

Farming Based Livelihood Systems

UNIT : 1

Status of agriculture in India and different states, income of farmers and rural people in India. Livelihood – Definition, Concept and Livelihood Pattern in Urban and Rural Area.

Status of in Agriculture India.

- Agriculture is the primary source of livelihood for nearly 58% of India's population. However, despite its importance, agriculture contributes only around 18-20% to India's GDP. The sector has been characterized by challenges such as low productivity, fragmented land holdings, inadequate infrastructure, climate vulnerability, and market fluctuations.
- Key Crops and Agricultural Regions:
- Rice: The main staple crop grown in states like West Bengal, Punjab, Uttar Pradesh, Andhra Pradesh, and Tamil Nadu.
- Wheat: Predominantly grown in Punjab, Haryana, Uttar Pradesh, and Madhya Pradesh.
- Pulses: Grown in Maharashtra, Madhya Pradesh, Rajasthan, and Uttar Pradesh.
- Sugarcane: Cultivated in Uttar Pradesh, Maharashtra, Karnataka, and Tamil Nadu.
- Fruits and Vegetables: Horticulture has emerged as a significant part of Indian agriculture with states like Maharashtra, Andhra Pradesh, Tamil Nadu, Gujarat, and West Bengal leading the production of various fruits and vegetables.

Major Challenges in Agriculture:

- Fragmented Land Holdings: Over 86% of Indian farmers own less than 2 hectares of land, leading to uneconomical farm sizes.

- **Water Scarcity:** Dependence on monsoon rains makes agriculture highly vulnerable to fluctuations in rainfall.
- **Low Productivity:** Despite the large workforce, agricultural productivity in India remains low compared to global standards.
- **Limited Access to Technology:** Modern farming techniques and advanced machinery are not accessible to many small and marginal farmers.
- **Climate Change:** Increased incidences of droughts, floods, and unseasonal rainfall are impacting crop yields and farmers' income.

Status of Agriculture in Different States of India

- **Punjab:**
 - Known as the "Granary of India," Punjab leads in the production of wheat and rice.
 - The state's agriculture is highly mechanized, and farmers benefit from assured irrigation, primarily through canals.
 - However, over-reliance on water-intensive crops like paddy has led to groundwater depletion.
 - Challenges: Depleting water table, declining soil health, stagnating crop yields, and over-dependence on wheat-paddy crop cycle.

- **Uttar Pradesh:**
 - A major producer of food grains, including wheat, rice, and sugarcane.
 - The state also leads in milk production, contributing significantly to India's dairy sector.

Challenges: Fragmented land holdings, low mechanization, and insufficient access to modern farming technologies.

- **Maharashtra:**
 - A leading producer of cotton, sugarcane, pulses, and horticultural crops (fruits like grapes, pomegranates, and oranges).

- The state has made significant progress in agricultural exports, especially in fruits.
- Challenges: Drought-prone regions (like Marathwada and Vidarbha) face severe water shortages affecting crop yields.
- **Madhya Pradesh:**
 - Known for being the largest producer of pulses and oilseeds in India.
 - The state's agricultural economy has been bolstered by the cultivation of wheat, pulses, soybeans, and gram.
 - Challenges: Despite good rainfall, irrigation coverage is limited, and farmers rely on monsoons for water.
- **Tamil Nadu:**
 - A leading producer of rice and horticultural crops.
 - Agriculture in Tamil Nadu has been affected by water scarcity and irregular rainfall patterns.
 - Challenges: Water scarcity, monsoon dependency, and urbanization are impacting rural and farm areas.
- **West Bengal:**
 - West Bengal is a top producer of rice, jute, and fish.
 - The state has rich soil and ample water resources from the Ganges and its tributaries, but floods often affect crop yields.
 - Challenges: Floods, outdated farming methods, and rural poverty continue to challenge agricultural productivity.

Income of Rural People and Farmers in India

- Average Income of Farmers:
- The average monthly income of an agricultural household in India was around ₹10,218 (as per a 2018 National Sample Survey Office report).

- This includes income from wages, cultivation, livestock, and non-farm business activities.
- Regional Variations: Punjab: Highest average monthly income (over ₹18,000).
- Bihar, Jharkhand, West Bengal: Farmers here have among the lowest average incomes (around ₹7,000-₹9,000).
- Sources of Income: Apart from cultivation, many rural households depend on wages, remittances, and other non-farm activities for survival.

Rural Employment and Income Distribution:

- Around 70% of India's rural population is dependent on agriculture for their livelihood. Rural income comes from multiple sources: Agriculture (cultivation and livestock).
- Rural labour market (non-agricultural activities like construction, transportation).
- Public sector employment (government schemes like MNREGA).
- MGNREGA (Mahatma Gandhi National Rural Employment Guarantee Act) provides 100 days of guaranteed employment to rural households, improving rural income stability.

Livelihood – Definition, Concept and Livelihood Pattern in Urban and Rural Areas

Definition of Livelihood

- A livelihood refers to the means through which an individual or household makes a living. It encompasses the resources (such as skills, knowledge, and assets) and the activities (such as employment, agriculture, or trade) that people undertake to earn income or gain resources that support their life.
- Chambers and Conway (1992) defined livelihood as “the capabilities, assets (both material and social resources), and activities required for a means of living.”

Concept of Livelihood

- The concept of livelihood goes beyond income generation and focuses on a more holistic understanding of the way people secure the essentials of life, such as food, water, shelter, clothing, and access to education and healthcare. It also includes social, cultural, and environmental dimensions.

- Key components of the livelihood concept include:

- **Assets:** Tangible and intangible resources that individuals or households have access to. These can include land, livestock, cash, skills, social networks, and education.

- **Activities:** The specific actions that individuals or households undertake to meet their needs, such as farming, trading, laboring, or working in industries.

- **Capabilities:** The ability of individuals or households to use their assets effectively to generate income and secure their livelihood. This can include knowledge, skills, health, and access to services.

- **Livelihood Patterns in Rural Areas**

- Rural areas are characterized by a greater dependence on natural resources and agricultural activities.

- Rural areas are characterized by a greater dependence on natural resources and agricultural activities. The primary livelihood patterns include.

- **Agriculture:** Farming is the dominant livelihood activity in rural areas, where households engage in the cultivation of crops, such as rice, wheat, maize, and various cash crops like cotton and sugarcane.

- **Livestock Rearing:** Many rural households supplement their income through raising livestock, including cattle, sheep, goats, and poultry.

- **Fisheries and Forestry:** In coastal and forested regions, fishing and forest-based activities are key livelihood options. This includes the collection of forest products (such as timber, fuelwood, medicinal plants, and honey).

- **Aquaculture:** In some rural areas, fish farming is becoming a viable livelihood option.

- **Rural Non-Farm Employment:**

- **Artisanal Activities:** In many rural areas, traditional crafts, weaving, pottery, and handloom production provide employment.
- **Casual Labor:** Many rural households supplement their incomes by working as casual laborers in construction, transportation, and small-scale manufacturing.
- **Rural Enterprises:** Small shops, milling units, repair services, and other enterprises contribute to rural livelihoods.

Livelihood Patterns in Urban Areas

- **Formal Employment:**
- **Industries and Manufacturing:** A large portion of the urban workforce is employed in manufacturing units, textile industries, electronics, and other industrial sectors.
- **Service Sector:** The urban economy is increasingly service-driven, with a significant portion of the population employed in sectors like finance, education, healthcare, retail, and IT services.
- **Public Sector Jobs:** Government employment, including jobs in education, healthcare, law enforcement, and municipal services, forms a stable source of livelihood for many urban households.
- **Public Sector Employment and Schemes:**
- Programs like Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) provide guaranteed employment for a certain number of days annually to rural households, ensuring a fallback option for income generation.
- Government schemes focused on improving rural infrastructure (roads, irrigation, electricity) also create employment opportunities.
- **Self-Employment and Entrepreneurship:**
- **Small and Medium Enterprises (SMEs):** Urban areas offer opportunities for self-employment, including running small shops, tailoring, carpentry, repair services, and other entrepreneurial ventures.

- Online and Gig Economy: The growth of technology and digital platforms has introduced new livelihood patterns in urban areas, including freelance work, gig economy jobs (like food delivery and ridesharing), and online businesses.
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UNIT : 2

Agricultural livelihood system (ALS), Meaning, Approach, Approaches and Framework.

- The Agricultural Livelihood System (ALS) refers to the integrated and holistic approach to managing agricultural activities that contribute to the economic and social well-being of individuals and communities. This system is vital in rural areas where agriculture is a primary source of income, food security, and cultural identity.

Definition of Agricultural Livelihood System (ALS)

- Agricultural Livelihood System (ALS) encompasses the various agricultural-based activities and strategies employed by households and communities to secure their livelihoods. It includes the farming activities, income diversification strategies, access to markets, inputs, and support services that shape the living conditions of individuals who depend on agriculture for their sustenance.

Core Components of ALS

- Natural Resources
- Human Resources
- Financial Resources
- Social and Institutional Support
- Physical Infrastructure
- Markets and Trades

Approaches to Agricultural Livelihood Systems

Farming Systems Approach:

This approach focuses on the farm as a holistic system, considering interactions between crops, livestock, soil, water, and socio-economic factors. It aims at optimizing resource use for sustainable productivity.

Sustainable Livelihoods Approach (SLA):

SLA views livelihoods in a broader socio-economic context, focusing on how people use assets (natural, financial, human, social, physical) to develop livelihood strategies and reduce vulnerabilities.

Agroecological Approach:

This approach integrates ecological principles into agricultural systems. It promotes biodiversity, organic inputs, and traditional knowledge to enhance the resilience and productivity of agricultural ecosystems.

Value Chain Approach:

This approach seeks to improve the entire agricultural value chain, from production to marketing, by linking smallholder farmers to markets, improving access to inputs, and increasing value addition.

Integrated Rural Development Approach:

This approach combines agricultural development with other rural sectors (health, education, infrastructure) to create synergies that improve the overall well-being of rural communities.

- **Climate-Smart Agriculture (CSA):** CSA aims to increase agricultural productivity and incomes, build resilience to climate change, and reduce greenhouse gas emissions through the promotion of climate-adaptive practices.

Framework of Agricultural Livelihood System

- **Assets:** Households rely on five types of capital: natural, physical, financial, social, and human. These assets are used to formulate strategies to improve livelihoods.
- **Vulnerability Context:** Factors such as climate variability, economic instability, policy changes, and market fluctuations that influence livelihoods and shape the environment in which households operate.
- **Transforming Structures and Processes:** These include government institutions, private sector actors, nongovernmental organizations (NGOs), and international agencies that provide resources, implement policies, and offer services that influence ALS outcomes.
- **Livelihood Strategies:** These are the various activities and choices people make to achieve livelihood goals, including crop production, livestock rearing, wage labor, and income diversification through non-agricultural activities.
- **Livelihood Outcomes:** The outcomes of ALS strategies are measured in terms of increased income, food security, reduced vulnerability, sustainable resource management, and improved well-being.

Conclusion

- The Agricultural Livelihood System (ALS) is a complex and multi-dimensional concept that integrates agricultural production, socio-economic factors, and sustainability considerations. Through various approaches and frameworks, ALS seeks to enhance the livelihoods of rural communities, ensuring resilience, environmental stewardship, and equitable development. The system is dynamic, adapting to changing environmental, economic, and social conditions to provide a sustainable path for agricultural-dependent populations.

Thank You

Definition of farming systems and farming based livelihood systems

Prevalent Farming Systems in India contributing to livelihood.

Definition of Farming Systems: Farming systems can be defined as a complex interrelated matrix of soils, plants, animals, implements, power, labor, capital, and other inputs controlled by farm households. These are designed to meet the diverse objectives and needs of the family while maintaining or improving the natural resource base and environmental quality. Farming systems integrate crops, livestock, aquaculture, forestry, and agro-forestry with the aim of optimizing resource use efficiency, improving agricultural productivity, and increasing farm income.

Key elements of farming systems include:

- Agro-climatic conditions: Soil, water, and climate, topography.
- Biological factors: Crops, livestock, trees, and their interaction.
- Economic and social factors: Labor, market access, household size, and objectives.

Farming-Based Livelihood Systems: Farming-based livelihood systems refer to livelihood strategies adopted by rural households that center on agriculture and related activities. In these systems, agriculture is the primary means of securing food, income, and employment. These households also diversify into allied sectors such as animal husbandry, fisheries, forestry, and non-farm rural activities to enhance their income and reduce risk.

- Livelihood systems consider multiple dimensions such as:
- Natural capital (land, water, biodiversity).
- Physical capital (infrastructure, tools).
- Human capital (skills, education).
- Social capital (relationships, networks).
- Financial capital (income, credit access).

Prevalent Farming Systems in India: India's farming systems are diverse due to variations in agro-climatic conditions, socio-economic factors, and cultural practices. The major farming systems prevalent in India include:

- **Crop-Based Farming Systems:**

- **Rice-Wheat System:** Common in northern states like Punjab, Haryana and Uttar Pradesh. Rice is grown during the Kharif season (monsoon), and wheat is grown during the Rabi season (winter). This system contributes to food security in India.
- **Rice-Based Systems:** Prevalent in eastern and southern states such as West Bengal, Odisha, Tamil Nadu, and Andhra Pradesh. In these regions, rice is grown with other crops like pulses, oilseeds, and vegetables.
- **Millet-Based Systems:** Found in semi-arid regions like Rajasthan, Karnataka, and parts of Maharashtra, where millets like sorghum, pearl millet, and finger millet are the staple crops.
- **Sugarcane-Based Systems:** Common in states like Maharashtra, Uttar Pradesh, and Karnataka. Sugarcane is a major cash crop and contributes significantly to the income of farmers.

- **Mixed Farming Systems:-**

- **Crop-Livestock Systems:** In many parts of India, small and marginal farmers rely on a combination of crop farming and livestock rearing. For instance, in states like Gujarat and Rajasthan, farmers grow crops and rear livestock (cows, buffaloes, goats) to diversify income sources and meet household needs for milk, meat, and manure.

- **Agroforestry Systems:** These systems integrate trees with crops and livestock. Farmers in southern and northeastern India practice agroforestry, where fruit trees (mango, coconut, banana) are combined with staple crops like rice and vegetables. These systems are more sustainable and increase farm resilience.

- **Horticulture-Based Systems:-**

- **Fruit and Vegetable Farming:** India is a leading producer of fruits and vegetables such as mango, banana, papaya, citrus fruits, potato, tomato, and onion. Horticulture-based systems are prevalent in states like Kerala, Tamil Nadu, Maharashtra, and West Bengal. These systems provide high returns, although they are more labor-intensive and susceptible to price fluctuations.

- **Spice-Based Systems:** States like Kerala, Karnataka, and Tamil Nadu are known for cultivating spices such as cardamom, pepper, ginger, and turmeric. These high-value crops contribute to both domestic consumption and export.

- **Livestock-Based Farming Systems:-**

- **Dairy Farming:** India is the largest milk producer in the world, and dairy farming is an important livelihood for millions of rural households. Dairy based systems are prominent in states like Uttar Pradesh, Punjab, Gujarat, and Maharashtra.

- **Poultry Farming:** Poultry is a significant sector in states like Tamil Nadu, Andhra Pradesh, and West Bengal. The rising demand for eggs and poultry meat provides steady income to small farmers.

- **Fishery-Based Systems:**

- **Inland Fisheries:** With its vast network of rivers, lakes, and ponds, India has a well-established inland fishery system. States like West Bengal, Assam, Andhra Pradesh, and Odisha are prominent in freshwater fish production.

- **Marine Fisheries:** The coastal states of Kerala, Tamil Nadu, Maharashtra and Gujarat have vibrant marine fishing communities. Fisheries contribute to both livelihoods and nutritional security in these regions.

- **Integrated Farming Systems**

- These systems combine various components of farming, such as crops, livestock, aquaculture, and agroforestry, to enhance farm productivity and sustainability. Integrated farming systems are being promoted in many parts of India to maximize resource use efficiency, improve soil fertility, and reduce input costs.

Contribution of Farming Systems to Livelihoods in India:

- **Employment Generation:** Agriculture and allied activities provide employment to nearly 60% of India's rural population. Farming systems support both on-farm labor and off-farm rural employment.

- **Food Security:** Farming systems, particularly rice-wheat and other cereal-based systems, are critical for ensuring food security in India. India is largely self-sufficient in food grains, thanks to these systems.
- **Income Diversification:** Mixed farming systems and horticulture-based systems help farmers diversify their sources of income. By incorporating livestock, fishery, or agroforestry, farmers reduce their dependence on a single crop or enterprise, thus minimizing risk.
- **Sustainability and Resource Conservation:** Integrated farming systems promote sustainable agricultural practices, such as crop rotation, organic farming, and soil conservation. This helps in preserving soil fertility and protecting natural resources.
- **Economic Growth:** High-value farming systems, such as horticulture and dairy farming, contribute significantly to the rural economy. These systems provide higher returns and enable smallholder farmers to improve their standard of living.
- **Women's Empowerment:** Livestock-based farming systems and horticulture involve women significantly in day-to-day activities. These systems provide income-generation opportunities for rural women and contribute to their empowerment.
- **Export Earnings:** Farming systems that produce high-value cash crops(sugarcane, spices, cotton, and horticulture) contribute to India's export earnings and enhance the livelihoods of farmers involved in these sectors.

- **Conclusion:**

Farming systems in India are crucial for the livelihoods of rural households, providing food, income, and employment. The diverse agro-climatic conditions of India support a variety of farming systems, each tailored to regional needs. From crop-based systems to integrated farming approaches, Indian agriculture remains a key driver of rural development and sustainability. Given the growing challenges posed by climate change, population growth, and market volatility, there is a strong need to promote diversified and sustainable farming systems to ensure the long-term prosperity of India's rural communities.

Thank You

❖ UNIT : 3

Types of traditional & modern farming systems. Components of farming system / farming based livelihood systems- Crops and cropping systems, Livestock, (Dairy, Piggery, Goatry, Poultry, Duckry etc.), Horticultural crops, Agro--forestry systems, Aqua culture Duck/Poultry cum Fish, Dairy cum Fish, Piggery cum Fish etc., Small, medium and large enterprises including value chains and secondary enterprises as livelihood components for farmers, Factors affecting integration of various enterprises of farming for livelihood.

❖ Traditional Farming Systems:-

• Shifting Cultivation (Slash and Burn Agriculture)

Farmers clear a patch of forest, burn vegetation, and grow crops on the nutrient-rich ash. After a few years of cultivation, the soil fertility declines, and the field is abandoned. The process is then repeated on a new patch of land.

- Advantages: It allows soil recovery over time, conserves biodiversity in forested areas, and requires fewer inputs like fertilizers or pesticides.
- Disadvantages: Deforestation, loss of biodiversity, and unsustainable with increasing population pressure.
- Locations: Practiced in tropical rainforests of Africa, Southeast Asia, and parts of South America.

• Subsistence Farming

- Farming system where crops are grown mainly for personal consumption rather than for sale. It is labor-intensive, often reliant on family labor, and uses traditional tools like hoes and plows.
- Advantages: Low input costs and minimal environmental degradation.
- Disadvantages: Low yields, limited surplus for trade, and high vulnerability to climate variations.
- Locations: Common in parts of Africa, South Asia, and Latin America.

• Pastoralism (Nomadic and Semi-Nomadic)

- A system where livestock (cattle, sheep, goats) are moved seasonally in search of grazing areas. Nomadic pastoralists are constantly on the move, while semi-nomadic ones have a home base but still move with their herds.
- Advantages: Utilizes marginal lands that are unsuitable for crop production and allows flexible use of resources.
- Disadvantages: Overgrazing, land degradation, and conflict over grazing rights.
- Locations: Found in arid and semi-arid regions like the Sahel in Africa, Mongolia, and Central Asia.

• **Mixed Farming**

- A system that combines crop cultivation with livestock farming. Farmers grow crops to feed their animals and sell animal products such as milk, meat, and eggs.
- Advantages: Diversifies income, improves soil fertility through animal manure, and reduces risk through multiple income streams.
- Disadvantages: Requires more labor, expertise in both animal husbandry and crop production and may need more land.
- Locations: Practiced in temperate regions like Europe, North America, and parts of Asia.

• **Terrace Farming**

- Farming on sloped land by constructing terraces (step-like structures) to prevent soil erosion and conserve water.
- Advantages: Makes use of hilly terrain, conserves water, reduces erosion, and supports food production in mountainous areas.
- Disadvantages: Labor-intensive to construct and maintain terraces.
- Locations: Practiced in mountainous regions like the Andes (South America), Southeast Asia (rice terraces), and the Himalayas.

• **Rainfed Agriculture**

- Farming that depends solely on rainfall for water, with little to no irrigation.

- **Advantages:** Minimal cost for irrigation infrastructure, promotes local crop varieties suited to rainfall patterns.
- **Disadvantages:** Highly vulnerable to weather changes, droughts, and inconsistent rainfall.
- **Locations:** Common in sub-Saharan Africa, South Asia, and parts of Latin America.

❖ Modern Farming Systems

• Monoculture

- The practice of growing a single crop on a large scale over a vast area.
- **Advantages:** Simplifies management, efficient use of machinery, and maximizes output for high-demand crops.
- **Disadvantages:** Depletes soil nutrients, increases vulnerability to pests and diseases, and leads to biodiversity loss.
- **Locations:** Common in large agricultural operations in the United States (e.g., corn, soy), Brazil, and Australia.

• Commercial Farming

- Large-scale production of crops or livestock for sale and profit, usually relying on advanced technologies, high inputs of fertilizers, and mechanization.
- **Advantages:** High yields, increased efficiency through mechanization and contribution to food security and export economies.
- **Disadvantages:** High input costs, environmental damage from overuse of fertilizers and pesticides, and social inequalities in land ownership.
- **Locations:** Widely practiced in developed countries (U.S., Canada, Australia) and emerging economies like Brazil and Argentina.

• Agroforestry

- A system that integrates trees and shrubs into crop and livestock farming systems to improve land use and diversify production.
- **Advantages:** Increases biodiversity, improves soil fertility and provides multiple products (timber, fruits, fuelwood).
- **Disadvantages:** Complex management system and longer time to see economic returns from tree crops.

- Locations: Practiced in Southeast Asia, Africa, and parts of Latin America.

• Hydroponics and Aquaponics

- Soilless farming systems where plants are grown in nutrient rich water solutions (hydroponics) or integrated with fish farming (aquaponics).
- Advantages: Uses less water, no soil degradation, high efficiency in small spaces, and reduced use of pesticides.
- Disadvantages: High setup costs, need for technical expertise and dependence on external inputs.
- Locations: Practiced in urban areas, greenhouses, and arid regions (e.g., Middle East).

• Precision Farming

- A technology-driven approach that uses GPS, sensors, and data analytics to optimize farm inputs (fertilizers, water, seeds) and monitor crop conditions in real-time.
- Advantages: Increases efficiency, reduces waste, and enhances productivity by fine-tuning inputs to specific field conditions.
- Disadvantages: High initial investment and dependence technology.
- Locations: Predominantly in developed countries like the U.S., Europe, and Australia.

• Vertical Farming

- Growing crops in vertically stacked layers or vertically inclined surfaces, often in controlled environments (indoors or greenhouses).
- Advantages: Efficient use of space, controlled environment allows year-round production, reduces need for pesticides.
- Disadvantages: High energy costs for artificial lighting and climate control, expensive setup, and limited crop variety.
- Locations: Practiced in urban areas, especially in cities like Singapore, Tokyo, and New York.

• Genetically Modified (GM) Farming

- A system that utilizes genetically modified crops that are engineered for traits like pest resistance, herbicide tolerance, and improved nutritional content.
- **Advantages:** Higher yields, reduced use of pesticides, and resistance to environmental stresses.
- **Disadvantages:** Ethical concerns, potential environmental risks, and market resistance to GM products.
- **Locations:** Common in the U.S., Brazil, Argentina, and parts of Asia.

❖ Comparison: Traditional Vs Modern Farming Systems

- **Technology:** Traditional systems rely on minimal technology, while modern systems use advanced technology like machinery, GMOs, and precision tools.
- **Scale:** Traditional farming is usually small-scale and subsistence-oriented, whereas modern farming is large-scale and profit-driven.
- **Inputs:** Traditional systems use organic methods and low inputs, while modern systems depend heavily on synthetic inputs (fertilizers, pesticides).
- **Environmental Impact:** Traditional methods often conserve biodiversity and maintain soil health, whereas modern systems may lead to environmental degradation if not managed sustainably.

❖ Components of Farming Systems / Farming-Based Livelihood Systems-

- Farming systems refer to an integrated set of agricultural activities organized to efficiently use resources for sustainable production. Each component within a farming system works symbiotically to improve productivity, resource efficiency, and farmer income. The main components of a farming system typically include crops, livestock, horticulture, agroforestry, and aquaculture, among others

❖ Crops and Cropping Systems

- **Crops** refer to plants grown and harvested for food, fodder, fiber, fuel, or raw materials.
- **Cropping systems** describe the patterns and techniques used to grow crops over time and space, ensuring efficient resource use and sustainable productivity.

• Key Types of Cropping Systems:

- **Monocropping:** Growing only one type of crop in a specific area year after year. Examples: wheat, rice.
- **Mixed Cropping:** Growing two or more crops simultaneously in the same field without a distinct row arrangement. Examples: maize and beans.
- **Intercropping:** Growing two or more crops together with distinct row arrangements. It helps in utilizing space more efficiently. Examples: maize and cowpea intercropping.
- **Crop Rotation:** The practice of growing different crops sequentially on the same land to improve soil health and reduce pest pressure. Example: rotation of legumes and cereals.
- **Agro-pastoral Systems:** Integration of crops and livestock, where both serve to enhance productivity (e.g., crops for feed and animals for manure).
- **Livestock-Based Systems:** Livestock plays a vital role in most farming systems, contributing to food security, income, and employment. Livestock components are typically integrated with crop production systems for mutual benefits.
- **Key Livestock Systems:**
 - Dairy Farming:** Focuses on the production of milk. The animals reared include cows, buffaloes, goats, and camels. Dairy waste can be used as manure in crop production.
 - Piggery:** Raising pigs for meat production (pork). It is a profitable venture due to pigs' ability to convert diverse feeds into body mass quickly. Piggery waste can be used in biogas production or as manure.
 - Goat Farming (Goatry):** Goats are raised for milk, meat, skin, and fiber. They require less land and resources compared to larger livestock.
 - Poultry Farming:** Focuses on the raising of chickens for eggs and meat. Poultry manure is a valuable organic fertilizer for crop farming.
 - Duck Farming:** Ducks are raised for meat, eggs, and feathers. Duckry is commonly integrated into fish farming.
 - Sheep Farming:** Sheep are reared for wool, milk, and meat. Sheep farming is often practiced in regions unsuitable for crop farming.
- **Integrated Livestock Systems:**
 - **Mixed Crop-Livestock Farming:** This is the most widespread farming system, where Livestock is integrated with crops. Animals graze on crop residues, and their manure improves soil fertility.
 - **Poultry cum Fish Farming:** Poultry droppings serve as feed for fish in integrated systems.

❖ Horticultural Crops

Horticulture includes the cultivation of fruits, vegetables, ornamental plants, and medicinal herbs. Horticultural crops are typically higher value crops and are crucial in enhancing income and nutrition for smallholder farmers.

• Key Components:-

- **Fruits:** Mango, banana, citrus, guava, papaya, apple, etc.
- **Vegetables:** Potatoes, tomatoes, cabbages, onions, okra, leafy greens, etc.
- **Ornamentals:** Flowers and plants grown for aesthetic purposes (roses, tulips, etc.).
- **Medicinal and Aromatic Plants:** Examples include turmeric, aloe vera, and lavender.

❖ Agroforestry Systems

Agroforestry refers to the intentional integration of trees and shrubs into crop and livestock farming systems. It provides ecological and economic benefits by improving soil fertility, water retention, carbon sequestration, and providing wood and nontimber forest products.

• Key Types of Agroforestry:

- **Silvo-Pastoral Systems:** Trees are integrated with livestock grazing areas. This system helps improve forage quality, provides shade, and contributes to ecosystem services.
- **Agro-Silviculture:** Integration of trees with crop production. For example, growing fruit or timber trees alongside cash crops or staples.
- **Agri-Horti-Forestry:** A system combining agriculture, horticulture, and forestry to enhance productivity and reduce risks.

❖ Aquaculture-Based Systems

Aquaculture is the farming of aquatic organisms like fish, shellfish, and aquatic plants. It is often integrated with other farming systems to utilize water and waste efficiently.

• Key Types of Integrated Aquaculture Systems:

- **Duck/Poultry cum Fish Farming:** This system involves raising ducks or poultry on platforms above fishponds. Duck/poultry droppings act as organic manure for the fishpond, promoting plankton growth (natural fish food).
- **Dairy cum Fish Farming:** In this system, cattle or buffaloes are raised near fish ponds, and the livestock waste is directed into the fishpond as organic fertilizer to promote fish production.

- **Piggery cum Fish Farming:** In this system, pigs are raised adjacent to fish ponds, and pig excrement is used as a nutrient source for aquatic organisms, enhancing fish growth.

- **Benefits of Integrated Aquaculture:**

- Improved efficiency of nutrient recycling (animal waste supports fish production).
- Enhanced farm income through the diversification of products (meat, eggs, fish).
- Reduced reliance on synthetic fertilizers and feeds for fish production.

❖ Special Integrated Farming Systems

These systems combine multiple components of agriculture (crops, livestock, aquaculture, etc.) to achieve sustainability, economic viability, and environmental conservation.

- **Examples of Special Integrated Systems:**

- **Rice-Fish Systems:** Rice paddies are used for growing both rice and fish. The fish help control pests in the rice fields and improve water quality by eating weeds and other harmful organisms.
- **Agro-Silvo-Pastoral Systems:** This involves the integration of crops, trees and livestock on the same land. Trees provide shade and fodder, crops provide food for humans and animals, and livestock provides manure to improve soil fertility.
- **Agri-Horti-Livestock Systems:** Combining agriculture, horticulture, and livestock farming to optimize land use and improve farm income.

❖ Small, medium and large enterprises including value chains and secondary enterprises as livelihood components of farmers.

- Farming is the primary source of income for millions of people worldwide, but increasingly, farmers are turning to small, medium, and large enterprises to diversify their livelihoods and increase economic resilience. These enterprises can range from small on-farm activities to participation in large-scale agribusinesses. By engaging in such enterprises, farmers can generate multiple income streams, reduce risk, and improve their overall economic stability.

❖ Small Enterprises as a Livelihood Component for Farmers

- **Definition:** Small enterprises are generally businesses that have fewer than 50 employees and modest revenue. For farmers, these are often on-farm or near-farm activities that require minimal investment but provide additional income.

❖ Medium Enterprises as a Livelihood Component for Farmers

- **Definition:** Medium enterprises generally have between 50 and 250 employees and generate moderate revenues. For farmers, medium enterprises typically involve more formalized business activities that are larger in scale and may involve external investment or partnerships.

❖ Value Chains in Agriculture

- An agricultural value chain encompasses all stages involved in bringing a product from the farm to the consumer, including inputs, production, processing, transportation, and marketing. Understanding the value chain is crucial for farmers to maximize their returns and sustainability.

• Primary Components of the Value Chain:

Input Suppliers: These enterprises supply farmers with seeds, fertilizers, pesticides, machinery, and other necessary materials.

- Small enterprises: Local agro-dealers.
- Medium enterprises: Regional input suppliers or cooperatives.
- Large enterprises: Multinational companies (e.g., Monsanto or John Deere).

Production: This involves growing crops or raising livestock.

- Small enterprises: Family farms or smallholder farmers.
- Medium enterprises: Commercial farms using modern technologies.
- Large enterprises: Large-scale agribusinesses.

Processing and Packaging: Adds value by transforming raw produce into consumable goods.

- Small enterprises: Local mills or dairy cooperatives.
- Medium enterprises: Regional processing plants (e.g., wheat mills, fruit canning factories).
- Large enterprises: Large agro-industries (e.g., Nestlé, Unilever).

• **Distribution:** Getting products from processing facilities to consumers.

- Small enterprises: Local vendors or small transportation services.

- Medium enterprises: Regional distributors, cooperatives.
- Large enterprises: Multinational distributors, retail chains.
- **Marketing and Retail:** Involves advertising, selling, and delivering products to the final consumers.
- Small enterprises: Farmers' markets, small shops.
- Medium enterprises: Regional supermarket chains.
- Large enterprises: Multinational retailers like Walmart or Carrefour.

❖ Secondary Enterprises as Livelihood Components for Farmers

- Secondary enterprises refer to businesses activities that farmers can engage in, in addition to their primary farming activities. These activities help diversify income sources and increase economic resilience.

• Examples of Secondary Enterprises:

- **Agri-tourism:** Farmers open their farms to tourists for activities such as farm stays, tours, and agricultural education. This offers both direct income and a marketing platform for farm products.
- **Processing of Farm Products:** Farmers can set up small-scale processing units (e.g., making jam, cheese, or dried fruit) to add value to their primary production.
- **Animal Husbandry:** Farmers can rear animals (e.g., chickens for eggs, goats for milk) alongside crop farming to generate additional income.
- **Crafts and Handicrafts:** Utilizing agricultural byproducts (e.g., straw, wood) to make and sell crafts.
- **Renewable Energy Production:** Farmers can produce bioenergy or invest in solar or wind energy installations, providing electricity to the grid or local communities.
- **Transport and Logistics:** Farmers can invest in small transport businesses to carry their own produce to market, reducing dependency on external logistics.
- **Input Supply and Equipment Leasing:** Farmers with extra equipment (e.g., tractors, harvesters) can rent these out to neighboring farmers, creating another revenue stream.

• Role of Enterprises in Supporting Farmer Livelihoods

- Different types of enterprises contribute to farmers' livelihoods in varied ways.

- **Small Enterprises:** Enable farmers to access locally available inputs at lower prices and provide personalized services (e.g., credit from local suppliers, small-scale marketing). These enterprises can foster close community ties.
- **Medium Enterprises:** Facilitate access to better technology, regional markets, and offer farmers opportunities for value added processing of their products (e.g., processing cooperatives, bulk transportation).
- **Large Enterprises:** Provide access to global markets, advanced agricultural technologies, and bulk-buying opportunities. However, large enterprises may also exert significant pressure on smaller farmers, sometimes leading to unfavorable power dynamics in contracts or pricing.

Challenges and Opportunities in Value Chains for Small holder Farmers

• Challenges:

- **Access to Finance:** Smallholder farmers often struggle to obtain affordable credit to invest in necessary inputs or technology.
- **Market Access:** Farmers may face challenges in accessing high-value markets due to logistical hurdles or lack of information.
- **Dependence on Middlemen:** Many small-scale farmers sell their produce through intermediaries who take a substantial cut of profits.
- **Infrastructure:** Poor infrastructure in rural areas can limit farmers' ability to process or transport goods.

• Opportunities:

- **Cooperatives and Farmer Associations:** Farmers can pool resources, reduce costs, and access larger markets by forming cooperatives. This strengthens their bargaining power.
- **Technology Adoption:** Digital platforms (e.g., mobile money, agri tech apps) allow farmers to access market prices, weather forecasts, and online sales, bypassing middlemen.
- **Sustainable Farming Practices:** Organic and fair-trade certifications offer farmers opportunities to access niche, high value markets.

• Small, medium, and large enterprises play crucial roles in supporting agricultural production and the livelihoods of farmers. While small enterprises provide localized services, medium and large enterprises drive regional and global market integration. Secondary enterprises give farmers additional income streams, boosting their resilience in a rapidly evolving agricultural economy. Effective integration of value chains and enterprise support systems is key to maximizing farmers' productivity and income potential.

❖ Factors Affecting the Integration of Various Enterprises of Farming for Livelihood

- The integration of different farming enterprises (such as crops, livestock, fisheries, agroforestry, and horticulture) is essential for creating a sustainable and diverse livelihood for farmers. The process of integrating these enterprises involves combining activities to optimize resource use, increase income, and reduce risks.

- **Environmental Factors:-**

Soil Quality: The type of soil available influences the crops that can be grown and the success of integrating livestock or agroforestry. For example, fertile soils may support multiple crops or trees that provide fodder for livestock, while poor soils may limit integration options.

Climate and Weather Conditions: Climate affects which crops, livestock, or fish can thrive in a region. For instance, dairy farming and fish farming may thrive in temperate regions, while dry areas may be better suited to drought-tolerant crops and hardy livestock.

Water Availability: Access to sufficient and reliable water is crucial for integrating farming systems such as crop production, livestock, and fisheries. Irrigation infrastructure and rainfall patterns directly impact integration, especially in water-intensive activities like horticulture and aquaculture.

Biodiversity and Ecosystem Health: A healthy ecosystem with diverse plant and animal species promotes natural pest control, soil fertility, and water conservation, creating better opportunities for integration of enterprises. Degraded ecosystems, on the other hand, limit options for farmers.

- **Economic Factors:-**

Market Access: The availability of local, regional, or international markets plays a significant role in the success of integrated farming systems. For instance, farmers may choose to focus on high-demand products (like dairy, fish, or organic vegetables) if they have access to markets that offer fair prices.

Capital and Investment: The initial cost of setting up integrated enterprises can be high, especially for infrastructure (e.g., irrigation systems, livestock pens, or fish ponds). Farmers with limited access to credit or financial resources may face challenges in adopting integrated systems.

Price Volatility: Fluctuations in the prices of agricultural products can affect the stability of income from integrated farming systems. Farmers may hesitate to invest in high-risk enterprises if there is uncertainty in product prices or demand.

- **Technological Factors:-**

Access to Modern Farming Technologies: Availability and adoption of modern technology (e.g., precision agriculture, improved seeds, artificial insemination for livestock, aquaculture innovations) greatly influence the integration of different farming enterprises. Efficient use of these technologies improves productivity and sustainability.

Mechanization: Mechanized farming tools and machinery can increase efficiency in integrating enterprises like crop-livestock farming. Lack of mechanization may limit integration potential, especially for smallholder farmers.

Knowledge and Skills: Farmers must have the technical know-how to manage multiple enterprises effectively. Training and extension services are critical to enable them to integrate crops, livestock, and fish production, as well as adopt modern farming practices.

Information and Communication Technology (ICT): ICT can support integration by providing farmers with real-time data on market trends, weather forecasts, and farming techniques. This helps in making informed decisions regarding enterprise integration.

- **Social and Cultural Factors:-**

Traditional Farming Practices: Some farming communities may rely on traditional, single-enterprise methods (e.g., subsistence farming) that resist integration. Changing these practices requires education, incentives, and community involvement.

Family Labor and Workforce: The availability of family labor or hired help affects the ability to manage multiple enterprises. Labor intensive enterprises, such as livestock or horticulture, may require more workforce, and successful integration depends on the capacity to meet labor demands.

Land Tenure and Ownership: Secure land ownership or long-term leasing arrangements encourage farmers to invest in diverse enterprises and adopt sustainable practices. In contrast, insecure land tenure limits long-term investment in integrated systems.

Gender and Social Roles: In many farming communities, gender roles influence enterprise integration. Women may focus on specific enterprises (like small livestock or horticulture), while men may dominate larger-scale or more mechanized enterprises. Promoting gender equality in access to resources can improve integration.

Cultural Preferences: Local preferences for certain crops or livestock also play a role in what enterprises are integrated.

Cultural Preferences: Local preferences for certain crops or livestock also play a role in what enterprises are integrated. Cultural significance attached to specific enterprises can affect the willingness to adopt others.

- **Policy and Institutional Factors:-**

Government Policies and Subsidies: Supportive government policies, subsidies, and incentives can encourage farmers to adopt integrated farming systems. Policies that promote crop diversification, agroforestry, and livestock integration, as well as access to credit, can boost integration.

Land Use Regulations: Zoning laws, environmental regulations, and land use policies can either promote or restrict the integration of enterprises. In some regions, laws may restrict activities like livestock farming or fish ponds, which limits integration opportunities.

Cooperatives and Farmer Organizations: Cooperative groups and farmer associations can provide resources, training, and market access, making it easier for farmers to adopt integrated systems. Institutional support helps share knowledge and resources among farmers.

Access to Extension Services: Availability of agricultural extension services that provide technical knowledge, support, and training on integrated farming practices is crucial. Without access to such services, farmers may not be able to effectively integrate enterprises.

Rural Infrastructure: Infrastructure such as roads, storage facilities, and energy access directly impact the ability of farmers to integrate enterprises and bring products to market.

- **Ecological Sustainability:-**

Natural Resource Management: Sustainable integration requires careful management of soil, water, and biodiversity to avoid depletion. Practices like crop rotation,

agroforestry, and conservation agriculture can enhance ecological sustainability while integrating various enterprises.

Environmental Impact: Enterprises like livestock farming and aquaculture can have negative environmental impacts (e.g., methane emissions, water pollution). Sustainable integration involves balancing productivity with ecological conservation, such as using organic practices or regenerative farming techniques.

Resilience to Climate Change: Integrated farming systems that include a mix of crops, livestock, and trees can provide greater resilience to climate change by diversifying risks. The success of integration will depend on the ability to adapt farming practices to changing environmental conditions.

- Integrating various enterprises in farming is a multifaceted approach that depends on environmental, economic, technological, social, cultural, and policy related factors. A successful integration strategy focuses on maximizing resource use, improving income diversity, and ensuring ecological sustainability. With proper planning and support, integrated farming systems can improve farmers livelihoods and make them more resilient to economic and environmental challenges.



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❖ UNIT : 4

Feasibility Of Different Farming Systems For Different agro-climatic Zones, Commercial Farming Based Livelihood Models By NABARD, ICAR And Other Organizations Across The Country.

❖ Feasibility of different farming systems for different agro-climatic zones

- The feasibility of farming depends on various agro systems climatic factors, such as temperature, rainfall, soil type, and topography, which influence crop types, productivity, and sustainability.

Tropical Wet and Humid Zone :

- **Characteristics:** High temperature (25-30°C), high humidity, and abundant rainfall (above 2000 mm annually).
- **Regions:** Parts of Southeast Asia, Central Africa, Amazon Basin.
- **Soil:** Generally acidic with low nutrient retention due to leaching.
- **Crops:** Rice, sugarcane, bananas, coffee, cocoa, rubber, oil palm.

Feasible Farming Systems:-

- **Plantation Agriculture:** High-value perennial crops like coffee, cocoa, oil palm, and rubber thrive, especially in commercial setups.
- **Intensive Mixed Farming:** With regular water availability, crop-livestock systems can maximize returns, balancing crop residues for livestock feed.
- **Rice-Fish Farming:** Wetlands in this zone are suitable for integrated rice-fish farming, benefiting from the high-water availability and supporting biodiversity.

Semi-Arid and Arid Zones

- **Characteristics:** Low rainfall (150-500 mm annually), high temperatures, and low soil moisture.
- **Soil:** Often sandy, poor in organic matter, prone to salinity.
- **Crops:** Drought-resistant crops like millets, sorghum, chickpeas, and pulses.

- **Dryland Farming:** Drought-resistant crops like millet, sorghum, and pulses are grown, focusing on conserving soil moisture.
- **Agro-Pastoralism:** Combining livestock with limited cropping (e.g., forage crops), using hardy breeds that can survive in sparse vegetation.
- **Rainfed Agriculture:** Crop selection is rain dependent, typically practicing soil conservation to retain moisture.

Sub-Humid and Moist Sub-Humid Zones

- **Characteristics:** Moderate rainfall (500-1500 mm), seasonal dry spells, moderate temperatures.
- **Regions:** Parts of Madhya Pradesh, Uttar Pradesh, Bihar, Jharkhand, West Bengal, Chhattisgarh, Odisha.
- **Soil:** Fertile alluvial and red soils, suitable for diverse crops.
- **Crops:** Rice, wheat, maize, pulses, oilseeds, sugarcane, cotton.
- **Mixed Farming:** Crop-livestock integration is common, especially in Uttar Pradesh and Bihar, where crops and livestock complement each other.
- **Integrated Crop-Livestock Systems:** Nutrient cycling with crop residues for animal feed in states like Chhattisgarh and Jharkhand.
- **Organic Farming:** Suitable for states like Sikkim (fully organic), and parts of Bihar and Madhya Pradesh, due to good soil and rainfall.

Temperate Zone

- **Characteristics:** Mild summers, cold winters, moderate rainfall (700-1500 mm).
- **Indian Regions:** Jammu & Kashmir, Himachal Pradesh, Uttarakhand.
- **Soil:** Rich in nutrients, suitable for temperate crops and horticulture.
- **Crops:** Apple, pear, walnut, wheat, barley, potatoes.
- **Commercial Horticulture:** Apples, pears, plums, and other temperate fruits are grown widely in Himachal Pradesh and Kashmir.
- **Dairy Farming:** Favorable for dairy production with improved breeds in hilly regions, utilizing available pastures.

- **Orchard Farming:** Ideal for apples, apricots, and walnuts, mainly in Himachal Pradesh and Kashmir valleys.

Mountain and Hilly Zones

- **Characteristics:** Varied altitudes, cold climates at higher elevations, seasonal rainfall.
- **Indian Regions:** Himalayan states (Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Arunachal Pradesh), Nilgiris in Tamil Nadu.
- **Soil:** Thin and fragile on slopes, fertile in valleys.
- **Crops:** Barley, maize, wheat, millet, tea, cardamom, saffron, medicinal plants.
- **Terrace Farming:** Common in Uttarakhand and Himachal Pradesh, helps prevent soil erosion, mainly for rice, wheat, and millets.
- **Horticulture:** Apple, peach, pear, and other fruits are cultivated in higher altitudes, especially in Kashmir and Himachal Pradesh.
- **Agroforestry:** Medicinal plant cultivation (e.g., saffron in Kashmir, herbs in Uttarakhand) alongside trees to conserve soil.
- **Pastoralism:** Sheep and goat rearing are common in the Himalayas, especially at higher altitudes.

Coastal Zones

- **Characteristics:** Moderate temperatures, high humidity, seasonal rainfall, saline soils in some regions.
- **Indian Regions:** Coastal areas of Kerala, Tamil Nadu, Andhra Pradesh, Odisha, West Bengal, Goa, and Maharashtra.
- **Soil:** Varies from fertile alluvial to saline soils in low-lying areas.
- **Crops:** Rice, coconut, sugarcane, groundnut, vegetables and salt-tolerant crops.
- **Aquaculture and Mariculture:** Brackish water fish and shrimp farming are prominent in Kerala, West Bengal, and Andhra Pradesh.
- **Rice-Fish Farming:** Integrated rice-fish systems thrive in flood-prone regions, especially in West Bengal and Odisha.

- **Coconut-Based Farming:** Kerala, Tamil Nadu, and Goa use coconut intercropped with fruits and spices for diversified income.
- **Salt-Tolerant Crop Farming:** Suitable in saline-affected coastal areas, with crops like saline-tolerant rice and vegetables.

• In India, the diverse agroclimatic zones make it suitable for a range of farming systems. Sustainable farming practices like agroforestry and conservation agriculture help mitigate climatic challenges and enhance productivity. Tailoring these systems to each zone's specific characteristics-such as dryland farming in arid areas like Rajasthan and aquaculture in coastal states like West Bengal-ensures resilience and optimal agricultural output. Each region can benefit from adaptive systems that match its rainfall, soil type, and temperature profile.

❖ Commercial Farming Based Livelihood Models by NABARD, ICAR and other Organizations across the Country.

- India's agricultural sector has seen numerous initiatives aimed at promoting commercial farming as means to enhance rural livelihoods, boost agricultural productivity, and reduce poverty. These initiatives are driven by government organizations like NABARD (National Bank for Agriculture and Rural Development), ICAR (Indian Council of Agricultural Research), state agricultural departments, and several NGOs and private organizations.

NABARD Initiatives in Commercial Farming

- NABARD plays a pivotal role in financing and promoting commercial farming models across India through schemes, subsidies, and loans.

Key models and initiatives include:

Integrated Watershed Management Program (IWMP):

- Launched in 2009 as a part of the Pradhan Mantri Krishi Sinchai Yojana (PMKSY).
- NABARD supports watershed projects to improve water availability and soil conservation.
- Focuses on improving agriculture and promoting crop diversification.
- Farmers are encouraged to adopt cash crops and high-value horticulture, boosting income levels.

Agri-Clinic and Agri-Business Centres (ACABC):

- Launched in 2002 by NABARD in partnership with MANAGE (National Institute of Agricultural Extension Management).
- NABARD provides support to trained agricultural graduates to set up Agri-Clinics and Agri-Business Centers.
- These centers assist farmers in crop planning, providing quality seeds, and linking them with markets for commercial crops like vegetables and fruits.

Model Bankable Projects:

- NABARD has developed model bankable projects for various commercial activities, such as dairy farming, poultry, mushroom floriculture, cultivation, and
- These projects provide detailed blueprints for loans and financial support to entrepreneurs willing to enter commercial farming.

NABARD's Rural Infrastructure Development Fund (RIDF):

- Launched in 1995-96.
- RIDF finances irrigation, roads, and marketing infrastructure, critical for the success of commercial farming.
- Enhances farmers' access to markets, increases land productivity, and supports high-value crops.

Farmer Producer Organizations (FPOs):

- NABARD started promoting FPOs as a formal initiative around Feb 2020.
- NABARD promotes FPOs that help small farmers aggregate produce and collectively market it.
- FPOs help smallholder farmers take part in commercial farming, thus improving their bargaining power and market access.

ICAR Initiatives

- **Krishi Vigyan Kendra (KVKs)** - First KVK was established in 1974.
- **All India Coordinated Research Projects (AICRP)**- First launched in 1967 and has since expanded to various domains of agriculture.
- AICRP is ICAR's collaborative research initiative that develops location-specific technologies in fields like horticulture, fisheries, poultry, and floriculture.
- Provides viable commercial farming models suited to different agro-climatic regions
- **National Agricultural Innovation Project (NAIP):**
 - NAIP focuses on value chain development in high-value commercial crops like vegetables, fruits, and medicinal plants.
 - Emphasizes post-harvest processing and market linkages, crucial for increasing farmers' profits.
- **Agri-Business Incubation Centres (ABIC):**
 - Established under ICAR's agribusiness development programs to nurture agri-startups in commercial farming.
 - Supports farmers and entrepreneurs with mentorship, technology, and funding to start ventures in commercial crops and livestock.

Government Schemes and State Initiatives

- **Pradhan Mantri Fasal Bima Yojana (PMFBY):**
 - Provides crop insurance to mitigate the risk in commercial farming. Covers crops such as cotton, soybeans, horticultural produce, and other high-value crops.
 - Launched in 2016.
 - Under the Pradhan Mantri Fasal Bima Yojana (PMFBY), the premium rates for crop insurance are as follows:
 - Kharif Crops: Farmers pay a premium of 2% of the sum insured.

- Rabi Crops: Farmers pay a premium of 1.5% of the sum insured.
- Horticultural and Commercial Crops: Farmers pay a premium of 5% of the sum insured.

- **National Horticulture Mission (NHM):**

- Focuses on promoting high-value horticultural crops (fruits, vegetables, spices, and floriculture).
- NHM supports the establishment of nurseries, provision of quality seeds, training, and infrastructure.
- Launched in 2005 as part of the National Horticulture Board's activities.

- **Mission for Integrated Development of Horticulture (MIDH):**

- Aims to increase the area under horticulture crops through commercial cultivation.
- Provides financial assistance for drip irrigation, greenhouses, and marketing of horticultural produce.

- **Dairy Entrepreneurship Development Scheme (DEDS):**

- Helps small farmers develop commercial dairy farms with assistance for breed improvement, quality feed, and milk processing.

Private Sector and NGO Models

- **Community-Based Agro-Enterprises by NGOs:**

- NGOs promote community-based agro-enterprises, such as Honey production, silk farming, and organic agriculture.
- These enterprises promote collective marketing and processing, enhancing commercial viability.

- **Public-Private Partnerships (PPP):**

- PPPs in agriculture involve private players working with government agencies to develop rural infrastructure, storage facilities, and markets. Common in high-value agriculture like horticulture, floriculture, and organic farming.

- **Benefits of Commercial Farming-Based Models**

- **Income Generation:** By promoting high-value livestock, these models improve farmers' income.
- **Employment Opportunities:** These models create rural employment in production, processing, and value addition. Market Linkages and Export Potential: Many initiatives provide export opportunities, especially in horticulture, organic farming, and floriculture.
- **Sustainability:** Focus on sustainable agriculture practices, including organic farming, water management, and soil health management.

- **Challenges and Limitations**

- **Lack of Awareness and Training:** Many small farmers need more information and training on commercial farming.
 - **Market Volatility:** Prices of commercial crops can be volatile, impacting farmers' income.
 - **Infrastructure Gaps:** Lack of infrastructure, particularly in remote areas, can affect productivity and market access.
 - **Financial Constraints:** Access to credit can be challenging for small and marginal farmers.
- **Conclusion:-** commercial farming-based livelihood models promoted by NABARD, ICAR, and other organizations have significantly impacted rural incomes, job creation, and agricultural productivity in India. With continued support, training, and market development, these models hold promise for transforming India's agriculture sector into a more profitable and sustainable industry.

--- Thank You ---



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➤ UNIT : 5

Risk & success factors in farming based livelihood systems, Schemes & programs by Central & State Government, Public & Private organizations involved in promotion of farming based livelihood opportunities.

Role of farming based livelihood enterprises in 21st Century in view of circular economy, green economy, climate change, digitalization & changing life style.

➤ Risk and success factors in farming based livelihood systems.

• Introduction to Farming-Based Livelihood Systems:

- Farming-based livelihoods refer to agricultural practices that provide sustenance and income to farmers and their families.
- These systems often include crops, livestock, fisheries, agroforestry, and mixed farming.
- They form the backbone of rural economies, particularly in developing countries, contributing significantly to food security and income generation.

➤ Risk Factors in Farming-Based Livelihoods:

Farming-based livelihoods face numerous risks that can impact productivity and income. These risks are categorized as natural, economic, social, and political.

• Environmental and Climate Risks:

Climate Change: Altered weather patterns, rising temperatures, droughts, and flooding can disrupt planting and harvesting cycles.

Extreme Weather Events: Hurricanes, cyclones, storms, and unseasonal frosts can lead to crop and livestock loss.

Pests and Diseases: Outbreaks affecting crops and livestock can cause massive yield losses. Examples include locust swarms and diseases like foot-and-mouth in livestock.

Soil Degradation: Poor farming practices, erosion, and deforestation can lead to reduced soil fertility and productivity.

• Economic Risks:

Market Fluctuations: Volatile prices of crops and livestock can make incomes unpredictable.

Farming Based Livelihood Systems Notes By Akhil Agriculture

Input Costs: Rising costs of fertilizers, seeds, animal feed, and fuel can limit profitability.

Access to Credit: Limited or expensive access to financial resources hinders the ability to invest in better farming practices and technologies.

Global Trade Policies: Shifts in tariffs, subsidies, and trade agreements can impact the competitiveness of farm products.

- **Social and Human Risks:**

Labor Shortages: Migration to urban areas and aging farming populations can reduce available labor.

Education and Skill Levels: A lack of technical knowledge in modern agricultural practices and sustainable farming reduces efficiency.

Health Risks: Farmers' exposure to chemicals and inadequate healthcare can lower productivity and family income.

- **Political and Institutional Risks:**

Land Tenure Insecurity: Unclear or weak land rights can discourage farmers from investing in land improvements.

Government Policies: Inconsistent agricultural policies, inadequate support for farmers, and corruption can stifle growth.

Subsidy Reduction: Removal or reduction of agricultural subsidies can increase production costs.

- **Technological Risks:**

Access to Technology: Limited availability or high cost of modern tools and machinery can prevent farmers from improving efficiency.

Technology Gaps: Inconsistent adoption of innovative farming practices can result in productivity gaps between different regions.

➤ **Success Factors in Farming-Based Livelihoods:**

Successful farming requires a combination of favorable conditions, strategic practices, and supportive policies. Key success factors include:

- **Adoption of Sustainable Agricultural Practices:**

Crop Diversification: Growing multiple crops reduces dependency on a single source of income and spreads risk.

Integrated Pest Management (IPM): Combines biological, cultural, and chemical practices to control pest populations with minimal environmental impact.

Conservation Agriculture: Techniques such as reduced tillage, crop rotation, and mulching help maintain soil health and water retention.

- **Access to Markets and Value Chains:**

Market Integration: Ensures farmers can sell their produce at fair prices and access local and international markets.

Value Addition: Processing agricultural products(e.g., turning milk into cheese) can significantly increase income.

Cooperatives and Farmer Groups: Collective bargaining for inputs and market prices can empower farmers.

- **Technological Innovation and Adoption:**

Mechanization: Adoption of tractors, automated irrigation systems, and harvesters increases efficiency.

Precision Farming: Use of GPS and satellite technology for soil and crop monitoring allows more efficient resource use.

Mobile and Digital Tools: Apps that provide weather forecasts, market prices, and best practices enhance decision-making.

- **Strong Infrastructure and Support Systems:**

Irrigation Systems: Reliable water supply systems enable farmers to cultivate throughout the year.

Storage Facilities: Proper storage reduces postharvest losses and allows farmers to sell when market conditions are favorable.

Transportation Networks: Access to roads and transport vehicles facilitates the movement of goods to markets.

- **Access to Financial Services:**

Microfinance and Credit: Availability of loans and credit helps farmers invest in seeds, equipment, and technology.

Insurance Schemes: Agricultural insurance can protect against losses from weather events and pests.

Government Subsidies: Support for seeds, fertilizers, and farming equipment can bolster productivity.

- **Education and Capacity Building:**

Training Programs: Workshops and training for farmers on sustainable practices, market analysis, and business management can improve outcomes.

Extension Services: Government or NGO provided advisory services bridge the gap between research institutions and farmers.

- **Policy and Institutional Support:**

Effective Land Reform: Ensures farmers have secure ownership and rights to land.

Investment in Research and Development: Funding agricultural research leads to better seeds, practices, and technology.

Subsidies and Support Programs: Government policies that include subsidies for essentials (e.g., fertilizers) and infrastructure investments encourage farming growth.

- **Strategies to Manage and Mitigate Risks:**

Diversified Income Streams: Including alternative income sources like agro-tourism, handicrafts, or seasonal employment.

Risk-Sharing Mechanisms: Participation in community-based insurance and cooperative saving schemes.

Sustainable Water Management: Collecting and using rainwater efficiently can mitigate drought impact.

Disaster Preparedness and Response Plans: Community and individual farmer plans for disaster response reduce long-term damage.

➤ Schemes and Programs by Central and State Government, Public and Private Organizations Involved in Promotion of Farming Based Livelihood System.

➤ Central Government Schemes and Programs:

- **PM-Kisan (Pradhan Mantri Kisan Samman Nidhi Yojana)**

Objective: Direct income support to farmers.

Features:

Provides 36,000 per year to small and marginal farmers in three equal installments.

Beneficiaries: Farmers owning up to 2 hectares of cultivable land.

- **PMFBY (Pradhan Mantri Fasal Bima Yojana)**

Objective: Crop insurance against natural calamities, pests, and diseases.

Features:

Farmers pay a minimal premium (2% for Kharif, 1.5% for Rabi, 5% for commercial crops).

Government shares the remaining premium cost.

- **RKVY-RAFTAAR (Rastriya Krishi Vikas Yojana)**

Objective: Holistic development of the agricultural sector.

Features:

Allocates funds to states based on their agriculture performance.

Focus on farm mechanization, organic farming, and skill development.

- **National Mission on Sustainable Agriculture (NMSA)**

Objective: Promote climate-resilient farming systems.

Submissions under NMSA:

Soil Health Management (SHM).

Rainfed Area Development (RAD).

Agroforestry Mission.

- **National Food Security Mission (NFSM)**

Objective: Increase production of rice, wheat, pulses and coarse cereals.

Features: Provides subsidies on seed distribution, training, and machinery.

▪ Ministry of Rural Development Initiatives:

- **MGNREGA (Mahatma Gandhi National Rural Employment Guarantee Act)**

Objective: Provide livelihood security through employment.

Features: Allows creation of water conservation structures like ponds, wells, and check dams, which benefit agriculture.

- **National Rural Livelihoods Mission (NRLM)**

Objective: Promote self-employment and skill development in rural areas.

Linkages: Encourages farming-based microenterprises and women-led self-help groups(SHG).

▪ Ministry of Fisheries, Animal Husbandry, and Dairying:

- **National Livestock Mission**

Objective: Increase productivity in animal husbandry, dairying, and fisheries.

Features: Supports breed improvement, fodder development, and processing units.

- **PM Matsya Sampada Yojana**

Objective: Promote the Blue Revolution by improving fish production.

Features: Focuses on aquaculture, cold storage, and market linkages.

➤ State Government Initiatives:

➤ Public Sector Organizations and Bodies:

- **NABARD (National Bank for Agriculture and Rural Development)**

Focus Areas:

Infrastructure Development: Provides funding for irrigation, warehouses, and rural roads.

Farm Producer Organizations (FPOs): Supports collective farming models.

Rural Innovation: Promotes agritech solutions.

- **ICAR (Indian Council of Agricultural Research)**

Activities:

Research in crop improvement and animal sciences.

Dissemination of new technologies to farmers via Krishi Vigyan Kendra (KVKs).

- **Agricultural Skill Council of India (ASCI)**

Role:

Conducts skill development programs.

Certification of farmers and agricultural workers in modern

➤ Private Sector and NGOs

- **ITC Limited: e-Choupal**

Objective: Provide market linkages and real-time information to farmers.

Features: Enables better price realization through direct procurement.

- **Mahindra Agri Solutions**

Focus Areas:

High-yield seeds.

Mechanized equipment (tractors, harvesters).

Farm advisory services.

➤ NGOs and Social Enterprises

- **BAIF Development Research Foundation**

Focus: Sustainable rural livelihoods via livestock and watershed development.

- **Self Employed Women's Association (SEWA)**

Encourages women-led farming cooperatives.

- **Digital Green**

Uses ICT tools to promote agricultural practices.

➤ Key Focus Areas in Promotion of Farming Based Livelihoods:

- **Financial Assistance**

Subsidized credit and low-interest loans from, institutions like NABARD, cooperative banks, and regional rural banks.

- **Technology Promotion**

Use of Artificial Intelligence (AI), IoT, and drones for precision farming.
Soil testing laboratories under SHM programs.

- **Capacity Building**

Farmer training programs conducted by KVKs, NGOs, and ASCI.

- **Infrastructure Development**

Cold storage, market linkages, and transport facilities under schemes like PM-Agriculture Infrastructure Fund.

- **Diversification of Livelihoods**

Integration of fisheries, poultry, and bee keeping with traditional agriculture.



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➤ Role of farming based livelihood enterprises in 21st century in view of circular economy, green economy, climate change, digitalization and changing life style.

The 21st century has witnessed transformative changes in global economies and lifestyles, which have greatly influenced the role of farming-based livelihood enterprises. These enterprises must adapt to emerging trends, including the circular economy, green economy, climate change mitigation, digitalization, and evolving lifestyles.

- **Circular Economy and Farming-Based Enterprises:**

The Circular economy emphasizes reducing waste, reusing resources, and regenerating natural systems. Farming-based enterprises play a critical role by:

Utilizing Bio-Waste: Converting agricultural residues into compost, bioenergy, or animal feed to minimize waste and enhance resource efficiency.

Adopting Regenerative Practices: Using crop rotations, agroforestry, and conservation agriculture to restore soil health and biodiversity.

Promoting Closed-Loop Systems: Integrating crop and livestock systems where waste from one becomes a resource for the other.

Recycling Water: Utilizing treated wastewater or rainwater harvesting to ensure sustainable water use.

- **Green Economy and Sustainable Farming:**

The green economy prioritizes low-carbon, resource-efficient, and socially inclusive growth. Farming-based enterprises contribute by:

Producing Renewable Energy: Utilizing solar panels, wind turbines, and biomass energy solutions on farms.

Cultivating Organic Crops: Avoiding chemical fertilizers and pesticides, promoting eco-Friendly products for healthier ecosystems.

Sustainable Supply Chains: Reducing the carbon footprint through local sourcing and short food supply chains.

Biodiversity Conservation: Preserving traditional crop varieties and protecting natural habitats.

Eco-Labeling: Encouraging consumer preference for sustainable products through certification like organic, fair trade, and carbon-neutral farming.

- **Climate Change and Farming Enterprises:**

Climate change poses both challenges and opportunities for farming-based enterprises. Their role includes:

Climate-Smart Agriculture: Implementing practices like drip irrigation, drought-resistant crops, and precision farming to cope with climate variability.

Carbon Sequestration: Using techniques like agroforestry, cover cropping, and no-till farming to capture atmospheric carbon.

Disaster Resilience: Building infrastructure and systems to adapt to extreme weather events, such as flood-resistant crops and improved drainage systems.

Promoting Agroecology: Strengthening the resilience of ecosystems through diverse, interdependent farming systems.

Contributing to Carbon Markets: Participating in carbon credit programs by reducing emissions or increasing sequestration.

- **Digitalization in Farming Enterprises:**

The integration of technology is revolutionizing farming-based livelihood enterprises, enabling higher efficiency, sustainability, and profitability.

Precision Agriculture: Using, drones, sensors, and GPS technologies to monitor and optimize crop performance.

Digital Marketplaces: Empowering farmers to sell produce directly to consumers, reducing intermediaries and increasing income.

Data-Driven Decisions: Leveraging big data and AI to predict weather, optimize irrigation and improve yields.

Blockchain for Traceability: Ensuring transparency in food supply chains to build consumer trust.

Remote Monitoring: Managing farms through IoT-enabled devices, reducing the need for on-site interventions.

Fintech Innovations: Providing farmers access to microloans and crop insurance via mobile platforms.

- **Changing Lifestyles and Consumer Preferences:**

Modern lifestyles are characterized by an increasing awareness of health, sustainability, and convenience, which influences farming enterprises:

Demand for Organic and Natural Products: Catering to health-conscious consumers with chemical-free and minimally processed food.

Urban Agriculture: Supporting vertical farming, hydroponics, and rooftop gardening to meet the needs of urban populations.

Value-Added Products: Producing processed or semi-processed foods like juices, packaged snacks, and organic condiments.

Customization and Delivery: Adopting direct-to-consumer models with personalized options and subscription-based services.

Functional Foods and Superfoods: Meeting demands for nutrient-rich foods like quinoa, spirulina, and chia seeds.

- **Social and Economic Impact of Farming Enterprises:**

Farming enterprises significantly impact rural livelihoods, employment, and community development:

Job Creation: Providing employment opportunities in production, processing, marketing, and distribution.

Empowering Women and Youth: Engaging marginalized groups in agribusiness ventures, particularly through skill development and entrepreneurship.

Inclusive Growth: Promoting cooperative farming models and ensuring equitable profit distribution.

Strengthening Rural Economies: Boosting local economies by creating backward and forward linkages with industries.

- **Challenges:**

Limited access to technology and financial resources for smallholder farmers.

Vulnerability to climate shocks and market volatility.

Resistance to adopting new sustainable practices.

- **In conclusion**, farming based enterprises are livelihood central to achieving sustainable development goals in the 21st century. By embracing circular and green economy principles, addressing climate change, leveraging digital technologies, and adapting to changing lifestyles, these enterprises can ensure economic growth, environmental sustainability, and social inclusivity.



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