediation and ecosystem restoration plans need to include soil health and soil biodiversity considerations
- There is a need to promote the necessary shift to include biological indicators of soil health along with physical and chemical
- Policies with farming plans need to integrate soil biodiversity into sustainable soil management and ecosystems restoration plans to guarantee healthy soils to farmers by reducing threats to soil biodiversity

AKKADI SAALU PRACTICE: Need of action plans

- Advocacy for multiple cropping system
- Educating farming community on the importance of AKKADI SAALU and empowering them to adopt AKKADI SAALU PRACTICE

Establishing Native Seed Banks & Organic Soil input (manures) banks to improve and increase SOM & SOC

- Establishing AKKADI SAALU information centers at Grama Panchayath levels
- Improving knowledge on roles and services of soil biodiversity as a key indicator of soil health
- Improving the knowledge in local languages on the importance of native seeds and soil life
- Strengthen the knowledge on the different soil groups forming soil biodiversity (i.e., microbes, micro, meso, macro and megafauna)
- Establishing a SOIL MUSEUM at Grama Panchayath level, to educate people by providing information on types of soils – native seeds – domestic animals – other living organism in the biodiversity, the roles and services they do for mankind and why it is the responsibility of the people to protect them

Economy of Akkadi Saalu cultivation

Mixed cropping with perennials seeks to provide a conservation oriented approach to farming but some benefits like soil conservation or shade may not have a direct economic value. Depending on the level of detail required in the economic evaluation and its purpose, opportunity costs of such benefits can be derived and included in the evaluation

REVITALISING RAINFED
AGRICULTURE NETWORK

AKKADI SAALU

FARM ECONOMICS

INCOME AND EXPENDITURE IN ONE ACRE OF
AKKADI SAALU FARMING

MULBAGAL, KARNATAKA

Akkadi Saalu Crops

**Ground Nut, Avare, Toor, Cowpea, Pearl Millet,
Great Millet, Mustard, Foxtail Millet, Niger Seeds,
Maize, Castor, Finger Millet, Little Millet, black
sesame, Horse Gram**

Live Stock

**1 HF Cow, 2 Sheep and
Poultry starting with one hen**

Expenditure - Rs.82,750

**Practice
Rs.20,320**

**Green manure,
Land preparation,
Sowing, Weed
Management, Liquid
Manure**

**Input cost
Rs.43,280**

**Seeds, Feed and
fodder, Sheep
Purchase, BYP
Purchase, Organic
urea**

**Harvesting exp
Rs.3,800**

**Labour cost on
Harvest of
Groundnut, Ragi,
Toor Dal, Horse Gram**

**Processing &
Value addition**

**Rs.15,350
Processing of
Groundnut, Ragi, Toor
Dal, Horse Gram and
ground nut oil
extraction**

**Input cost
saved**

**Seeds, Organic Urea,
Compost, organic pesticides**

Income - Rs.2,42,860

From Crops Rs.95,460

From Ragi, Toor Dal,
Groundnut Oil &
Cake, Horsegram,
Field Bean, Niger
Seeds, Cowpea,
Mustard

Value of Fodder Rs.10,000

Fodder from Peral
Millet, Great Millet,
Finger Millet and
Ground nut

Income from Livestock Rs.1,37,400

Income from dairy farming - 1,04,000
From Backyard Poultry - 15,400
From Sheep Farming - 18,000

Summary

Expenditure	Rs.82,750
Income	Rs. 2,42,860
Input Cost Saved	Rs.12,480
Total Profit	Rs.1,72,590



Akkadi Saalu & Ecological Services

**Landrace seed conservation
Appropriate use of crop residue
Short term soil nutrients
Increase in soil fertility and soil conservation
Bird biodiversity
Reptile biodiversity
Sustainable agricultural culture
Optimal use of rainwater,
Zero ground water dependency
Fodder Security
Livestock development
Microbial biodiversity
Insect Biodiversity
Genetic Diversity
Conservation of natural resources
Zero burning of crop residue
Improve in soil organic matter
Zero Chemical application**